

**PALM BEACH COUNTY
BOARD OF COUNTY COMMISSIONERS**

AGENDA ITEM SUMMARY

Meeting Date: March 17, 2020 [] Consent [X] Regular
 [] Ordinance [] Public Hearing
 Department: Palm Tran

I. EXECUTIVE BRIEF

Motion and Title: Staff recommends motion to approve: The Fare Collection System contract with Genfare, a Division of SPX Corporation, in the amount of \$10,912,988.64, effective March 17, 2020 for a ten (10) year term with two (2) three (3) year options for renewal.

Summary: On May 15, 2019, Palm Tran issued a Request for Proposal (RFP) for a new Fare Collection System (FCS) for its Fixed Route Bus Services. Palm Tran received two (2) proposals to the RFP. Genfare was selected as the successful bidder for the installation of the new FCS. Genfare will be responsible for all services, labor, supervision, materials, documentation, development, installment, testing and training of a fully integrated FCS that supports and facilitates Palm Tran's business operation. The capital funding for this project is being provided through the Palm Beach County Transportation Planning Agency (TPA) and the Federal Transit Administration (FTA) Section 5307 Formula grant. The total contract amount is \$10,912,989 which consists of a base cost of \$6,358,771 for the system equipment and installation. The contract includes on-going Operations and Maintenance support costs for ten (10) years, \$84,048 for the first year's cloud hosting, with two (2) optional three (3) year extensions, totaling \$4,466,804 if all sixteen (16) years are utilized. The Disadvantaged Business Enterprise (DBE) participation percentage of this contract is 6.3%.

The contract contains an indemnification provision that differs from the County's standard requirements. In accordance with PPM CW-F-049, the Department of Risk Management and the County Attorney's Office have negotiated with Genfare and agreed to limit Genfare's indemnification to the County to the extent arising out of Genfare's negligent, reckless, intentional, malicious or wrongful acts or omissions. The contract also contains a limitation of liability for Genfare at an amount not-to-exceed of \$16,280,661.

The new, state-of-the-art FCS will provide Palm Tran with 165 new validating fareboxes, 22 ticket vending machines, 6 agency point of sale machines, testing/ maintenance/ training equipment and back office software that supports account-based sales, mobile applications, inventory management, revenue management and website purchases. It will also include 600 retailers within the point of sell network, those of which will be dispersed geographically across Palm Beach County to ensure accessibility. The FCS will also allow interoperability with the South Florida region, including, but not limited to Broward County Transit, Miami-Dade Transit and South Florida Regional Transit Authority (Tri-Rail), which will foster a more efficient transfer between systems.

Palm Tran is scheduled to complete the installation of 165 fareboxes and 22 ticket vending machines in August 2020. The implementation of mobile ticketing and retail outlet sales will follow in September 2020. Additionally, fare capping, fully functional account based set-up will be implemented by September 2020. All open payment options (i.e. contactless credit/debit cards, Apple Pay and Google Pay) will be implemented the First Quarter of 2021. Fare capping will ensure the rider never pays more than the lowest fare structure for a particular period of time. The new FCS will assist Palm Tran with implementing a Regional Interoperability program by Fall 2020. The contract requires a separate payment processing agreement to be brought back to the BCC for execution. If the payment processing agreement cannot be negotiated within 90 days from execution of this contract, the Executive Director of Palm Tran is authorized to extend the 90 day time period to continue negotiating the payment processing agreement. Countywide (DR)

(Background and Policy Issues on page 3)

Attachment(s): 1. Fare Collection System Contract with Genfare (3 originals)

Recommended By: _____
Executive Director
Date: 2/20/2020

Approved By: _____
Assistant County Administrator
Date: 3/10/2020

II. FISCAL IMPACT ANALYSIS

A. Five Year Summary of Fiscal Impact:

Fiscal Years	2020	2021	2022	2023	2024
Capital Expenditures	\$6,358,771				
Operating Costs	\$84,048**	\$86,569*	\$89,167*	\$91,842*	\$94,597*
External Revenues	(\$6,442,819)				
Program Income(County)					
In-Kind Match(County)					
NET FISCAL IMPACT	\$0	\$86,569	\$89,167	\$91,842	\$94,597
#ADDITIONAL FTE					
POSITIONS (CUMULATIVE					

Is Item Included in Current Budget?	<u>Yes</u>	No
Does this item include the use of federal funds?	Yes	No

Budget Account No:

Fund	Agency	Organization	Object
1341/1340	540/542	Various	Various

B. Recommended Sources of Funds/Summary of Fiscal Impact:

Federal Transit Administration and Transportation Planning Agency funds are included in Palm Tran's Capital Budget (Fund 1341). Operations and Maintenance costs will be included in future operating budgets (Fund 1340). The 10-year operations and maintenance costs, with the two 3-year extension options, are related to hosting and software maintenance (\$1,694,146) and on-call support – as needed (\$2,772,658).

*Operating costs listed on fiscal impact are contractually required cloud hosting (\$84,048 first year) and do not include optional expenses for software escrow (\$51,414), warehouse storage (\$36,000) or on-call support.

** Does not include optional on-call support which is indeterminable at this time

C. Departmental Fiscal Review: Carol Richmond
Carol Richmond, Interim Director Administrative Services

III. REVIEW COMMENTS:

A. OFMB Fiscal and/or Contract Dev. and Control Comments:

Robert Lewis 2/24/2020
2/2/20 OFMB

Contract Dev. & Control

B. Legal Sufficiency

Anne Delgado 3-10-2020
Assistant County Attorney

C. Other Department Review

Department Director

(**Background and Policy Issues** continued from Page 1)

Background and Policy Issues: Palm Tran has utilized the same Fare Collection System since 2007. In 2015, the Executive Director evaluated the feasibility of an existing plan for the FCS because it only contemplated an interoperability solution for transit systems in the region, and did not include implementation of a new FCS for Palm Beach County residents and visitors. The current GFI Odyssey fareboxes have an outdated magnetic stripe media that accepts only bills and coins, which severely limits the functionality of modern technology that has been adopted by other local transit agencies. Palm Tran's current hardware and software backend systems are approaching the end of their useful life and will not be supported by the manufacturer in the near future. In March 2017, Palm Tran hired Lumenor, a fare technology consultant, to closely examine the current system and provide options on implementing a state of the art FCS for Palm Beach County and a strategy for interoperability. Lumenor completed a fare system review and assessment in June 2017 and developed a strategic plan for a new fare system in January 2018.

Following Lumenor's assessment, Palm Tran contracted with Intueor in February 2019 to develop the technical specifications of the scope of work and assist Palm Tran throughout the development of the Request for Proposal (RFP) and selection process. Intueor will continue to assist with vendor oversight during the installation and community outreach phase of the FCS replacement. Intueor will also facilitate the development of the Regional Operating Rules for the interoperability phase with the other partner agencies throughout the South Florida region.

The new FCS will allow Palm Tran to offer a variety of new programs for our ridership, such as fare capping, retail outlet sales, replacement of lost or damaged account-based passes, and inclusion of 7-Day and 3-Day passes. Palm Tran intends to bring before the Board a fare structure agenda item containing such programs in the upcoming months ahead of implementation. Additionally, this system will allow riders to pay their fare with a smart phone, credit/debit cards, Smart Card and cash (except pennies).

**CONTRACT FOR
FARE PAYMENT & COLLECTION SYSTEM
(Contract No. F-19-056/SS)**

This Contract No. F-19-056/SS is made as of this ____ day of _____, 2020, by and between Palm Beach County, a political subdivision of the State of Florida, by and through its Board of Commissioners, hereinafter referred to as the COUNTY, and Genfare, a division of SPX Corporation, 800 Arthur Avenue, Elk Grove Village, IL 60007, a corporation authorized to do business in the State of Florida, hereinafter referred to as the CONTRACTOR.

In consideration of the mutual promises contained herein, the COUNTY and the CONTRACTOR agree as follows:

ARTICLE 1 - SERVICES

The CONTRACTOR's responsibility under this Contract is to provide a new Account-Based Transportation Fare Payment and Collection System, herein known as "FARE SYSTEM", to COUNTY for its public transit system known as "Palm Tran" in accordance with Exhibit A, Scope of Work/Services, and Exhibit B, CONTRACTOR's proposal dated July 17, 2019, both of which are attached hereto and incorporated herein, and all other terms and conditions of this Contract, including but not limited to those set forth in RFP No. F-19-056/SS and all Amendments thereto (RFP No. 19-056/SS and all Amendments thereto may also be referred to herein as RFP No. 19-056/SS). COUNTY's public transit system is operated by Palm Tran, Inc., a not for profit corporation and instrumentality created and controlled by COUNTY (also referred to herein as "Palm Tran").

The COUNTY's representative/liaison during the performance of this Contract shall be Clinton B. Forbes, Executive Director, telephone number (561) 841-4205 or designee.

The CONTRACTOR's representative/liaison during the performance of this Contract shall be Sabeena Haridas, Senior Program Manager, telephone number (224) 434-8263 or designee.

ARTICLE 2 - ORDER OF PRECEDENCE

Conflicting provisions hereof, if any, shall prevail in the following descending order of precedence: (1) Laws passed by Congress, which are codified in provisions of the United States Code (U.S.C.) applicable to the funding source for this Solicitation; (2) Rules or regulations adopted by a federal agency, which are codified in the Code of Federal Regulations (C.F.R) and applicable to the funding source for this Solicitation; (3) the federal award or funding document for this Solicitation; (4) the SuperCircular, inclusive of 2 C.F.R. 200.317 – 200.326; (5) Palm Beach County Code 2-51 – 2-58; (6) the provisions of the Contract, including Exhibit A; (7) the provisions of RFP No. F-19-056/SS and all Amendments thereto, which are incorporated into and made a part of this Contract; (8) Exhibit B, CONTRACTOR's proposal dated July 17, 2019; and (9) all other documents, if any, cited herein or incorporated herein by reference.

ARTICLE 3 - SCHEDULE

The CONTRACTOR shall commence services on March 17, 2020; deliver all items defined as the Base System, which comprises all items composing and associated with the FARE SYSTEM within the period as defined in Attachment A, to Exhibit B, CONTRACTOR's Proposal, Detailed Price Page, Tab 1 and Tabs 1A through 1D, and Attachment A, Payment Milestones of Exhibit A, Scope of Work/Services; and complete all post warranty services by March 16, 2030. CONTRACTOR hereby grants to COUNTY the option to renew and continue the Genfare Link subscription services and support services for up to two (2) additional three (3) year periods at the same price, terms and conditions established in this Contract. Such renewals will be at the sole discretion of the COUNTY and COUNTY will give notice to CONTRACTOR of COUNTY's exercise of each option and intent to renew and continue the services at least sixty (60) days prior to the end of the then-current term.

Reports and other items shall be delivered and/or completed in accordance with Exhibit A.

ARTICLE 4 - PAYMENTS TO CONTRACTOR

- A. The total amount to be paid by the COUNTY under this Contract for all services and materials shall not exceed a total contract amount of Ten Million Nine Hundred Twelve Thousand Nine Hundred Eighty-Eight Dollars and Sixty-Four cents (\$10,912,988.64); comprised of Six Million Three Hundred Fifty-Eight Thousand Seven Hundred Seventy-One Dollars and Five cents (\$6,358,771.05), for the Base System Cost; Four Million Four Hundred Sixty-Six Thousand Eight Hundred Three Dollars and Fifty-Nine cents, (\$4,466,803.59), for the Operations and Maintenance Costs and Eighty-Seven Thousand Four Hundred Fourteen Dollars and no cents (\$87,414.00) for Options Costs.

Payment of the Base System Cost is defined by Attachment A, Payment Milestones of Exhibit A, Scope of Work/Services. Payment of any software subscriptions and support services shall be paid as specified in the applicable subscription and/or support agreement.

At the sole discretion of the COUNTY, for the options listed in Attachment A, Exhibit B, CONTRACTOR's Proposal, Detailed Price Page, Tab 4, the COUNTY will notify the CONTRACTOR whether it will exercise any of the listed options no less than sixty (60) days prior to the start of the Warranty Period.

- B. CONTRACTOR shall send ALL ORIGINAL invoices to: PALM BEACH COUNTY FINANCE DEPT., P.O. BOX 4036, WEST PALM BEACH, FL 33402-4036, with a copy to the COUNTY's representative. Invoices received from the CONTRACTOR pursuant to this Contract will be reviewed and approved by the COUNTY's representative, indicating that services have been rendered in conformity with the Contract. Approved invoices will be sent to the Finance Department for payment. Invoices will normally be paid within thirty (30) days following approval by the COUNTY's representative. Invoices submitted on carbon paper shall not be

accepted. In order for the COUNTY to make payment, the CONTRACTOR must ensure that the following information included on Appendix B, Business Information, of Exhibit B, CONTRACTOR's proposal, must be exactly the same as it appears on the invoice and in the COUNTY's Vendor Self Service System which can be accessed at: <https://pbcvssp.co.palm-beach.fl.us/webapp/vssp/AltSelfService>; Vendor's Legal Name, Vendor's Address, and Vendor's TIN/FEIN Number.

- C. Final Invoice: In order for both parties herein to close their books and records, the CONTRACTOR will clearly state "final invoice" on the CONTRACTOR's final/last billing to the COUNTY. This shall constitute CONTRACTOR's certification that all services have been properly performed and all charges and costs have been invoiced to the COUNTY. Any further charges, if not properly included on this final invoice, are waived by the CONTRACTOR.

ARTICLE 5 - PALM BEACH COUNTY OFFICE OF THE INSPECTOR GENERAL AUDIT REQUIREMENTS

Pursuant to Palm Beach County Code, Section 2-421 - 2-440, as amended, Palm Beach County's Office of Inspector General is authorized to review past, present and proposed COUNTY contracts, transactions, accounts, and records. The Inspector General's authority includes, but is not limited to, the power to audit, investigate, monitor, and inspect the activities of entities contracting with the COUNTY, or anyone acting on their behalf, in order to ensure compliance with contract requirements and to detect corruption and fraud. Failure to cooperate with the Inspector General or interfering with or impeding any investigation shall be a violation of Palm Beach County Code, Section 2-421 – 2-440, and punished pursuant to Section 125.69, F.S., in the same manner as a second degree misdemeanor.

ARTICLE 6 - TRUTH-IN-NEGOTIATION CERTIFICATE/MOST FAVORED CUSTOMER

Signature of this Contract by the CONTRACTOR shall also constitute the execution of a truth-in-negotiation certificate certifying that the wage rates, over-head charges, and other costs used to determine the compensation provided for in this Contract are accurate, complete, and current as of the date of the Contract and no higher than those charged the CONTRACTOR's most favored customer for the same or substantially similar service in the same or substantially similar quantities and on comparable terms.

The said rates and costs shall be adjusted to exclude any significant sums should the COUNTY determine that the rates and costs were increased due to inaccurate, incomplete, or noncurrent wage rates or due to inaccurate representation(s) of fees paid to outside contractors. The COUNTY shall exercise its rights under this Article 6 within three (3) years following final payment.

Furthermore, the CONTRACTOR warrants that the price(s) shall not exceed the CONTRACTOR's price(s) extended to its most favored similarly situated customer for the same or similar goods or services in similar quantities, or the current market price,

whichever is lower. In the event the CONTRACTOR offers more favorable pricing to one of its customer(s) purchasing the same or similar goods or services in similar quantities on comparable terms, the CONTRACTOR shall extend to the COUNTY the same pricing or the then current market price, whichever is lower.

ARTICLE 7 - PERFORMANCE BOND

The CONTRACTOR, at its sole cost and expense, shall furnish to the COUNTY, a Performance Bond or Clean Irrevocable Letter of Credit (Letter of Credit) in the amount of five percent (5%) of the Contract amount, prior to commencement of work, and shall keep the same in force and effect until the end of the warranty period. At its sole cost and expense and no less than sixty (60) days prior to the conclusion of the warranty period, CONTRACTOR shall provide to COUNTY a maintenance bond, in the amount of \$250,000, which shall be kept in full force and effect during the entire term of this Contract.

The CONTRACTOR shall furnish a Performance Bond in a form and format satisfactory to the COUNTY as security for the faithful performance of the Contract resulting from the award of RFP No. F-19-056/SS and for the payment of all costs incurred by the COUNTY to obtain a replacement contract, in the event CONTRACTOR fails to perform as required under said Contract. The term "COST" as used herein shall include all fees, costs, and expenses arising out of the failure to perform the contract and shall include attorney's fees and costs, expert witness fees and expenses, and all time incurred by Palm Beach COUNTY. In addition, the Performance Bond shall fully comply with the COUNTY's requirements and format as set forth in Palm Beach COUNTY PPM #CW-F-056, the terms of which are incorporated herein by reference. The Maintenance Bond shall be in a form and with terms and conditions acceptable to COUNTY and shall conform in material respects to COUNTY'S requirements regarding the Performance Bond.

The Performance Bond is to ensure the faithful performance of all the requirements of the Contract (RFP No. F-19-056/SS), and to compensate the COUNTY from any and all damages, costs, fees, and expenses, caused by CONTRACTOR'S failure to perform the Contract. The Maintenance Bond is security for CONTRACTOR'S faithful performance of its duties and obligations under the Contract after the conclusion of the warranty period and to compensate the COUNTY from any and all damages, costs, fees, and expenses, caused by CONTRACTOR'S failure to perform said duties and obligations. The bonds shall be issued by a company authorized to do business in the State of Florida and having a currently valid certificate of authority and bonding capacity as issued by the United States Department of Treasury under 31.U.S.C. 9304-9308. Bond Company shall meet all requirements/regulations set forth under the Florida Insurance Commissioner's Office. CONTRACTOR shall verify, prior to execution of the Contract, the acceptability of the surety provided thereunder. The attorney-in-fact who signs each bond must file, with the Bond, a certificate and effective dated copy of power of attorney. CONTRACTOR must furnish the executed Performance Bond prior to the COUNTY's approval of Contract.

A cash deposit, or certified check, or Clean Irrevocable Letter of Credit, from a financial institution with a rating deemed acceptable by the COUNTY, may be provided in lieu of the Performance Bond provided that the form, format, and terms of coverage are acceptable to the COUNTY. The terms of coverage of an Irrevocable Letter of Credit shall be

substantially the same as that required of the Performance Bond, and the Letter of Credit shall be issued by an institution that offers security similar to that of a bonding company. In addition, the Letter of Credit shall fully comply with the COUNTY's requirements set forth in Palm Beach County PPM #CW-F-055; and, the face of the Letter of Credit shall be in the format described in PPM #CW-F-055, the terms of which are incorporated herein by reference. In the event of any conflict between the terms of the RFP and PPM #CW-F-055, the latter shall control.

ARTICLE 8 - TERMINATION

- A. This Contract may be terminated by the CONTRACTOR upon sixty (60) days prior written notice to the COUNTY in the event of substantial failure by the COUNTY to perform in accordance with the terms of this Contract through no fault of the CONTRACTOR.
- B. This Contract may also be terminated, in whole or in part, by the COUNTY, **with cause** if upon receiving written notice, pursuant to Article 35, of a default, CONTRACTOR does not cure such default within ten (10) business days, or other time frame agreed to and as determined by COUNTY. Such time extension shall not be unreasonably withheld by the COUNTY. Additionally, COUNTY may terminate this Contract, in whole or in part without cause and for the convenience of COUNTY upon ten (10) business days written notice to the CONTRACTOR. Unless the CONTRACTOR is in breach of this Contract, the CONTRACTOR shall be paid for services rendered in conformity with the requirements of this Contract through the date of termination for its costs, including contract close-out costs, and profit on work authorized by the COUNTY and performed up to the time of termination. If COUNTY terminates for cause, CONTRACTOR shall reimburse COUNTY the cost to re-procure similar services and replacement goods up to the limits prescribed in Article 45 of this Contract.
- C. After receipt of a Termination Notice, except as otherwise directed by the COUNTY, in writing, the CONTRACTOR shall:
 - 1. Stop work on the date and to the extent specified;
 - 2. Place no further subcontracts or order for hardware, software, materials, equipment, supplies, services or facilities, except as necessary to complete any continued portion of the Contract, as authorized by COUNTY, and terminate and settle all orders and subcontracts to the extent relating to the performance of the terminated work;
 - 3. Transfer all work in process, completed work, and all other materials, of any kind or nature, (including but not limited to hardware, software, equipment, supplies, software and licenses related thereto) related to the terminated work to the COUNTY to the extent that COUNTY has paid for such items, and if the CONTRACTOR has any property related to the terminated work in its possession paid for by COUNTY or belonging to the COUNTY, the CONTRACTOR will account for same, return it to COUNTY or dispose of it

in the manner the COUNTY directs; to the extent practicably, continue and complete all parts of the work that have not been terminated; and

4. Take any action that may be necessary, or that the COUNTY may direct, for the protection and preservation of property related to this Contract that is in the possession of the CONTRACTOR and which the COUNTY has or may acquire an interest in.
- D. After termination, the CONTRACTOR shall submit any and all claims it has arising out of or related to a termination in the form of a final termination settlement proposal to the COUNTY in the form and with the certification(s) prescribed by the COUNTY. The CONTRACTOR shall submit the proposal within one (1) year of the termination date, unless the CONTRACTOR has requested an extension of the date in writing within said one (1) year period and the COUNTY has agreed to an extension, as it deems appropriate, in writing. If the CONTRACTOR fails to submit the proposal within the time allowed, the COUNTY may determine, on the basis of information available, the amount, if any, due the CONTRACTOR because of the termination for convenience and pay the amounts so determined.
 - E. Any amounts owed CONTRACTOR as the result of a termination for convenience, shall not exceed the Contract price reduced by the amount of payments previously made or to be made for work not terminated, inclusive of all close-out costs.
 - F. Under a termination for convenience, CONTRACTOR shall exclude and not charge COUNTY for facility costs, lease payments and expenses, all personnel, subcontractor and labor severance payments or expenses, and other costs or expenses not reasonably attributable to the termination of the Contract. CONTRACTOR further represents that the hardware, software, equipment, materials, supplies and licenses used to perform the Contract are fungible and can be used, transferred to or adapted for use by it in the performance of non-COUNTY work, with minimal hardship, costs and expense, if any. Nothing contained herein is intended to create any third party beneficiaries and confers no rights on anyone other than the CONTRACTOR, COUNTY and Palm Tran, Inc.
 - G. If, after termination for cause, it is determined that the CONTRACTOR was not in default or that the default was excusable, the rights and obligations of the parties shall be the same as if the Contract had been terminated for the convenience of the COUNTY.

ARTICLE 9 - PERSONNEL

The CONTRACTOR represents that it has, or will secure at its own expense, all necessary personnel required to perform the services under this Contract. Such personnel shall not be employees of or have any contractual relationship with the COUNTY.

All of the services required hereinunder shall be performed by the CONTRACTOR, or under its supervision, and all personnel engaged in performing the services shall be fully

qualified and, if required, authorized or permitted under state and local law to perform such services.

Any changes or substitutions in the CONTRACTOR's key personnel, as may be listed in Exhibit B, CONTRACTOR's proposal, attached hereto and incorporated herein, must be made known to the COUNTY's representative and written approval must be granted by the COUNTY's representative before said change or substitution can become effective.

The CONTRACTOR warrants that all services shall be performed by skilled and competent personnel to the highest professional standards in the field.

All of the CONTRACTOR's personnel (and all subcontractors) will comply with all COUNTY requirements governing conduct, safety, and security while on COUNTY premises.

ARTICLE 10 - CRIMINAL HISTORY RECORDS CHECK

The CONTRACTOR, CONTRACTOR's employees, subcontractors of CONTRACTOR and employees of subcontractors shall comply with Palm Beach County Code, Section 2371 – 2377, the Palm Beach County Criminal History Records Check Ordinance ("Ordinance"), for unescorted access to critical facilities ("Critical Facilities") or criminal justice information facilities ("CJI Facilities") as identified in Resolution R-2003-1274, as amended. The CONTRACTOR is solely responsible for understanding the financial, schedule, and/or staffing implications of this Ordinance. Further, the CONTRACTOR acknowledges that its Contract price includes any and all direct or indirect costs associated with compliance with this Ordinance, except for the applicable FDLE/FBI fees that shall be paid by the COUNTY.

This Contract may include sites and/or buildings which have been designated as either "critical facilities" or "criminal justice information facilities" pursuant to the Ordinance and Resolution R-2003-1274, as amended. COUNTY staff representing the COUNTY department will contact the CONTRACTOR(s) and provide specific instructions for meeting the requirements of this Ordinance. Individuals passing the background check will be issued a badge. The CONTRACTOR shall make every effort to collect the badges of its employees and its subcontractors' employees upon conclusion of the contract and return them to the COUNTY. If the CONTRACTOR or its subcontractor(s) terminates an employee who has been issued a badge, the CONTRACTOR must notify the COUNTY within two (2) hours. At the time of termination, the CONTRACTOR shall retrieve the badge and shall return it to the COUNTY in a timely manner.

The COUNTY reserves the right to suspend the CONTRACTOR if the CONTRACTOR: 1) does not comply with the requirements of COUNTY Code Section 2-371 - 2-377, as amended; and as may be applicable to CONTRACTOR 2) does not contact the COUNTY regarding a terminated CONTRACTOR employee or subcontractor employee within the stated time; or 3) fails to make a good faith effort in attempting to comply with the badge retrieval policy where applicable to CONTRACTOR.

ARTICLE 11 - SUBCONTRACTING

In response to the requirements of Special Contract Provision Number 9, Disadvantaged Business Enterprises (DBE), set out in Part A of Appendix C of Section 6 of RFP F-19-056/SS, CONTRACTOR submitted with its proposal to Palm Beach County Board of County Commissioners for a Fare Payment & Collection System, an Exhibit 4 Letter of Intent, Exhibit 4-A Schedule of DBE Participation and an Exhibit 4-E Disadvantaged Business Enterprise (DBE) Utilization, all of which pertain to the CONTRACTOR's obligation to utilize DBEs in its performance of this Contract (and all of which are contained in Exhibit B to CONTRACTOR's proposal). CONTRACTOR has agreed to use the DBEs identified in Exhibit 4 and Exhibit 4-A as subcontractors for the performance of the described work and at the dollar amount set forth therein. CONTRACTOR has further committed to a minimum of 6.3% DBE utilization on this Contract as set out in Exhibit 4-E. Accordingly, the CONTRACTOR shall comply with the following provisions regarding its subcontracting obligations and use of DBEs.

- A. Palm Tran, a department of the COUNTY, operates and manages, the COUNTY's public transit system. COUNTY has established a Disadvantaged Business Enterprise (DBE) Program in accordance with regulations of the U.S. Department of Transportation (DOT), 49 CFR Part 26. COUNTY's DBE Program is administered by Palm Tran under the oversight of COUNTY.
- B. The Code of Federal Regulation 49 CFR Part 26 defines a DBE as a for-profit small business concern that is subject to the following requirements:
 - 1. At least 51% owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51% of the stock is owned by one or more such individuals **AND**
 - 2. Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.
- C. In order to overcome the effects of discrimination and its past influence on DBEs, and in compliance with DOT mandates, COUNTY, through PALM TRAN, establishes an annual overall goal for DBE participation. Attainment of this goal may be achieved through Race Neutral or Race Conscious means. Race Neutral means are aimed at achieving the participation of small businesses in the COUNTY's contracts without respect to the gender or race of the owner. A Race Neutral program is one that, while benefiting DBEs, is not solely focused on DBE firms. When the use of Race Neutral means does not substantially contribute towards the overall agency goal for DBE participation, PALM TRAN also utilizes Race Conscious means as a method of achieving a "level playing field" for DBEs seeking to participate in federal-aid transportation contracting. Race Conscious means are aimed at achieving the desired level of participation among certified DBE firms.

- D. This Contract is being funded, in whole or in part with the Department of Transportation (DOT) financial assistance. Accordingly, it is the policy of the COUNTY:
1. To ensure nondiscrimination in the award and administration of DOT-assisted contracts;
 2. To create a level playing field on which DBEs can compete fairly for DOT-assisted contracts;
 3. To ensure that its DBE Program is narrowly tailored in accordance with applicable law;
 4. To ensure that only firms that fully meet 49 CFR Part 26 eligibility standards are permitted to participate as DBEs;
 5. To help remove barriers to the participation of DBEs in DOT assisted contracts;
 6. To assist the development of firms that can compete successfully in the marketplace outside the DBE Program.
- E. This Contract is subject to the requirements of 49 CFR Part 26, Participation by Disadvantaged Business Enterprises in Department of Transportation (DOT) Financial Assistance Programs and Palm Beach County Resolution No. R-2014-0869 setting forth the COUNTY's Disadvantaged Business Enterprise Program.
- F. The CONTRACTOR and its subcontractors for this Contract shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The CONTRACTOR shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of the work associated with this DOT assisted Contract, to ensure nondiscrimination. Failure by the CONTRACTOR to carry out these requirements is a material breach of this Contract, which may result in the termination of this Contract or such other remedy as the COUNTY deems appropriate which may include, but is not limited to:
- (1) Withholding monthly progress payments;
 - (2) Assessing sanctions;
 - (3) Liquidated damages; and/or
 - (4) Disqualifying the CONTRACTOR from future bidding as non-responsible.
- G. DBE Participation Goals: A DBE participation goal has been established for this Contract.

(X) **DBE Goal Established for this Contract:** The CONTRACTOR has made a commitment to subcontract at least 6.3% of the dollar value of the total amount of this Contract to certified DBE Subcontractors (Race Conscious), as stated in

CONTRACTOR's Exhibits 4, 4-A and 4-E of Appendix C submitted with its proposal.

1. CONTRACTOR agrees that throughout the term of this Contract, the services as provided by the firms listed on **Exhibit 4-A, page 2** shall remain at least at the percentage levels set forth therein.
2. CONTRACTOR shall pay its subcontractors and suppliers within thirty (30) days following receipt of payment from the COUNTY, for such subcontracted work or supplies. CONTRACTOR agrees that if it withholds an amount as retainage from its subcontractors or suppliers, that it will release such retainage and pay same within thirty (30) days following receipt of payment of retained amounts from COUNTY, or within thirty (30)) days after the subcontractor has satisfactorily completed its work, whichever shall first occur.
3. CONTRACTOR agrees that nonpayment of a subcontractor or supplier shall be a material breach of this Contract and that COUNTY may, at its option, increase allowable retainage or withhold progress payments unless and until CONTRACTOR demonstrates timely payments of sums due to such subcontractors or suppliers. CONTRACTOR agrees that the presence of a "pay when paid" provision in a subcontract shall not preclude COUNTY's inquiry into allegations of nonpayment. The foregoing remedies shall not be employed when CONTRACTOR demonstrates that its failure to pay results from a bona fide dispute with its subcontractor or supplier.
4. CONTRACTOR agrees to submit with each pay application a report to COUNTY's contract representative (with a copy to Palm Tran's DBE Liaison), on DBE participation, which should contain a record of payments made to its DBE subcontractors during the current billing period. CONTRACTOR shall utilize the form **Exhibit 4-C DBE Utilization Report**, a copy of which is provided in Exhibit D of this Contract. Reports must be submitted with each pay application.
5. CONTRACTOR agrees to submit a Final DBE Participation Report containing the total amount paid to its DBE subcontractors to County. This report must be submitted with the CONTRACTOR's request for final payment and release of retainage, if applicable. CONTRACTOR shall utilize the form, **Exhibit 4-D - Final DBE Utilization Report**, a copy of which is provided in Exhibit D of this Contract.
6. CONTRACTOR shall certify to COUNTY, the amounts paid to each DBE used in the performance of this Contract. All such certifications shall be signed by both CONTRACTOR and DBEs. One of the main purposes of these provisions is to make sure that DBEs actually perform work committed to them at contract award.

7. CONTRACTOR agrees that failure to provide appropriate certification as to the payment of DBEs and participants in the Contract and provide certification in a form acceptable to COUNTY that disadvantaged business participation requirements of the Contract have been met, notwithstanding any other provisions of the Contract, shall be cause for COUNTY to withhold further payments under the Contract until such time as such certification is received and accepted by COUNTY, and shall not entitle CONTRACTOR to terminate the Contract, to cease work to be performed, or to be entitled to any damages or extensions of time, whatsoever, due to such withholding of payment or delay in work associated thereto.
 8. CONTRACTOR agrees that it cannot terminate a DBE subcontractor for convenience and then perform the work with its own forces or its affiliate. If a situation arises that a DBE subcontractor needs to be replaced or removed, CONTRACTOR must submit a written request to COUNTY's contract representative, with a copy to Palm Tran's DBE Liaison, with detailed explanation or justification for the submission of such request. Before transmitting to the COUNTY's contract representative its request to terminate, the CONTRACTOR must give notice in writing to the DBE of its intent to do so. A copy of this notice must be provided to COUNTY's contract representative and Palm Tran's DBE Liaison prior to consideration of the request to terminate. The DBE will then have five (5) days to respond and advise the COUNTY and Palm Tran why it objects to the proposed termination. If the request is due to a voluntary cessation of the DBE firm from the Contract, documentation supporting the voluntary cessation must accompany the request. Requests for substitution or termination of DBE subcontractors will only be approved on a case-by-case basis provided that reasons cited are properly justified. When a DBE subcontractor is terminated or fails to complete its work, CONTRACTOR must make good faith efforts to find another DBE subcontractor to substitute for the original DBE and submit such documentation and the name of the new subcontractor to COUNTY for approval. Good faith efforts are detailed in Section 26.53 of Palm Tran's Disadvantaged Business Enterprise (DBE) Program.
 9. Should CONTRACTOR's performance fall short of its commitments regarding the utilization of DBEs, it shall be subject to applicable compliance mechanisms.
- H. Sanctions for Noncompliance with DBE Program Provisions. Failure of the CONTRACTOR to carry out DBE program provisions shall constitute a breach of the Contract for default or such remedy as the COUNTY may deem appropriate. The willful making of false statements or providing incorrect information will be referred for appropriate legal action.

I. DBE - Contract Compliance Monitoring

1. Compliance monitoring is conducted to determine if CONTRACTOR and/or subcontractors are complying with the requirements of the DBE Program. Failure of the CONTRACTOR to comply with this provision may result in the COUNTY imposing penalties or sanctions pursuant to the provisions of the DBE regulations at 49 CFR Part 26.
2. Contract compliance will encompass monitoring for Contract dollar achievement and DBE contractor utilization. COUNTY and Palm Tran staff each shall have the authority to audit and monitor the Contract and Contract related documents pertaining to activities under this Contract including all subcontracts. The requirements of the DBE Program are applicable to the CONTRACTOR, its general contractors, third party contractors, and subcontractors and suppliers.
3. CONTRACTOR shall be responsible for ensuring that proper documentation with regard to its utilization and payment of DBE subcontractors is maintained at all times throughout the term of this Contract and provided to COUNTY as required in this article.

**ARTICLE 12 - CONTRACTING WITH SMALL AND MINORITY BUSINESSES,
WOMEN'S BUSINESS ENTERPRISES, AND LABOR SURPLUS AREA FIRMS**

- A. The COUNTY has made all necessary affirmative steps to assure that small and minority businesses, women's business enterprises, and labor surplus area firms are used when possible. The CONTRACTOR, if prime subcontracts are to be let, shall take the Affirmative Steps listed below in paragraphs 1) through 5) of this Article.

B. **AFFIRMATIVE STEPS** must include:

1. Placing qualified small and minority businesses and women's business enterprises on Solicitation lists;
2. Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;
3. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises;
4. Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises;

5. Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.

ARTICLE 13 - FEDERAL AND STATE TAX

The COUNTY is exempt from payment of Florida State Sales and Use Taxes. The COUNTY will provide an exemption certificate submitted by the CONTRACTOR. The CONTRACTOR shall not be exempted from paying sales tax to its suppliers for materials used to fulfill contractual obligations with the COUNTY, nor is the CONTRACTOR authorized to use the COUNTY's Tax Exemption Number in securing such materials.

The CONTRACTOR shall be responsible for payment of its own and its share of its employees' payroll, payroll taxes, and benefits with respect to this Contract.

ARTICLE 14 - INSURANCE REQUIREMENTS

Prior to execution of this Contract, the CONTRACTOR shall provide evidence of the following minimum required insurance coverage and limits (such as through a Certificate of Insurance) to COUNTY, c/o Purchasing Department, 50 South Military Trail, Suite 110, West Palm Beach, FL 33415, Attention: Sandy Shea, Senior Buyer, until otherwise notified by the County.

The CONTRACTOR shall maintain at its sole expense, in full force and effect, at all times during the term of this Contract, insurance coverage and limits (including endorsements) as described herein. Failure to maintain the required insurance shall be considered default of the Contract. The requirements contained herein, as well as COUNTY's review of insurance maintained by CONTRACTOR, are not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by CONTRACTOR under the Contract. CONTRACTOR agrees to notify the COUNTY at least ten (10) days prior to cancellation, non-renewal or material change to the required insurance coverage. Where applicable, coverage shall apply on a primary basis.

- A. **Commercial General Liability:** CONTRACTOR shall maintain Commercial General Liability at a limit of liability not less than **\$1,000,000** Each Occurrence. Coverage shall not contain any endorsement(s) excluding Contractual Liability or Cross Liability.
- B. **Workers' Compensation Insurance & Employer's Liability:** CONTRACTOR shall maintain Workers' Compensation & Employer's Liability in accordance with Florida Statute Chapter 440.
- C. **Professional Liability/Technology Errors & Omissions:** CONTRACTOR shall maintain Professional Liability, or equivalent Errors & Omissions Liability with coverage for third-party liability, Privacy and Security as well as Security Breach Response, at a limit of liability not less than \$1,000,000 each claim, and \$1,000,000 per aggregate. When a self-insured retention (SIR) or deductible exceeds \$10,000, COUNTY reserves the right, but not the obligation, to review and request a copy of

successful bidder's most recent annual report or audited financial statement. For policies written on a "claims-made" basis, CONTRACTOR warrants the Retroactive Date equals or precedes the effective date of this Contract. In the event the policy is canceled, non-renewed, switched to an Occurrence Form, retroactive date advanced, or any other event triggering the right to purchase a Supplement Extended Reporting Period (SERP) during the life of this Contract, successful bidder shall purchase a SERP with a minimum reporting period not less than three (3) years. The requirement to purchase a SERP shall not relieve the successful bidder of the obligation to provide replacement coverage. The Certificate of Insurance providing evidence of the purchase of this coverage shall clearly indicate whether coverage is provided on an "occurrence" or "claims-made" form.

- D. **Additional Insured Clause:** Except as to Workers' Compensation and Employer's Liability (and Professional Liability, when applicable) the Certificate(s) of Insurance shall clearly confirm that coverage required by the Contract has been endorsed to include Palm Beach County and Palm Tran Inc., as an Additional Insured.
- E. **Waiver of Subrogation:** CONTRACTOR hereby waives any and all rights of Subrogation against the COUNTY, its officers, employees and agents for each required policy.
- F. **Certificates of Insurance:** Prior to each subsequent renewal of this Contract, within forty-eight (48) hours of a request by COUNTY, and subsequently, prior to expiration of any of the required coverage throughout the term of this Agreement, the CONTRACTOR shall deliver to the COUNTY a signed Certificate(s) of Insurance evidencing that all types and amounts of insurance coverage required by this Contract have been obtained and are in full force and effect. The Certificate Holder shall read:

Palm Beach County Board of County Commissioners
c/o Purchasing Department
50 South Military Trail, Suite 110
West Palm Beach, FL 33415

- G. **Umbrella or Excess Liability:** If necessary, CONTRACTOR may satisfy the minimum liability limits required above for Commercial General Liability and Business Auto Liability under Umbrella or Excess Liability policy. There is no minimum Per Occurrence limit of liability under the Umbrella or Excess Liability policy; however, the Annual Aggregate limit shall not be less than the highest "Each Occurrence" limit for either Commercial General Liability or Business Auto Liability. CONTRACTOR agrees to endorse COUNTY as an "Additional Insured" on the Umbrella or Excess Liability policy, unless the Certificate of Insurance notes the Umbrella or Excess Liability provides coverage on a pure/true "Follow-Form" basis.
- H. **Right to Revise or Reject:** COUNTY, by and through its Risk Management Department in cooperation with the contracting/monitoring department, reserves the right to modify, reject, or accept any required insurance, including limits, coverages, or endorsements, subject to negotiation herein from time to time

throughout the term of this Contract. COUNTY reserves the right, but not the obligation, to review and reject any insurer providing coverage because of its poor financial condition or failure to operate legally.

ARTICLE 15 – HIRING OF MECHANICS OR LABORERS

For those Solicitations and contracts including the employment of mechanics or laborers, the contract must provide for compliance with 40 U.S.C 3702, as supplemented by Department of Labor regulations (29 C.F.R. 5). Specifically, each CONTRACTOR must be required to compute the wages of every mechanic and laborer based on a standard workweek of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half (1½) times the basic rate of pay for all hours worked in excess of 40 hours in the work week.

ARTICLE 16 – INDEMNIFICATION

CONTRACTOR shall protect, defend, reimburse, indemnify and hold COUNTY and Palm Tran and their respective current and former agents, servants, employees and elected officers free and harmless from and against any and all claims, liability, expense, loss, cost, penalties, fines, damages, judgments, causes of action, liabilities and expenditures of every kind or character, including attorney's fees, costs, and litigation expenses, whether at trial, on appeal, or otherwise, to the extent arising as a result of CONTRACTOR's performance or failure to perform this Contract, or due to the negligent, reckless, intentional, malicious or wrongful acts or omissions of CONTRACTOR or any of its current or former officers, servants, employees, agents, volunteers, agents or subcontractors. CONTRACTOR's indemnity obligations shall apply to the fullest extent of the law and shall include all liability to third parties, including but not limited to the appropriation or misuse of proprietary information, and infringements of or violations of any third party's trade secrets, trademarks, copyrights or patent rights; provided, however, that CONTRACTOR shall not be liable for the negligent or intentionally wrongful acts of the COUNTY or Palm Tran or a third party contractor acting under the direction of the COUNTY or Palm Tran and without input or direction from CONTRACTOR.

The foregoing indemnity shall not apply to any intellectual property infringement claim that arises out of (i) any products that have been altered or modified by the COUNTY (or a third party contractor of COUNTY), to the extent such alleged infringement arises from such alteration or modification; or (ii) the use of any product in combination with other equipment and materials not furnished by CONTRACTOR, to the extent such alleged infringement arises from such combination; provided that altering or modifying a standard configuration within the product is not considered an alteration or modification of the product itself.

In the event any claim is brought against COUNTY, Palm Tran or other indemnified third party, CONTRACTOR shall, upon written notice from COUNTY, defend each indemnified party against each such claim through counsel satisfactory to and approved by COUNTY. The provisions and obligations described in this section shall survive the expiration or earlier termination of this Contract. To the extent considered necessary by the COUNTY Attorney, in his or her reasonable discretion, any sums due CONTRACTOR under this

Contract may be retained by COUNTY until all claims subject to this indemnification obligation have been resolved. Any sums so withheld shall not be subject to the payment of interest by COUNTY.

ARTICLE 17 - SUCCESSORS AND ASSIGNS

The COUNTY and the CONTRACTOR each binds itself and its partners, successors, executors, administrators and assigns to the other party of this Contract and to the partners, successors, executors, administrators and assigns of such other party, in respect to all covenants of this Contract. Except as above, neither the COUNTY nor the CONTRACTOR shall assign, sublet, convey, or transfer its interest in this Contract, without the prior written consent of the other. Nothing herein shall be construed as creating any personal liability on the part of any officer or agent of the COUNTY, nor shall it be construed as giving any rights or benefits hereunder to anyone other than the COUNTY and the CONTRACTOR.

ARTICLE 18 - REMEDIES

This Contract shall be governed by the laws of the State of Florida. Any and all legal action necessary to enforce the Contract will be held in a court of competent jurisdiction located in Palm Beach County, Florida. Except as otherwise set forth herein, no remedy herein conferred upon any party is intended to be exclusive of any other remedy, and each and every such remedy shall be cumulative and shall be in addition to every other remedy given hereunder now or hereafter existing at law, or in equity, by statute or otherwise. No single or partial exercise by any party of any right, power, or remedy hereunder shall preclude any other or further exercise thereof.

Except as to Palm Tran, Inc., no provision of this Contract is intended to, or shall be construed to, create any third party beneficiary or to provide any rights to any person or entity not a party to this Contract, including but not limited to any citizen or employees of the COUNTY, Palm Tran, Inc., and/or CONTRACTOR.

ARTICLE 19 - CONFLICT OF INTEREST / GIFT POLICY

- A. The CONTRACTOR represents that it presently has no interest and shall acquire no interest, either direct or indirect, which would conflict in any manner with the performance or services required hereunder, as provided for in Chapter 112, Part III, F.S. and the Palm Beach County Code of Ethics. The CONTRACTOR further represents that no person having any conflict of interest shall be employed for said performance or services.

The CONTRACTOR shall promptly notify the COUNTY's representative, in writing, by certified mail, of all potential conflicts of interest for any prospective business association, interest, or other circumstance which may influence, or appear to influence, the CONTRACTOR's judgment or quality of services being provided hereunder. Such written notification shall identify the prospective business association, interest or circumstance, the nature of work that the CONTRACTOR may undertake and request an opinion of the COUNTY as to whether the

association, interest or circumstance would, in the opinion of the COUNTY, constitute a conflict of interest if entered into by the CONTRACTOR. The COUNTY agrees to notify the CONTRACTOR of its opinion by certified mail within thirty (30) days of receipt of notification by the CONTRACTOR. If, in the opinion of the COUNTY, the prospective business association, interest or circumstance would not constitute a conflict of interest by the CONTRACTOR, the COUNTY shall so state in the notification and the CONTRACTOR shall, at its option, enter into said association, interest or circumstance and it shall be deemed not in conflict of interest with respect to services provided to the COUNTY by the CONTRACTOR under the terms of this Contract.

- B. **CONFLICT OF INTEREST:** Notwithstanding any provision of Section 2-443 of the Ethics Code, no employee, officer or agent of the COUNTY may participate in the selection, award, or administration of a contract supported by a federal award if he or she has a real or apparent conflict of interest. Such a conflict of interest would arise when the employee, officer, agent, any member of his or her immediate family, his or her partner, or an organization which employs or is about to employ any of the parties indicated herein, has a financial or other interest in or may receive a tangible personal benefit from a vendor considered for a COUNTY contract.

In addition, all federal criminal law violations involving fraud, bribery or gratuity that potentially affect a federal award are required to be disclosed in writing. Failure to make the required disclosures can result in withheld payments, award termination, suspension or debarment of the vendor.

- C. **ORGANIZATIONAL CONFLICT OF INTEREST:** If the vendor has a parent, affiliate, or subsidiary organization that is not a state government, local government, or Indian tribe, the non-federal entity must also maintain written standards of conduct covering organizational conflicts of interest. Organizational conflicts of interest means that because of relationships with a parent company, affiliate, or subsidiary organization, the non-federal entity is unable or appears to be unable to be impartial in conducting a procurement action involving the related organization.
- D. **GIFT POLICY:** Notwithstanding any provision of the Ethics Code, no vendor or contractor shall offer, and no officer, employee, or agent of the COUNTY shall solicit or accept gratuities, favors, or anything of monetary value from contractors or subcontractors.

ARTICLE 20 - PERFORMANCE DURING EMERGENCIES / EXCUSABLE DELAYS

The CONTRACTOR shall not be considered in default by reason of any failure in performance if such failure arises out of causes reasonably beyond the control of the CONTRACTOR, or its subcontractor(s), and without their fault or negligence. Such causes include but are not limited to: acts of God; force majeure; natural or public health emergencies; labor disputes; freight embargoes; and abnormally severe and unusual weather conditions.

If the CONTRACTOR's failure to perform was without it or its subcontractors' fault or negligence, the Contract Schedule and/or any other affected provision of this Contract shall be revised accordingly, subject to the COUNTY's rights to change, terminate, or stop any or all of the work at any time.

Notwithstanding anything in the foregoing to the contrary, the CONTRACTOR agrees and promises that, immediately preceding, during and after a public emergency, disaster, hurricane, flood, or act of God, the COUNTY shall be given "first priority" for all goods and services under this Contract. CONTRACTOR agrees to provide all goods and services to the COUNTY immediately preceding, during and after a public emergency, disaster, hurricane, flood, or act of God, at the terms, conditions, and prices as provided in this Contract on a "first priority" basis. CONTRACTOR shall furnish a 24-hour phone number to the COUNTY. Failure to provide the goods or services to the COUNTY on a first priority basis immediately preceding, during and after a public emergency, disaster, hurricane, flood, or act of God, shall constitute breach of Contract and subject the CONTRACTOR to sanctions from doing further business with the COUNTY.

ARTICLE 21 - ARREARS

The CONTRACTOR shall not pledge the COUNTY's credit or make it a guarantor of payment or surety for any contract, debt, obligation, judgment, lien, or any form of indebtedness. The CONTRACTOR further warrants and represents that it has no obligation or indebtedness that would impair its ability to fulfill the terms of this Contract.

ARTICLE 22 - DISCLOSURE AND OWNERSHIP OF DOCUMENTS

The CONTRACTOR shall deliver to the COUNTY's representative for approval and acceptance, and before being eligible for final payment of any amounts due, all documents and materials prepared by and for the COUNTY under this Contract. The CONTRACTOR agrees that copies of any and all property, work product, documentation, reports, computer systems and software, schedules, graphs, outlines, books, manuals, logs, files, deliverables, photographs, videos, tape recordings or data relating to this Contract which have been created specifically for the COUNTY by the CONTRACTOR, whether or not in privity of contract with the COUNTY or the CONTRACTOR, and wherever located shall be the property of the COUNTY.

To the extent allowed by Chapter 119, F.S., all written and oral information not in the public domain or not previously known, and all information and data obtained, developed, or supplied by the COUNTY, or at its expense, will be kept confidential by the CONTRACTOR and will not be disclosed to any other party, directly or indirectly, without the COUNTY's prior written consent, unless required by a lawful court order. All drawings, maps, sketches, programs, data bases, reports and other data developed or purchased under this Contract for the COUNTY, or at the COUNTY's expense, shall be and remain the COUNTY's property and may be reproduced and reused at the discretion of the COUNTY.

COUNTY and CONTRACTOR acknowledge and agree that the work performed under this Contract does not constitute experimental, developmental or research work.

Notwithstanding any other provision in this Contract, CONTRACTOR retains title to all intellectual property, patents, trademarks, know-how, copyrights, software, engineering and designs, models, production prints, drawings, work products, technical data, and other information and documents that relate to the goods and services sold to COUNTY, the creation of which was not funded with any monies paid by COUNTY under this Contract.

All covenants, agreements, representations and warranties made herein, or otherwise made in writing by any party pursuant hereto, including but not limited to any representations made herein relating to disclosure or ownership of documents, shall survive the execution and delivery of this Contract and the consummation of the transactions contemplated hereby.

ARTICLE 23 - INDEPENDENT CONTRACTOR RELATIONSHIP

The CONTRACTOR is, and shall be, in the performance of all work, services, and activities under this Contract, an Independent Contractor and not an employee, agent, or servant of the COUNTY. All persons engaged in any of the work or services performed pursuant to this Contract shall at all times, and in all places, be subject to the CONTRACTOR's sole direction, supervision, and control. The CONTRACTOR shall exercise control over the means and manner in which it and its employees perform the work, and in all respects the CONTRACTOR's relationship, and the relationship of its employees, to the COUNTY shall be that of an Independent Contractor and not as employees or agents of the COUNTY.

The CONTRACTOR does not have the power or authority to bind the COUNTY in any promise, agreement, or representation other than specifically provided for in this Contract.

ARTICLE 24- CONTINGENT FEE

The CONTRACTOR warrants that it has not employed or retained any company or person, other than a bona fide employee working solely for the CONTRACTOR, to solicit or secure this Contract and that it has not paid or agreed to pay any person, company, corporation, individual, or firm, other than a bona fide employee working solely for the CONTRACTOR, any fee, commission, percentage, gift, or any other consideration contingent upon or resulting from the award or making of this Contract.

ARTICLE 25 – PUBLIC RECORDS, ACCESS AND AUDITS

- A. Any material submitted in response to this Request for Proposal is considered a public document in accordance with Section 119.07, F.S. This includes material that the CONTRACTOR might consider to be confidential. All submitted information that the CONTRACTOR believes to be confidential and exempt from disclosure (i.e., a trade secret or as provided for in Section 119.07 and Section 812.081, F.S.) must be specifically identified as such. Upon receipt of a public records request for such information, a determination will be made as to whether the identified information is, in fact, confidential.

- B. The CONTRACTOR shall maintain all records pertaining to the procurement of the goods or services paid with federal funds for a period of five (5) years from the date of submission of the final expenditure report for the entire federal allocation or, for federal awards that are renewed quarterly or annually, from the date of the submission of the quarterly or annual financial report, respectively, as reported to the federal awarding agency or pass-through entity. The COUNTY shall have access to such records as required in this Section for the purpose of inspection or audit during normal business hours, at the CONTRACTOR's place of business. Exceptions include:
1. If any litigation, claim, or audit is started before the expiration of the five (5) year period, the records must be retained until all litigation, claims, or audit findings involving the records have been resolved and final action taken.
 2. When the COUNTY has received written notification to extend the records retention period from the federal awarding agency, agency for audit, oversight agency for audit, agency for indirect costs, or pass-through entity.
 3. Records for equipment acquired with federal funds must be retained for five (5) years *after final disposition*.
 4. When records are transferred to or maintained by the federal awarding agency or pass-through entity, the five (5) year retention requirement is *not* applicable to the COUNTY.
- C. Notwithstanding anything contained herein, as provided under Section 119.0701, F.S., if the CONTRACTOR: **(i) provides a service; and (ii) acts on behalf of the COUNTY as provided under Section 119.011(2), F.S.**, the CONTRACTOR shall comply with the requirements of Section 119.0701, F.S., as it may be amended from time to time. The CONTRACTOR is specifically required to:
1. Keep and maintain public records required by the COUNTY to perform services provided under the Contract.
 2. Upon request from the COUNTY's Custodian of Public Records ("COUNTY's Custodian") or COUNTY's representative/liaison, on behalf of the COUNTY's Custodian, provide the COUNTY with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119 or as otherwise provided by law. The CONTRACTOR further agrees that all fees, charges and expenses shall be determined in accordance with Palm Beach County PPM CW-F-002, Fees Associated with Public Records Requests, as it may be amended or replaced from time to time.
 3. Ensure that public records that are exempt, or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the Contract, if the CONTRACTOR does not transfer the

records to the public agency. Nothing contained herein shall prevent the disclosure of or the provision of records to the COUNTY.

4. Upon completion of the Contract, the CONTRACTOR shall transfer, at no cost to the COUNTY, all public records in possession of the CONTRACTOR unless notified by COUNTY's representative/liaison, on behalf of the COUNTY's Records Custodian, to keep and maintain public records required by the COUNTY to perform the service. If the CONTRACTOR transfers all public records to the COUNTY upon completion of the Contract, the CONTRACTOR shall destroy any duplicate public records that are exempt, or confidential and exempt from public records disclosure requirements. If the CONTRACTOR keeps and maintains public records upon completion of the Contract, the CONTRACTOR shall meet all applicable requirements for retaining public records. All records stored electronically by the CONTRACTOR must be provided to the COUNTY, upon request of the COUNTY's Custodian or the COUNTY's representative/liaison, on behalf of the COUNTY's Custodian, in a format that is compatible with the information technology systems of COUNTY, at no cost to COUNTY.

Failure of the CONTRACTOR to comply with the requirements of this Section, and other applicable requirements of state or federal law, shall be a material breach of the Contract. COUNTY shall have the right to exercise any and all remedies available to it for breach of contract, including but not limited to, the right to terminate for cause.

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, IT IS THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THE CONTRACT, PLEASE CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT: RECORDS REQUEST, PALM BEACH COUNTY PUBLIC AFFAIRS DEPARTMENT 301 N. OLIVE AVENUE, WEST PALM BEACH, FL 33401 OR VIA E-MAIL RECORDSREQUEST@PBCGOV.ORG OR VIA PHONE 561-355-6680.

ARTICLE 26 - NON-DISCRIMINATION

- A. The COUNTY is committed to assuring equal opportunity in the award of contracts and complies with all laws prohibiting discrimination. Pursuant to Palm Beach County Resolution R-2017-1770, as may be amended, the CONTRACTOR warrants and represents that throughout the term of the Contract, including any renewals thereof, all of its employees are treated equally during employment without regard to race, color, religion, disability, sex, age, national origin, ancestry, marital status, familial status, sexual orientation, gender identity and expression,

or genetic information. Failure to meet this requirement shall be considered default of the Contract.

- B. Equal Employment Opportunity. During the performance of this Contract, the CONTRACTOR agrees as follows:
- C. CONTRACTOR and its contractors will comply with all applicable federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. 1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 - 794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. 6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) 523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. 290 dd-3 and 290 ee3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. 3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) Rehabilitation Act of 1973 any other nondiscrimination provisions in the specific statute(s) under which application for federal assistance is being made; and (j) the requirements of any other nondiscrimination statute(s) which may apply to the application. CONTRACTOR shall comply with the Drug Free Workforce Act of 1988.

ARTICLE 27 - AUTHORITY TO PRACTICE

The CONTRACTOR hereby represents and warrants that it has, and will continue to maintain, all licenses and approvals required to conduct its business; and, that it will, at all times, conduct its business activities in a reputable manner. Proof of such licenses and approvals shall be submitted to the COUNTY's representative upon request.

ARTICLE 28 - SEVERABILITY

If any term or provision of this Contract or the application thereof to any person or circumstances shall, to any extent, be held invalid or unenforceable, the remainder of this Contract, or the application of such terms or provision to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected, and every other term and provision of this Contract shall be deemed valid and enforceable to the extent permitted by law.

ARTICLE 29 - PUBLIC ENTITY CRIMES

As provided in F.S. 287.132-133, by entering into this Contract or performing any work in furtherance hereof, the CONTRACTOR certifies that it, its affiliates, suppliers, subcontractors and consultants who will perform hereunder, have not been placed on the convicted vendor list maintained by the State of Florida Department of Management Services within the thirty-six (36) months immediately preceding the date hereof. This notice is required by F.S. 287.133(3)(a).

ARTICLE 30 – DISCRIMINATORY VENDOR LIST

An entity or affiliate who has been placed on the discriminatory vendor list may not: submit a proposal on a Contract to provide goods or services to a public entity; submit a proposal on a contract with a public entity for the construction or repair of a public building or public work; submit proposals on leases of Real Property to a public entity; award or perform work as a vendor, supplier, subcontractor, or consultant under contract with any public entity; nor transact business with any public entity. The Florida Department of Management Services is responsible for maintaining the discriminatory vendor list and intends to post the list on its website. Questions regarding the discriminatory vendor list may be directed to the Florida Department of Management Services, Office of Supplier Diversity at (850) 487-0915.

ARTICLE 31 - DEBARMENT AND SUSPENSION

A completed "Certification Regarding Debarment and Suspension" (Appendix D) is required at time of response submission. Upon request, the CONTRACTOR agrees to provide the COUNTY with subsequent certification(s) for it and/or its suppliers, subcontractors and subconsultants after Contract award.

This Contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such the CONTRACTOR is required to verify that none of the CONTRACTOR, its principals (defined at 2 C.F.R. §180.995), or its affiliates (defined at 2 C.F.R. §180.905) are excluded (defined at 2 C.F.R. §180.935).

The CONTRACTOR must comply with 2 C.F.R. 180, subpart C and 2 C.F.R. pt. 3000, subpart C and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.

This certification is a material representation of fact relied upon by the COUNTY. If it is later determined that the CONTRACTOR did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to the Federal Government serving as grantee and COUNTY as subgrantee, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

The CONTRACTOR must comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The CONTRACTOR further agrees to include a provision requiring such compliance in its lower tier covered transactions.

ARTICLE 32 - FEDERAL SYSTEM FOR AWARD MANAGEMENT

A contract award shall not be made to parties listed on the government-wide exclusions set forth in the System for Award Management ("SAM") (found at www.sam.gov), which contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority.

ARTICLE 33 - SCRUTINIZED COMPANIES

- A. As provided in F.S. 287.135, by entering into this Contract or performing any work in furtherance hereof, the CONTRACTOR certifies that it, its affiliates, suppliers, subcontractors and consultants who will perform hereunder, have not been placed on the Scrutinized Companies that Boycott Israel List or is engaged in a boycott of Israel, pursuant to F.S. 215.4725.
- B. If the COUNTY determines, using credible information available to the public, that a false certification has been submitted by CONTRACTOR, this Contract may be terminated and a civil penalty equal to the greater of \$2 million or twice the amount of this Contract shall be imposed, pursuant to F.S. 287.135. Said certification must also be submitted at the time of Contract renewal.
- C. **When contract value is greater than \$1 million:** As provided in F.S. 287.135, by entering into this Contract or performing any work in furtherance hereof, the CONTRACTOR certifies that it, its affiliates, suppliers, subcontractors and consultants who will perform hereunder, have not been placed on the Scrutinized Companies With Activities in Sudan List or Scrutinized Companies With Activities in The Iran Petroleum Energy Sector List created pursuant to F.S. 215.473 or is engaged in business operations in Cuba or Syria.

If the COUNTY determines, using credible information available to the public, that a false certification has been submitted by CONTRACTOR, this Contract may be terminated and a civil penalty equal to the greater of \$2 million or twice the amount of this Contract shall be imposed, pursuant to F.S. 287.135. Said certification must also be submitted at the time of Contract renewal.

ARTICLE 34 - MODIFICATIONS OF WORK

The COUNTY reserves the right to make changes in Scope of Work, including alterations, reductions therein, or additions thereto. Upon receipt by the CONTRACTOR of the COUNTY's notification of a contemplated change, the CONTRACTOR shall, in writing: (1) provide a detailed estimate for the increase or decrease in cost due to the contemplated change; (2) notify the COUNTY of any estimated change in the completion date; and (3) advise the COUNTY if the contemplated change shall affect the CONTRACTOR's ability to meet the completion dates or schedules of this Contract.

If the COUNTY so instructs, in writing, the CONTRACTOR shall suspend work on that portion of the Scope of Work affected by a contemplated change, pending the COUNTY's decision to proceed with the change, such decision shall be made within sixty (60) days.

If the COUNTY elects to make the change, the COUNTY shall initiate a Contract Amendment, and the CONTRACTOR shall not commence work on any such change until such written amendment is signed by the CONTRACTOR and approved and executed on behalf of Palm Beach County.

ARTICLE 35 - NOTICE

All notices required in this Contract shall be sent by certified mail (return receipt requested), hand delivered, or sent by other delivery service requiring signed acceptance. If sent to the COUNTY, notices shall be addressed to:

Kathleen M. Scarlett, Director
Purchasing, Palm Beach County
50 South Military Trail, Suite 110
West Palm Beach, FL 33415

With a copy to:

Clinton B. Forbes, Executive Director
Palm Tran, Inc.
3201 Electronic Way
West Palm Beach, FL 33407

If sent to the CONTRACTOR, notices shall be addressed to:

Mark Mahon, National Sales Director
Genfare, a division of SPX Corporation
800 Arthur Avenue
Elk Grove Village, IL 60007

With a copy to:

Eric Kaled, President
Genfare, a division of SPX Corporation
800 Arthur Avenue
Elk Grove Village, IL 60007

ARTICLE 36 - ENTIRETY OF CONTRACTUAL AGREEMENT

The COUNTY and the CONTRACTOR agree that this Contract sets forth the entire agreement between the parties, and that there are no promises or understandings other than those stated herein. None of the provisions, terms, and conditions contained in the Contract may be added to, modified, superseded, or otherwise altered, except by written instrument executed by the parties hereto in accordance with Article 34 - Modifications of Work.

ARTICLE 37 – CLEAN AIR ACT AND THE FEDERAL WATER POLLUTION CONTROL ACT

CONTRACTOR agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended (42 U.S.C. 7401-7671) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387).

The CONTRACTOR agrees to report each violation to the COUNTY, and understands and agrees that the COUNTY will, in turn, report each violation as required by the federal awarding agency and the appropriate Environmental Protection Agency Regional Office.

The CONTRACTOR agrees to include these requirements in each subcontract exceeding \$100,000 financed in whole or in part with federal assistance money.

ARTICLE 38 - SCIENTIFIC RESEARCH AND DEVELOPMENT AND COPYRIGHT AND PATENT RIGHTS

Those solicitations or contracts providing federal funds in support of scientific research and development must comply with the requirements of 37 C.F.R. 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any implementing regulations issued by the awarding agency.

COUNTY shall be the exclusive owner of any patent rights arising as a result of any discovery or invention which arises or is developed specifically for the COUNTY under this Contract. The COUNTY shall hold the copyright to works produced or purchased specifically for the COUNTY under this Contract. FEMA and the Federal Government hold a royalty-free, non-exclusive and irrevocable license to produce, publish, or to otherwise authorize others to use, for Federal Government purposes, copyrighted material that was developed under a federal award or purchased under a federal award.

ARTICLE 39 - MANDATORY STANDARDS AND POLICIES RELATING TO ENERGY EFFICIENCY

CONTRACTOR is required to comply with mandatory standards and policies related to energy efficiency that are contained in the State energy conservation plan issued in accordance with the Energy Policy and Conservation Act (Pub. L. 94-163, 89 Stat. 871) (42 U.S.C. 6201).

ARTICLE 40 - PROCUREMENT OF RECOVERED MATERIALS (Applicable To Goods Valued Above \$10,000)

CONTRACTOR is to provide COUNTY with those goods designated by the Environmental Protection Agency ("EPA"), at 40 C.F.R. 247 – 247.17, that contain the highest percentage of recovered materials practicable while maintaining a satisfactory level of competition for goods valued above \$10,000 or where the value of the goods procured during the preceding fiscal year exceeded \$10,000. Categories of goods with the highest percentage of recovered materials include construction products; landscaping products;

miscellaneous products; non-paper office products; paper and paper products; park and recreation products; transportation products; and, vehicular products.

ARTICLE 41 - PROGRAM FRAUD AND FALSE OR FRAUDULENT OR RELATED ACTS

The CONTRACTOR acknowledges that 31 U.S.C. 38 (Administrative Remedies for False Claims and Statements) applies to the CONTRACTOR's actions pertaining to this contract. (31 U.S.C. Chapter 38).

ARTICLE 42 - FEDERAL CRIMINAL LAW/FALSE STATEMENTS ACT

The False Statement Act sets forth liability for, among other things, any person who knowingly submits a false claim to the Federal Government or causes another to submit a false claim to the government or knowingly makes a false record or statement to get a false claim paid by the government. For example, a false claim could include false billing documentation submitted by the COUNTY received from a CONTRACTOR or subcontractor under the contract. (31 U.S.C. 3729).

ARTICLE 43 – REGULATIONS; LICENSING REQUIREMENTS

The CONTRACTOR shall comply with all federal, state and local laws, ordinances and regulations applicable to the services contemplated herein, to include those applicable to conflict of interest and collusion. CONTRACTOR is presumed to be familiar with all federal, state and local laws, ordinances, codes and regulations that may in any way affect the services offered.

ARTICLE 44 – WARRANTY PERIOD

For a period of two years from the date of final acceptance of goods or performance of services by CONTRACTOR pursuant to this Contract and two years from the date user acceptance testing is made available for any software required under the Contract, and for the open payment functionality two (2) years from the COUNTY's acceptance of such functionality, including the EMV reader. CONTRACTOR warrants, to the COUNTY, the goods manufactured by CONTRACTOR to be free from defects in material and workmanship and the services performed by CONTRACTOR to be in accordance with the specifications of this Contract. If within such period it shall be proven to CONTRACTOR'S reasonable satisfaction that any goods are defective or any services are nonconforming, such goods shall, at CONTRACTOR'S option, be repaired or replaced and such services corrected, or a substitute obtained. This warranty shall not apply to (i) any loss or damage resulting from normal wear and tear or alteration, misuse, abuse or (ii) improper installation, operation or maintenance by County or a third party.

CONTRACTOR shall be responsible to pay all shipping fees both ways, and all costs and expenses related thereto during the warranty period. In the event parts returned by COUNTY are identified to possess damages not covered by the warranty or are found to have no damage, COUNTY shall be responsible for shipping fees both ways and all costs related thereto.

THE FOREGOING WARRANTIES ARE IN LIEU OF, AND CONTRACTOR EXPRESSLY DISCLAIMS, ALL OTHER WARRANTIES, EXPRESS OR IMPLIED IN FACT OR BY LAW, INCLUDING WITHOUT LIMITATION ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE.

ARTICLE 45 – LIMITATION OF LIABILITY

CONTRACTOR’S maximum aggregate liability under the Contract shall not exceed Sixteen Million Two Hundred and Eighty Thousand Six Hundred and Sixty-One Dollars and Twenty Cents (\$16,280,661.20). Any action for breach of contract or otherwise must commence within one year after cause of action accrues.

ARTICLE 47 – SOFTWARE AGREEMENTS

As part of this Contract, COUNTY and CONTRACTOR have entered into a Subscription, License and Software Support Agreement, which is attached hereto and incorporated herein by reference as Exhibit C. If a conflict arises between this Contract and Exhibit C, this Contract shall control.

ARTICLE 48 – MOBILE APPLICATION AND OPEN PAYMENT PROCESSING

Mobile Application: CONTRACTOR agrees to use COUNTY’s payment processor of record to configure and test the application and implementation related to the mobile application, at no cost to COUNTY.

Open Payments:

- (a) CONTRACTOR will investigate the option to implement the open payment processing using COUNTY’s payment processor of record.
- (b) CONTRACTOR will detail all associated costs to use the COUNTY’s processor of record, stating those costs, which are specific to the COUNTY’s system versus those costs for the CONTRACTOR’s platform.
- (c) The COUNTY and CONTRACTOR will review and agree to the above cost impact to amend the contract amount if necessary, if the COUNTY’s payment processor of record is used.
- (d) Both parties agree the terms of the Payment Processing Agreement and all associated forms will be executed by both parties within 90 days after execution of this Contract. If an extension of time is necessary, the Director of Palm Tran, can execute such extensions on behalf of the County.

THE REST OF THIS PAGE LEFT BLANK INTENTIONALLY

Execution of this Contract by the Director of Purchasing Is Not Legally Binding or in Effect until Approved by the Palm Beach County Board of County Commissioners.

IN WITNESS WHEREOF, the Director of Purchasing of Palm Beach County, Florida, on behalf of the COUNTY, and CONTRACTOR have executed this Contract on the day and year above written.

ATTEST:

PALM BEACH COUNTY, FLORIDA FOR ITS
BOARD OF COUNTY COMMISSIONERS
BY SHARON R. BOCK
CLERK & COMPTROLLER

BY: _____
Deputy Clerk

BY: _____
Dave Kerner, Mayor

WITNESSES:

Brittany Seagren
Signature

CONTRACTOR:

Genfare, a division of SPX Corporation
Company Name

BRITTANY SEAGREN
Name (type or print)

BY: [Signature]
Signature

[Signature]
Signature

Eric Kaled
Typed Name

Terese Eillen
Name (type or print)

President
Title

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY

APPROVED AS TO ALL
TERMS & CONDITIONS

BY: _____
County Attorney

BY: [Signature]
Clinton B. Forbes
Executive Director, Palm Tran, Inc.

EXHIBIT A
SCOPE OF WORK/SERVICES
Contract No. F-19-056/SS



Attachment No. 1 to
Amendment No. 2 to
RFP No. F-19-056/SS for
REVISED Scope of Work/Services



Contents

1	Glossary.....	1
2	Background	2
3	Introduction	2
3.1	Proposers Response to the Technical Specification	3
4	Project Overview.....	3
4.1	Overview of Regional Agencies.....	4
4.2	Current Fare Policy & Business Rules.....	6
4.3	Sales Channels & Media Distribution.....	9
4.4	Marketing.....	10
4.5	Customer Service	10
4.6	Business Processes.....	11
4.7	Regional Integration.....	13
5	Future Fare System Goals	13
5.1	Equipment Quantities and Locations.....	15
6	General Design Requirements	15
6.1	Work to be Performed by the CONTRACTOR	16
6.2	Work to be Performed by Palm Tran	16
6.3	Guiding Principles for the FARE SYSTEM Design.....	17
6.4	Quality of Work.....	17
6.5	Design Life and Non-Proprietary Technology	18
6.6	Materials and Workmanship.....	18
6.7	Physical Characteristics.....	19
6.8	Environmental Conditions	20
6.9	Security	24
6.10	System Security	26
6.11	Modular Design and Interchangeability.....	28
6.12	Safety	29
6.13	Human Factors	29
6.14	Aesthetic Requirements and User Interfaces	29
6.15	Expandability.....	30
6.16	Electrical Requirements.....	30
7	FARE SYSTEM Software Requirements	37
7.2	Maintainability and Serviceability.....	40

7.3	Codes, Regulations & Reference Standards.....	41
8	System Architecture.....	43
8.1	General Architecture.....	43
8.2	Open Architecture.....	45
8.3	Open Payment Architecture	46
8.4	Software Development Kits/Application Programming Interfaces	48
9	Reliability, Accuracy and Availability Requirements.....	49
9.1	Reliability Requirements.....	49
9.2	Accuracy.....	50
9.3	Availability.....	52
9.4	Failure Review Team.....	52
9.5	Non-Chargeable Failure	53
9.6	Chargeable Failure	53
10	Maintainability Programs.....	54
10.1	Maintainability Design Checklist.....	54
10.2	TVM Components Maintainability Requirements	56
10.3	Farebox Components Maintenance Requirement	56
10.4	Preventive Maintenance.....	57
10.5	Revenue Servicing.....	57
11	Stand-Alone Operation	58
11.1	Self-Diagnostics.....	58
12	Fare Policies	59
12.1	General Fare Policy Requirements.....	59
12.2	Fare Payment Options	59
12.3	Fare Structure and Pricing	59
12.4	Special Fare Programs.....	62
13	Fare Media Types.....	63
13.1	Open Payment Media	63
13.2	Palm Tran-Issued Media	64
13.3	Extended Use Contactless Smart Cards	65
13.4	Limited-Use Contactless Smart Cards	65
13.5	Palm Tran Employee and other Partner ID Smart Cards.....	65
14	Palm Tran Mobile Ticketing Application	65
14.1	FARE SYSTEM Integration	66
14.2	Mobile Platform.....	66



14.3	Application Design	66
14.4	Mobile Application Distribution.....	67
14.5	Mobile Fare Structure.....	67
14.6	Account Registration.....	68
14.7	Purchasing.....	69
14.8	Validation	70
14.9	Customer Tools	71
14.10	Trip Planning	72
14.11	Mobile Security and Fraud Prevention	72
14.12	Mobile Ticketing Back Office.....	73
14.13	Cash Payments	73
14.14	Closed-Loop Virtual Cards.....	73
15	Near Field Communications and other Mobile Payment Devices	74
16	Third Party Media	74
17	Fare Media Distribution	74
17.1	Distribution Channels.....	75
17.2	FARE SYSTEM Websites.....	76
18	Fare Accounts and Processing	83
18.1	Transit and Customer Accounts	83
18.2	Account Lists	85
19	Validating Farebox	86
19.1	Mechanical Design Requirements	88
19.2	Passenger Display.....	101
19.3	Driver Control Unit (DCU)	101
19.4	Revenue Access and Collection Process	105
19.5	External Communication Capability.....	105
19.6	Information Exchange over Vehicle Area Network.....	106
19.7	The Revenue Collection Process (RCP)	109
19.8	Farebox Diagnostic and Operational Reporting.....	110
19.9	Operational Testing and Measurements	110
20	Palm Tran Agency Point of Sale (APOS)	112
20.1	General Requirements	112
20.2	Software	114
20.3	Communications	117
20.4	Operations	118

21	Farebox Revenue Collection System (FRCS).....	123
21.1	General Function.....	123
21.2	Operating Environment	124
21.3	Keys and Locks	124
21.4	Mechanical Design Requirement.....	124
21.5	Electrical Design Requirement.....	128
21.6	Installation	128
21.7	Performance and Maintainability	129
21.8	FARE SYSTEM Monitoring	129
21.9	Operating Security	130
21.10	Operating Functions.....	130
21.11	Wireless Local Area Network System	131
21.12	Software	132
21.13	Portable Data Unit	132
22	Ticket Vending Machines (TVM)	133
22.1	Vending CSCs.....	134
22.2	Check Value, Add Value, or Add Product to CSC	135
22.3	Ticket Vending Machine Displays and Customer Interaction	137
23	Fare Media	141
23.1	General Media Requirements.....	141
23.2	Production Requirements.....	141
23.3	Encoding.....	142
23.4	Encryption Keys.....	142
23.5	Protection of Palm Tran Security Sensitive Information.....	143
23.6	Quality Control and Defects Allowed.....	143
23.7	Serialization.....	143
23.8	Packaging and Deliveries.....	144
23.9	Production, Storage and Storage Security.....	144
23.10	Palm Tran Acceptance Testing.....	145
24	Extended Use Contactless Media.....	145
24.1	Physical Characteristics.....	145
24.2	Pre-printed Graphics.....	146
25	Limited Use Contactless Media.....	146
25.1	Physical Characteristics.....	146
25.2	Pre-printed Graphics.....	146

26	Closed-Loop Virtual Cards.....	147
27	Receipt Stock.....	147
28	Desktop Bulk Smartcard Encoder (BSE)	147
29	Smart Cards.....	148
29.1	Smart Card Characteristics.....	148
29.2	Physical Standards	149
29.3	Card Interface Device.....	150
29.4	Card Data	150
30	FARE SYSTEM Backend and FARE SYSTEM Back Office.....	152
30.1	Subsystems and interfaces.....	154
30.2	FARE SYSTEM Backend Functionality.....	155
30.3	Payment Processing.....	155
30.4	Transactional Databases	156
30.5	User Interface Requirements.....	157
30.6	Systems Files Modifications	157
30.7	Monitoring Functions.....	160
30.8	FARE SYSTEM Back Office	161
30.9	Data Analysis and Reporting.....	173
30.10	FARE SYSTEM Backend Documentation and Training.....	188
30.11	FARE SYSTEM Backend Performance.....	188
30.12	FARE SYSTEM Backend Hosting.....	189
30.13	FARE SYSTEM Backend Backup and Recovery	190
30.14	FARE SYSTEM Security and Access.....	191
30.15	Data Transmission System	192
30.16	Palm Tran Rider Account.....	192
31	FARE SYSTEM Integration Elements.....	193
31.1	Retail Network.....	193
31.2	CAD/AVL.....	194
31.3	Other Modes.....	195
32	Design Reviews	195
32.1	Design Review Requirements	196
32.2	Conceptual Design Review (CDR).....	196
32.3	Preliminary Design Review.....	198
32.4	Final Design Review	200
33	TRAINING	202



33.1 General Outline..... 202

33.2 Instructor Qualification..... 203

33.3 Equipment..... 204

33.4 Training Material Submittal..... 204

33.5 Training Schedule..... 204

33.6 Driver Training..... 204

33.7 Revenue Collection Training 205

33.8 Revenue Collection System Operation Training 205

33.9 Maintenance Training..... 205

33.10 FARE SYSTEM Backend Training..... 206

33.11 Customer Service Training 206

33.12 Training Performance Measurement..... 207

33.13 Passenger Education Program (PEP)..... 207

34 DOCUMENTATION 207

34.1 Special Tools..... 208

35 DELIVERY AND INSTALLATION 208

35.1 Installation Time 209

36 MAINTENANCE AND SPARE PARTS 209

36.1 Spare Parts and Itemized Price List..... 209

36.2 Consumables 210

36.3 CONTRACTOR Responsibility..... 210

36.4 Maintenance Support Equipment..... 211

36.5 Maintenance Reporting 212

37 TESTING..... 212

37.1 Testing Program Plan 213

38 WARRANTY AND GUARANTEE 216

38.1 Warranty Plan 216

38.2 Warranty Coverage 216

38.3 Warranty Period..... 217

38.4 Notice of Defect 217

38.5 Fleet Defect..... 218

38.6 Remedial Action Response..... 218

38.7 Negligence..... 218

38.8 Exclusions..... 218

38.9 Warranty Support 219

38.10	Post Warranty	219
39	PROJECT MANAGEMENT.....	219
39.1	Program Management.....	219
39.2	CONTRACTOR's Quality Assurance (QA) Program and ISO Certification	230
40	SOFTWARE AND INTELLECTUAL PROPERTY REQUIREMENTS	231
40.1	Software Maintenance and Support.....	231
40.2	Software documentation	232
40.3	Software source code	232
41	Abbreviations and Acronyms.....	234
42	Palm Tran Existing Fare Policies.....	239
42.1	General Information	239
42.2	Palm Tran Fixed Route.....	239
42.3	Methods of Payment	240
42.4	Exact Change.....	241
42.5	Quik Pass Bus Passes.....	241
42.6	Half/Reduced Fare Requirements.....	243
42.7	Free Fare Requirements.....	243
42.8	Promotions and Special Events	243
42.9	Transfers	243
42.10	Locations	244
42.11	Riders Rules.....	245
42.12	Palm Tran's Non-Discrimination Policy.....	247
42.13	HURRICANE SEASON POLICY.....	248
42.14	PALM TRAN'S "BIKES ON BUSES" PROGRAM POLICY	248
42.15	Palm Tran Lost and Found.....	248
42.16	Palm Tran Park & Ride	249
42.17	Palm Tran Connection.....	249
42.18	Connection Program Descriptions	249
42.19	Connection Fares	250
42.20	Connection ADA Fix Route Pass	251
42.21	Flex Route Service/Dial A Ride	252
42.22	Flex Service and Dial-A-Ride Service Transfers	252
42.23	Palm Tran and Connection Fare Table.....	252



1 Glossary

Abbr./Acronym	Definition
Shall, Will, Must	Indicates a mandatory functional requirement. Failure to meet <u>address</u> these mandatory requirements may result in the rejection of the offer as non-responsive. <u>If there is a requirement, or are requirements, that the proposed system doesn't meet, then Proposers must state this, and what is proposed as an alternative.</u>
Should	Indicates something that is recommended but not mandatory. If the Offeror fails to provide recommended information, Palm Tran may, at its sole option, ask the Offeror to provide the information or evaluate the offer without the information.
May	Indicates something that is not mandatory but permissible.
Account-based system	System where account details are stored at a central server, as opposed to a card-based system, where account information resides on the fare media.
Agency	Any reference to Agency in these technical specifications refers to Palm Tran, Inc.
Americans with Disabilities Act (ADA)	Federal law that prohibits discrimination or reduced service based on disability. In a transit application, disabled patrons must have full and unrestricted access to all station features and transportation options, as well as be offered discounted fares under certain guidelines.
Application Programming Interface (API)	A set of protocols that define interaction between software packages. APIs can be proprietary or open source but are required for data exchange between software systems.
Autoload	Process where value is loaded automatically to a transit account when the account balance reaches a certain threshold, or at a specified time interval.
Automated Clearing House (ACH)	Automated Clearing House (ACH) is an electronic network for financial transactions in the U.S. ACH processes large volumes of credit and debit transactions in batches. The ACH system is the primary electronic funds transfer (EFT) system used by agencies and businesses to receive payments.
Base fare	The cash fare paid at a Farebox or TVM for a single adult boarding on a local route.
Back office	The fare engine and transaction processing component and all systems supporting back office functions, including the data warehouse, customer relationship management module, and other modules which rely on transaction data to function.
Bank card authorization	Step during a credit or debit payment transaction when the card and account is verified by the card issuing bank and payment is committed. Usually is processed by a credit card processor, and often requires real-time communication link.
Boardings	The number of passengers who board public transportation vehicles. Passengers are counted each time they board vehicles no matter how many vehicles they use to travel from their origin to their destination,
Business rules	The rules and guidelines that govern an agreement between parties. In an electronic fare system, the business rules define how the system will enforce Agency fare policies.
Canned reports	Pre-built reports that provide fundamental data in a database-driven operation.
Card-based system	System where account details are stored on the fare media itself rather than in the back office; fare processing is performed by the fare payment device and updated value is written to the media after each transaction.
Closed-loop system	A system where data processing is constrained within the system.
Commercial-Off-The-Shelf (COTS)	Term for products that are available for purchase in the open marketplace by the general public. COTS goods are generally widely available at lower cost than privately developed products.
Computer-Aided Dispatch/Automatic Vehicle Location (CAD/AVL) system	System that provides vehicle dispatch, scheduling, location, and maintenance services within a centralized dispatch center. CAD/AVL systems typically require operator login, which is then integrated with the fare collection system and equipment.
Contactless bank card	Bank-issued credit or debit card that supports contactless payment through an ISO 14443 communication interface.
Institutional programs	Special programs administered by Palm Tran for institutions outside of the transit-riding public. Can include business, educational, social service, and government entities that have special public transportation needs.
Linked trip	An origin to destination trip on a transit system, inclusive of all transfers.
Open payments	Payment model where payments are made using industry standard bank cards.



Abbr./Acronym	Definition
Paratransit	Transportation service that services disabled patrons or those with special access needs.

2 Background

Palm Tran, Inc. (Palm Tran) is seeking to award a contract to a system integrator to implement a new Regional Account-Based Transportation Fare Payment and Collection System (herein known as FARE SYSTEM), which should be scalable, and an open architecture designed automated fare collection system AFCS). The FARE SYSTEM will serve Palm Tran’s transportation network, with the capability of expansion to the other regional transportation agencies, modes and services in order to make public transportation services a seamless network as viewed by travelers in the region.

The FARE SYSTEM shall provide multiple forms of payment options to our patrons. In addition, the system should be based on an open architecture perspective with open Application Programming Interfaces (APIs). The system should facilitate integration with third party hardware and software as the system ages.

3 Introduction

Palm Tran is seeking to replace its current fare collection equipment that has been in use for over ten years and is outdated and inefficient. Currently, Palm Tran passengers can purchase tickets onboard or in advanced by purchasing a Bus Pass at a limited number of locations (West Palm Beach Intermodal Station, Connections and Libraries throughout the County). Palm Tran is seeking to modernize its fare collection system to allow riders to have multiple options for payment of their fare or multiple options for prepayment before boarding. Palm Tran would like their riders to be able to purchase a ticket with cash, credit card, phone App or a Smartcard before boarding a Palm Tran bus or at time of boarding. The rider would be able to pre-purchase their ticket at a Ticket Vending Machine (TVM), retail location or by adding value on a Smartcard or phone App at either a TVM or through the internet. Palm Tran is also seeking an option that would give the passenger a true seamless transfer between transit systems that serve the South Florida region: South Florida Regional Transportation Authority (SFRTA), Broward County Transit (BCT), Miami-Dade Transit (MDT), and Brightline.

Palm Tran desires to procure an account-based FARE SYSTEM featuring proven technology, open payments compatible (for potential future acceptance), Near Field Communication (NFC) payment capable, includes commercial off the shelf (COTS) components that are cost effective and future proof. The FARE SYSTEM comprises new advanced validating Fareboxes for the buses, Ticket Vending Machine (TVM)s for stations/locations where Palm Tran riders can transfer to other modes of services, a hosted cloud-based Backend/Back-office support system, a network of retail providers, and a mobile application. Additionally, the selected CONTRACTOR shall develop and provide as part of its proposed FARE SYSTEM a suite of application programming interface (API)s to allow various programs (e.g., Transportation Disadvantage (TD), ADA, etc.) and Systems (e.g., Palm Beach County Advantage Financial System). Further, the cloud-based Backend system will include a whole host of features and capabilities; e.g., Inventory Account Manage (parts, material, and media), system monitoring, performance dashboards, data analytics, business intelligence (BI), various reporting capabilities (standard and ad-hoc).

3.1 Proposers Response to the Technical Specification

The Proposer shall describe, in detail, its proposed FARE SYSTEM solution, taking into account Palm Tran's functional requirements described herein. This specification should be viewed as a functional specification that doesn't attempt to spell out every single detail or describe each nut and bolt of the FARE SYSTEM; however, whether explicitly stated or not, Proposers should make it a point to address each section within its proposal to illustrate how it will achieve Palm Tran's functional requirements. Proposers should take note that merely paraphrasing the content of this document isn't sufficient to meet the criteria of a compliant proposal response. Palm Tran is expecting Proposers to describe how they will meet the requirements; i.e., what is their method for realizing the described functionality. Short-listed Proposers will be required to demonstrate their proposed solution to Palm Tran. Thus, it is Palm Tran's expectation that Proposers are familiar with, have delivered, and implemented successfully similar systems over the past three (3) years.

Moreover, it is not Palm Tran's expectation that only one entity is able to provide all of the FARE SYSTEM components. In fact, Proposers are encouraged to form teams or ventures (e.g., the retail network to be developed as part of this offering will require an established retail network provider to develop and administer the program), just as long as one of the entities is identified as the Prime Contractor. The Prime Contractor will be legally responsible for all of the aspects of this project whether performed by another entity in its team or not.

To state clearly, the Proposer is advised that this document is not an attempt to "Prescribe" the FARE SYSTEM in each and every detail, but intended to convey, as best as possible, Palm Tran's desired and expected FARE SYSTEM functional requirements, which are in line with its Business Rules and Fare Policies. If a Proposer is unable to meet a requirement described herein, Proposers shall indicate this within their Proposal and describe how their proposed system addresses the requirement. In circumstances where a requirement cannot be achieved by the Proposed System, this too should be stated within the Proposal, and if possible, what would be required to update the proposed system to address the requirement. In brief, Palm Tran expects to see how and to what extent a Proposer's FARE SYSTEM intends to realize these functional requirements.

4 Project Overview

To reiterate, this document describes Palm Tran's functional requirements for a FARE SYSTEM. The Proposer shall provide a detailed description of its proposed solution for addressing these requirements.

The FARE SYSTEM comprises various components and subsystems that contain all the necessary functions, features, processing logic, data storage, system controls, etc. for facilitating the requirements of Palm Tran's Business Rules and Fare Policy. As stated above, Palm Tran desires to procure an account-based FARE SYSTEM featuring proven technology, open payments compatible (for potential future acceptance), NFC payment capable, includes COTS components that are cost effective and future proof. The FARE SYSTEM comprises new advanced validating Fareboxes for the buses, TVMs for stations/locations where Palm Tran riders can transfer to other modes of services, a hosted cloud-based Backend/Back-office support system, a network of retail providers, and a mobile application. Additionally, the selected CONTRACTOR shall develop and provide as part of its proposed FARE SYSTEM a suite of APIs to allow various programs (e.g., TD, ADA, etc.) and Systems (e.g., Palm Beach County Advantage Financial System). Further, the cloud-based Backend system will include a whole host of features and capabilities; e.g., Inventory Account Manage (parts, material, and media), system

monitoring, performance dashboards, data analytics, BI, various reporting capabilities (standard and ad-hoc). Nothing within the architecture of the FARE SYSTEM shall prohibit appropriate CONTRACTOR supported integration, at no additional cost to Palm Tran, with external devices or systems, such that all FARE SYSTEM activity, operations, and data may be used for the purpose of system interoperability and control. All elements pertaining to the FARE SYSTEM and its adherence to Open Architecture and enhanced UX design principles should be illustrated within the Proposer's Proposal.

The CONTRACTOR shall be required to provide for the Conceptual Design Review (CDR) complete design details of its proposed FARE SYSTEM (CDR - 2), which shall be finalized at the Preliminary Design Review (PDR) (PDR - 9). A working prototype shall be provided for the PDR (PDR - 10). Specific details of system architecture, construction, and equipment shall be provided for review and Acceptance. The CONTRACTOR shall provide test criteria for review and acceptance as part of the PDR (PDR - 11).

The CONTRACTOR shall be required to provide as part of the Final Design Review (FDR) (FDR - 6) the final details of the FARE SYSTEM that fully demonstrates the operation and functionality as specified herein. Notwithstanding any acceptances, the CONTRACTOR shall not be relieved of providing a complete and working system that meets the language and intent of the Contract.

4.1 Overview of Regional Agencies

4.1.1 Miami-Dade Transit

MDT is the largest public transportation system in Florida. MDT operates bus and rail service for the City of Miami and Miami-Dade County. Bus service is provided by Metrobus with a fleet size of over 815 buses. Rail service is provided by Metrorail which is a 22-mile elevated double-track rail system with 22 stations and over 136 vehicles. A renovation contract was awarded in 2008 to Cubic Transportation Systems (Cubic) and in October of 2009, MDT launched the new Easy Card Program as part of their Automated Fare Collection System (AFCS). MDT recently contracted with Cubic to migrate to a Cloud-based back-office, add Mobile Ticketing, as well as an Open Payment option.

MDT (Easy Card) Program

The Easy Card Program is owned and operated by MDT. Certain bus routes reach into Broward County to the north of Miami-Dade County, and an express bus route extends southward to points in the northern Florida Keys in Monroe County. SFRTA and MDT uses the same back-office for their Easy Card Program.

4.1.2 South Florida Regional Transportation Authority – Tri-Rail

SFRTA operates Tri-Rail that is one of four Commuter Rail Lines to use Smart Cards for Fare Collection. Tri-Rail is a commuter rail system operating in Miami-Dade, Broward and Palm Beach counties. Tri-Rail is a zone-based fare system covering approximately 72 miles traversing the three counties. Tri-Rail connects with 3 bus lines, 2 express bus lines and 1 heavy rail line. In 2010, SFRTA entered into a contract for a new fare collection system to include Smartcard technology. In 2011, SFRTA launched the new fare collection system, introducing the EASY Card onto the Tri-Rail system. The Easy Card was extended into the Tri-Rail system from the MDT system where it was already in use. SFRTA's fare system is integrated with MDT and both systems are controlled by a common central computer system, which is maintained by MDT.

Only Tri-Rail has executed an agreement with MDT regarding the share of cost and revenue with the MDT Easy Card Program. SFRTA is not currently a part of MDT Mobile Ticketing.

Two of four Tri-Rail stations in Miami-Dade County are direct interchange points between MDT trains and Tri-Rail. In addition to the four Tri-Rail stations in Dade County, seven stations are operated in Broward County and six stations are operated in Palm Beach County.

There are approximately 125,000 transfers between Palm Tran's and Tri-Rail's systems per year.

4.1.3 Broward County Transit

BCT's public transportation is serviced by a fleet of approximately 346 buses on fixed-routes. BCT provides links to MDT, Palm Beach County's transit systems, and to Tri-Rail (commuter rail service). BCT fixed routes provide connections to a multimodal transportation network, as well as connections to four transfer terminals: Broward Central Terminal (downtown Fort Lauderdale), West Regional Terminal (Plantation), Lauderhill Mall Transfer Facility (Lauderhill) and Northeast Transit Center (Pompano Beach).

Overview of BCT's solution:

1. GFI Fast Fare-e Onboard Processor for Smartcard
2. Mobile Ticketing Solution provided by CoCoo (purchased by Genfare)
3. No Upgrade to the Current Fareboxes (Upgrade Optional)
4. Card Based Processing
5. Mobile Ticketing App that will have the ability to provide Routes, Fare, and Schedules
6. Fareboxes Read-Only Functionality for Easy Card
7. Easy Card Usage Transaction in a Separate File

There are approximately 63,000 transfers between Palm Tran's and BCT's systems per year.

4.1.4 Martin County

Martin County offers three fixed-route bus routes with connectivity to St. Lucie County and a Commuter Express Route that offers connectivity to Palm Beach County via The Gardens Mall in Palm Beach Gardens. These routes provide commuters access to work, school, shopping, medical facilities, and recreational areas.

4.1.5 Palm Tran, Inc.

Palm Beach County is located within the Miami Urbanized Area (UZA), and the other transit properties operating in the region are MDT, BCT and Tri-Rail (operated by SFRTA).

Palm Tran provides transportation for Palm Beach County and has a fleet of 159 buses within the urban and rural areas of the county. The Palm Tran bus fleet consists of 30-foot, 35-foot, 40-foot, 60-foot articulated vehicles and hybrid transit style city buses. The annual fixed route and paratransit ridership is approximately ten (10) million, and the overall bus fleet exceeds eight (8) million miles per year. Palm Tran operates 32 routes within the county.

Palm Tran buses are currently outfitted with GFI Odyssey Fareboxes installed in 2007 that accept cash and magnetic stripe media. The Fareboxes do not provide change, and transfers are not available between Palm Tran buses. In addition to paying fares on the bus, customers can purchase tickets at various sales centers and locations throughout the county.

Palm Tran also runs a paratransit service called “Connection” that provides door-to-door trips for eligible ADA customers. There is no fare collection equipment on the Connection vehicles. Palm Tran utilizes a Trapeze system for eligibility, reservations, scheduling and dispatching all paratransit trips via the Trapeze Ranger Mobile Data Terminal on-board the vehicles.

Palm Tran’s fare system backend is GFI Network Manager System 7, Release 2. Both the hardware and backend systems are approaching the end of their useful life.

Key limitations with the current fare system include, but are not limited to:

- Lacks robust and comprehensive data reporting which is required to reconcile sales, make decisions on fare policy and planning, provide good customer service, and evaluate system performance. The existing GFI data system and reports do not provide this capability.
- Several of the backend systems (GFI, Trapeze, Avail) are not integrated and staff must use multiple systems and manual processes to collect and analyze the information available.
- The existing GFI hardware is aging and certain parts are becoming obsolete.
- With payment options limited to cash/magnetic stripe tickets and no retail sales locations or TVMs, customers are forced to pay with cash and Palm Tran must continue to collect and reconcile a high amount of cash.
- As the other agencies in the region move forward with more automated payment options and expanded fare media distribution channels, Palm Tran, with its existing fare system, will not be able to utilize a common regional payment media.

Palm Tran riders can transfer between a Palm Tran bus and BCT or Tri-Rail, but the current process is not seamless and requires the purchase of transfer tickets between the systems. Miami-Dade County, Broward County and Tri-Rail have either implemented or are in the advanced stages of installing new electronic fare technology that will provide for a greater transit rider experience, including smart card and mobile ticketing.

Palm Tran has a transfer agreement with SFRTA governing the transfer of customers at Tri-Rail stations intersecting with bus routes. EASY Cards (SFRTA fare system) are not accepted on Palm Tran. EASY Cardholders must obtain a Transfer-to-Bus Ticket from a Tri-Rail Ticket Vending Machine (TVM) to receive a transfer discount on Palm Tran tickets.

The most recent discussions among the Palm Tran stakeholders reinforced the desire to eliminate the use of Magnetic Stripe media. New Fareboxes are required, and there is a desire to add Ticket Vending Machines (TVMs) and expand to Retail Sales.

The current Palm Tran fare system hardware and backend was provided by GFI-Genfare, and the components are summarized as follows:

- Fareboxes GFI Odyssey.
- Depot Computers & Probing/Vaulting System.
- GFI Network Manager Version 7, Release 2 Backend System currently hosted in-house.

4.2 Current Fare Policy & Business Rules

The following summarizes the current fare structure at Palm Tran (refer to Attachment 1: Section 42 for detailed information):



4.2.1 Fare Media

Currently the only media accepted at Palm Tran to pay a fare on the bus are cash and magnetic stripe tickets. Customers can use other payments methods to purchase magnetic stripe tickets at certain sales centers as described later in the document.



4.2.2 Fare Structure



The current cash fare is \$2.00 per ride for full fare customers and \$1.00 per ride for reduced fare customers. Unlimited 1- Day QUIK Passes can be purchased on the bus for \$5.00 full fare or \$3.50 reduced fare. Palm Tran does not provide any change on their buses, but if a customer overpays by \$1.00 or more, the customer will be provided with a magnetic strip card in the amount of overpayment that can be used towards future travel. When paying with cash, customers must notify the driver prior to paying if they do not want a QUIK pass (i.e. the customer inserts a \$5 bill and the driver needs to know whether to issue a change card or a 1-Day QUIK pass). Transfers are only available when transferring to or from BCT or from Tri-Rail, which is described in the next section.

Palm Tran customers can also purchase a 31-Day QUIK Pass for \$70.00 full fare or \$55.00 reduced fare. Reduced fare eligible customers include seniors (65 and over), students (21 and under with a valid school ID), Medicare recipients, veteran’s administration (VA) Service Connect card holders, and those with disabilities.




Additionally, Palm Tran has agreements Fare Agreements with various residential associations where those residents receive an unlimited ride Palm Tran pass. Also, Palm Tran is developing a program to extend to universities/colleges that extend transportation services to participating students.

The following table summarizes the fare options available to Palm Tran riders:

Table 1 - Palm Tran Existing Fare Options

Fare Type	Fare Media	Cost	Sales Location
Single Trip	Cash	\$2.00	On Board
Single Trip Half-Fare	Cash	\$1.00	On Board
1 Trip Ticket (Valid for a single ride, available to use on day of purchase or for future rides on Palm Tran)		\$2.00	Palm Tran Connection Intermodal Transit Center
Unlimited 1-Day (Valid for unlimited rides all day in all directions of travel, and ideal for passengers using more than one bus to their destination)		\$5.00	On Board Palm Tran Connection Intermodal Transit Center



Fare Type	Fare Media	Cost	Sales Location
Unlimited 1-Day Reduced (Valid for unlimited rides all day in all directions of travel, and ideal for passengers using more than one bus to their destination)		\$3.50	On Board Palm Tran Connection Intermodal Transit Center
Unlimited 31-Day (Valid for unlimited rides for 31 consecutive days beginning on the first day of use, regardless of which day of the month it is first validated)		\$70.00	By mail Intermodal Transit Center QUIK Pass outlet
Unlimited 31-Day Reduced (Valid for unlimited rides for 31 consecutive days beginning the first day of use, regardless of which day of the month it is first validated at a reduced price)		\$55.00	By mail Intermodal Transit Center QUIK Pass outlet

4.2.2.1 Transfers

Palm Tran does not provide free or discounted transfers between its buses except with a 1-Day or 31-Day Pass. However, Palm Tran does provide the following regional transfer options.

When transferring to or from BCT:

- From Palm Tran to BCT: Customer must ask the driver for a free BCT transfer
- From BCT to Palm Tran: \$0.50 with a valid BCT transfer (visually validated by bus operator)

When transferring from Tri-Rail to Palm Tran:

- \$0.50 with a valid BCT transfer (visually validated by bus operator)
- Boarding at any location other than a Tri-Rail station will be a regular fare

4.2.2.2 Half/Reduced Fare Requirements

Palm Tran offers a half fare on our single-trip cash fare and a reduced price on all QUIK Passes for those who qualify. Passengers riding for a half fare or using a reduced fare QUIK Pass must be able to present identification when boarding the bus. This includes:

- Senior - any person 65 years or older with a photo ID issued by Palm Tran, a valid driver’s license or Florida State ID card. A Florida State Identification card can be obtained from the Driver License Bureau.
- Student - age 21 or under. Must show valid school ID.
- Disabled - any person who has received a half fare ID issued by Palm Tran or our paratransit division, Palm Tran Connection, based on documented disabilities.
- Medicare - Recipient must show their Medicare card to receive a half fare.

- Veteran's Administration - Must show their "Service Connected" VA card.

4.2.2.3 Free Fare Requirements

Free fares are provided to the following customers:

- Customers with an ADA photo ID card with a green stripe special issued from Palm Tran Connection.
- Children 8 and under ride free when accompanied by a fare paying passenger.
- Police officer in uniform or with badge.

4.2.2.4 Transportation Disadvantaged (TD)

Customers must qualify to purchase a discounted TD Bus Pass by submitting proof of household income, legal status and a photo ID to Palm Tran Connection. This information is verified prior to certifying current customers or enrolling new customers in the TD Bus Pass Program.



These customers can purchase a 31-Day Pass for \$15.00 (annual income of 75% or less of the Federal Poverty Level) or \$20.00 (annual income between 76% and 150% of the Federal Poverty Level) at Palm Tran Connection, and once approved can also purchase these from their qualifying agency and at the West Palm Beach Intermodal Transit Center.

4.3 Sales Channels & Media Distribution

Customers can purchase their fare directly on the bus using cash or can purchase various magnetic strip tickets at one of Palm Tran's sales centers. There is also a mail order program for the 31-Day passes.

4.3.1 Farebox Sales

As described previously, a customer can use cash to purchase a single fare on the bus or can purchase an Unlimited 1-Day Pass (full or reduced) that can be used to ride other buses.

4.3.2 Sales Centers

Palm Tran has Sales Centers located throughout the county. These include the Intermodal Transit Center, Palm Beach County Libraries, the Palm Tran Connection Office and selected agencies throughout the County.

At the Connection site, customers can use cash, check, money order, or a credit/debit card to purchase single trip tickets or 1-Day passes. All ticket types are available at the Intermodal Transit Center. There are limits to how many Transportation Disadvantage tickets a customer can purchase in a two-month period, which are two (2) 31-Day Reduced passes and ten (10) 1-Day Reduced passes.

4.3.3 Mail Order Sales

There is a mail order program for the full and reduced fare 31-Day Quick Passes. Customers can send in a form along with a check/money order and receive their pass(es) in the mail.

4.3.4 Bus Pass Tracker

Some third parties have been approved to purchase and sell tickets at the reduced rate. These are 501c-qualified agencies that have been pre-approved by Palm Tran. They must fill out a form to prove they

are qualified and can then order tickets in person or online through the Bus Pass Tracker site. These agencies are given a login at the website to place orders; however, they are not yet able to pay for their orders online due to a lack of EMV, which is the Europay, MasterCard, and Visa global standard for authentication of credit/debit cards recently mandated in the United States.

Eligible riders who have been approved either by Palm Tran or one of the qualified agencies are added to the Bus Pass Tracker system and can then purchase these discounted directly from that agency or at any of the Palm Tran sales locations. There is currently a limit to the amount of tickets that can be purchased through this program by an individual since the tickets are subsidized (2 tickets per transaction). The tickets sold are tracked by serial number in order to see those that have been activated. Currently there is a disconnect between the PO number and invoice number in the Bus Pass Tracker system, there is the ability to capture payment type and check number for those purchased using a check.

4.4 Marketing

Marketing is handled out of the Administration Office at the Electronics Way facility, and the department is responsible for advertising on buses and tickets, scheduling collateral, media relations and press releases, newsletters (both internal and external), and social networking. Marketing also handles any customer messaging related to fare changes and just completed a marketing campaign for Palm Tran's "IGO!" trip planning mobile app.

The main limitations seen by the Marketing department are the lack of payment options and sales locations, no regional integration, and the absence of institutional programs (commuter benefits, etc.). In addition, the current fare policy can cause some fare disputes on the bus, such as college students who are not under 21 (the policy states that a college student must be under 21 to receive the discounted fare).

4.5 Customer Service

Customer Service operation is handled out of the Connection facility. There is a total of 7 agents to serve both Fixed route and Connection. Staff is divided as follow: 4 agents are cross-trained and perform Fixed route and Connection tasks; 2 agents are dedicated only to Fixed route; and 1 agent is dedicated only to Connection. In addition, there are 2 supervisors who share responsibilities with a primary focus, one on fixed route and the other on paratransit. The staff work out of the same location.

4.5.1 Fixed Route

The Customer Service Representatives (CSR) and Customer Service supervisor for the fixed-route buses handle calls that include general information requests (e.g. lost and found), service questions/complaints, fare questions/complaints, trip planning, and commendations. Most of the fixed-route calls received are related to on-time performance or driver complaints. Complaints related to fares are typically due to the wrong amount being charged. The biggest issue on fixed route is fare disputes; the lack of good data from the GFI system makes it difficult for Customer Service to resolve customer service issues. In addition, the bus probing records aren't always correct and may be assigned to the wrong day, so the CSR is unable to match these up properly during an inquiry.

The Customer Service Reps do not operate 24/7, and many of the calls are left on the voicemail system.

4.5.2 Connection Paratransit

For the Connection Paratransit operation, the CSRs and Customer Service supervisor handle all paratransit customer service-related calls. There are an additional 21 staff who specifically handle the reservation process for the Connection Paratransit riders, which includes scheduling and “where’s my ride” calls. Palm Tran is contracted with two different paratransit vehicle operators, and although these drivers work directly for the contracted companies they are in the same union as the Palm Tran bus drivers.

Paratransit-eligible riders who also ride fixed-route buses can apply for an ADA ID (aka “ADA green card”) that is good for three years. These customers can use the ADA ID to ride fixed route buses for free, and they can purchase a Connection “Ticket to Ride” in person at the Connection facility or by mail.

The lack of fare equipment on the paratransit vehicles causes several issues, including fare disputes and fraud potential. There is also a security concern because the drivers must carry all cash accepted with them until the end of their trips. The drivers are also required to turn in any tickets collected; there is a manual process to reconcile the tickets and cash with the trips taken.

4.6 Business Processes

4.6.1 Revenue Collection

Once Palm Tran has counted the cash, it is collected, from the bus garages and sales centers by an armored car service. The following is the current Standard Operating Procedure (SOP) for the collection of cash from the bus garages and sales centers and includes procedures to monitor how frequently and timely the Farebox revenue is being removed from Palm Tran facilities by armored services. For security and financial reasons, revenue should be transferred by Palm Tran’s armored car service company.

- North County and pickup windows vary for pickup schedule. The armored services will call the front desk when they are 5-10 minutes away. Front desk personnel will notify the finance staff who will give them access to the deposits. At South County the armored service will come to the door once they arrive.
- Once the finance staff secures the cash counting area, the armored service will begin to scan the ID card with their handheld device, which is located in front of the deposit journal book, which verifies our location.
- Next, he/she will begin to scan cash bag barcodes with the value amount listed on bags from the deposit journal book into a handheld device.
- Finance staff will provide armored service with a calculator tape of the total value amount of coins and how many bags of coins he/she should enter into his/her handheld device. By entering the amounts in the handheld device there is a grand total of all deposits listed in the deposit journal book.
- After all deposit slips are scanned into handheld device, the finance staff must verify the total amount listed on the handheld device, and once verified the finance personnel must sign for the pickup. The armored service must sign the deposit journal book agreeing that the monies are what they received.
- The deposit journal book consists of two pages and the left page is strictly for the coins. This section is for the dollar amount and how many coin bags which always indicate that the coin description is mixed. The right page is strictly for cash and checks. This section is for the dollar

amount and the bag number, and the cash will always be entered on the description line that is provided.

4.6.2 Reconciliation & Settlement

The overall accounting for Farebox and sales center revenue is not performed completely by Palm Tran, and some of this fall under other entities. For instance, Palm Tran does collect the cash from its bus garages and sales centers, but the final deposits are handled by the county and the final reporting is performed by the Office of Management and Budget (OMB). Palm Tran does not have its own Enterprise Resource Planning (ERP) system, and the county system uses Crystal Reports, which makes it very difficult to reconcile.

Palm Tran records all cash as sales, but the funds available on a fare card are valid until the funds on the fare card is used. The reports provided from the GFI system are not clear as to what revenue has actually been collected by the Farebox versus what the Farebox expects based on the driver key counts. Additionally, the monies from each Farebox are comingled in the vault when the bus is probed and vaulted, so it is difficult to audit what actually came from each Farebox. This is important to insure the integrity of the data and monitor for any fraudulent activity. Palm Tran performs random Farebox audits, but not too frequently; therefore, reconciliation issues cannot be tied to an overall system-wide issue or an individual incident. However, there is a plan to begin a Farebox audit process soon. Also, Palm Tran does have an APC system on its buses but does not currently compare these counts to the Farebox counts.

Palm Tran sells some tickets to sales centers on consignment and some are paid for upfront, but there is not currently an accurate record of how many tickets are printed each month or how many have gone unused. Any hot-listing of tickets is performed through the GFI module.

There are also several current operational procedures with limited controls that make it difficult to reconcile revenue:

- If a customer does not insert enough cash to pay their entire fare, the driver can override this and accept it as a fare.
- If the bill acceptor continually rejects a bill, the driver can override this.
- Drivers can print live tickets from the Farebox prior to accepting payment for them.

4.6.3 Hardware Maintenance

Palm Tran has 3 garage facilities, North, South and West, out of which the buses, Fareboxes and other maintenance services are conducted. If a Farebox component becomes defective while the bus is in service, the driver will continue in service and collect fares on the operational components. The driver will call the defect into dispatch and a Farebox technician will either meet the bus during its run and swap out the bad component, or a new bus with a working Farebox will be sent out as a replacement. If the coin acceptor is jammed, the driver will put the Farebox in bypass mode so that coins can still be accepted until the repair is performed.

There are three Farebox technicians who handle all Farebox maintenance (2 main and 1 south). Preventive Maintenance (PM) on the Fareboxes is performed every 120 days, and this is conducted at the bus garage after the entire Farebox has been removed from the bus. The biggest issue seen on the Farebox is with the rollers that guide the bills into the cashbox and jammed tickets. There were some initial issues with the bill acceptors as well, and wet bills can also cause problems. During PMs, the rollers are changed out, and the batteries on the logic board are changed out every two years.

If a logic board is defective, it is swapped out and sent back to GFI for repair. If a bus needs to be sent off grounds for repair, then the entire Farebox is removed prior. When new buses are purchased and added to the fleet, Palm Tran attempts to purchase new Fareboxes through that same bus order.

The other systems on the bus that drivers interact with are maintained by the county and not by Palm Tran staff. These include the Avail system, which interfaces with the Farebox when the driver logs on, as well as the radio system and destination sign.

4.6.4 Backend & Server Maintenance

The GFI depot computers at each garage have a hot standby in case they need to be swapped out. The PCMCIA cards used for the depot computers are becoming obsolete and may soon cause an issue with spares. Palm Tran uses a Microsoft tool that constantly checks the health of the backend servers and sends out automatic alerts to the administrator on duty if there is an issue. There is a predetermined archiving schedule for the bus garage depots and GFI Network Manager (first Sunday morning of each month).

4.6.5 Revenue/Ridership Reporting

Palm Tran collects its revenue data from the GFI back office system and ridership information from Avail. It is currently a challenge for Palm Tran staff to analyze the GFI revenue and ridership data for accuracy. There are some operational procedures in place for the drivers that can skew the data (e.g. issuing tickets without collecting money and overriding fares), and it is not clear what some of the fields on the GFI reports are tied to. This makes it difficult to know whether the overall revenue and ridership is being overstated.

The following procedure is used for the early detection of significant variances between the physical cash amount counted and the amount that should be collected according to the GFI reports. If variances are discovered immediate corrective action will be taken to limit potential losses in revenue. Palm Tran aims to maintain a variance below 3%, and the most recent variances are falling below 1%.

Additionally, a daily reconciliation is completed after each physical count in the Revenue Section for the West Palm Beach, Delray and Belle Glade facilities, and a Monthly Reconciliation Log is maintained.

4.7 Regional Integration

The only current regional integration is through limited transfers between Palm Tran and BCT or Tri-Rail. This makes it very difficult for riders to plan trips in the region and to know which service and route option is best for their trip. It also requires riders to have multiple fare media depending on which service they are planning to use.

5 Future Fare System Goals

The technological advancements in the industry over the past few years offer many new, innovative and exciting solutions for Palm Tran. These range from traditional smart card media (closed loop and open loop), open payment-based systems, account-based systems, hosted cloud-based backend/back-office systems, mobile ticketing, and Near-Field Communication (NFC) media. Based on discussions with Palm Tran's staff and detailed review of the current system, a study by our consultants on the status of the current system proposes the following high-level functionality for the future FARE SYSTEM:

1. A true regional fare payment system with easy integration within the region BCT, MDT, SFTRA, Brightline, and/or Sun Pass.
2. Commonly acceptable payment methods within the region.
3. Faster transactions speeds for efficient onboarding and reduced dwell time.
4. Reduce the dependency on cash and increase cost savings via reduced cash handling.
5. More fare payment and account management options (smart cards, contactless bank cards, mobile payments, open payments, account-based payments, online account management).
6. Better distribution network providing more access to fare media and products (retail relationships, Ticket Vending Machines (TVMs), websites, call centers, etc.).
7. Allow for partnerships with colleges/universities, social service agencies, businesses (commuter benefits), hotels/resorts (tourists) and the ability to manage accounts and fare media through an institutional website.
8. Easy fare enforcement with minimal driver interaction.
9. Allow for flexible fare policy configuration for a variety of fare rules (i.e., may need to change fare structure and prices – e.g., 3-hour window to transfer for free).
10. Modular equipment with easily replaceable components and onboard diagnostics.
11. Enhanced security of fare revenue and back-office data.
12. Increased customer convenience to promote choice riders.
13. Enhanced analytics and reporting for better insight into operational efficiencies and system effectiveness.
14. Integration between fixed route and paratransit.

Additionally, the FARE SYSTEM should,

Provide solutions that:

- Automate and are scalable for recording and processing of passes associated with programs; e.g., Employer, University.
- Eliminate magnetic ticket media.
- Enable adoption of emerging fare payment technologies.
- Align with capital and operating budget resources.
- Improve fare collection equipment reliability and data security.
- Encourage the use of fare media over cash.
- Provide an enhanced user experience for customers and operators.

Automate fare collection that:

- Reduce human error and fare disputes.
- Improve data collection/reporting capabilities.
- Realize operational efficiencies and reduce overall cost of operations.
- Provide fare media that can be used to determine eligibility and/or provide fare payment for unlimited access (i.e., employer/school pass) programs, reduced fare programs, and if desired, Paratransit service.

Accommodate fare policy objectives, such as:

- Fare structure simplification
- Alternative mix of fare products



- Loyalty programs (e.g., fare accumulators, ride bonuses)

5.1 Equipment Quantities and Locations

The following table illustrates the type and quantity of equipment being procured as part of the FARE SYSTEM. If in a proposer’s opinion, these quantities are not correct, proposers are welcome to suggest different quantities and explain how these would support Palm Tran’s AFC Goals with the FARE SYSTEM.

Table 2 - Equipment Quantities and Locations

#	Description	Production Units	Spares	Maintenance/Test Facilities	Training Facilities
1.	Validating Farebox	156	9	3	2
2.	Ticket Vending Machine	22	2	3	2
3.	Receiver Vault	3	1	3	–
4.	Agency Point of Sale (APOS)	5	1	3	2

In addition to the above equipment, the CONTRACTOR shall provide an inventory of spare parts containing the lowest level replaceable components (LLRC) for the above listed equipment, consumables, and other CONTRACTOR recommended parts to support preventive, field, and remedial maintenance and repair. The quantity of spare parts, for each item, should represent 15% of the corresponding equipment quantities. The CONTRACTOR shall include in its proposal the name of the OEM manufacturer, lead time, recommended quantity, and unit cost.

6 General Design Requirements

The following section describes the general design requirements for the FARE SYSTEM. As stated previously, Palm Tran is seeking to replace its existing AFC System with a new innovative regional account-based AFC System. The CONTRACTOR shall deliver a technically proven, yet innovative, solution that incorporates the latest technical offerings from the Payment, and Transportation Industries, which will facilitate and support Palm Tran’s Business Rules and Fare Policies, as well as Palm Tran’s overall technical requirements, as more fully described herein. The FARE SYSTEM should be designed using non-proprietary technology in an open-architecture manner. To facilitate the regional aspects, the APIs developed for the FARE SYSTEM will be done in the context of openness and fostering integration, to allow Palm Tran and the region to utilize and grow the FARE SYSTEM as its needs change without being beholden to the CONTRACTOR.

In general, the CONTRACTOR shall deliver a complete system, which incorporates all necessary design, furnishing, delivery, installation, testing, training, support, etc. that meets the requirements of Palm Tran. The proposed FARE SYSTEM shall incorporate all necessary Hardware (HW), Software (SW), documentation, licenses, and agreements to allow Palm Tran total use, control, and configuration without any encumbrances, hidden fees, loss of rights, etc.

To reiterate, this document describes Palm Tran’s minimal functional requirements for a FARE SYSTEM and its components. The Proposer should note that the Contract is illustrating Palm Tran’s functional requirements; it is not a prescription for how the Proposer/CONTRACTOR should design its proposed

FARE SYSTEM. The Proposer shall describe in its Proposal how its proposed FARE SYSTEM solution will address Palm Tran's requirements; ensuring its Proposal addresses all of Palm Tran's requirements.

The applications, equipment, and services provided shall be subjected to various testing and verification to determine that the product is free of manufacturing and material defects and to ensure the various software components are functioning error free, such that the FARE SYSTEM is suitable to be installed and placed into revenue service operations.

The proposed FARE SYSTEM solution shall be based off of field proven solutions and standard non-proprietary products shall be used as much as possible, but notwithstanding the CONTRACTOR shall have the responsibility to develop, manufacture, maintain, and warranty the FARE SYSTEM in accordance with the terms of the Contract. The FARE SYSTEM design shall require like components to be fully interchangeable.

All products shall conform to the applicable federal, state and county laws and regulations in effect at the time of Notice to Proceed (NTP).

6.1 Work to be Performed by the CONTRACTOR

The CONTRACTOR is responsible for and shall perform all work tasks (except those tasks explicitly indicated to be performed by Palm Tran or others) in the design, manufacture, delivery, installation, commissioning, testing, training, documenting, and other tasks that can be reasonably expected for a complete FARE SYSTEM that supports and facilitates Palm Tran's Business Rules and Fare Policy; including all work tasks identified as an Option and exercised by Palm Tran. The work includes furnishing all services, labor, supervision and materials for the design, development and construction of a fully integrated FARE SYSTEM suitable for Palm Tran and its Business Policies and Operations. Additionally, the CONTRACTOR shall work with Palm Tran's Marketing and Public Relations departments as well as Palm Tran's Community Outreach provider to provide assistance and material as needed to educate the public and promote the use and adoption of the new FARE SYSTEM program.

In its Proposal, the CONTRACTOR will identify and submit a resume for its proposed Project Manager (PM). Please note the named PM shall have worked in the transportation for at least three (3) years and have at least five (5) years of experience for implementing similar type systems. The PM will have the authority to enter into agreements and negotiate on behalf of the CONTRACTOR during the tenure of this project. The CONTRACTOR may not change the PM without prior approval from Palm Tran. Palm Tran reserves the right to have the CONTRACTOR's PM replaced at any point during the course of this project.

The CONTRACTOR shall be required to prepare and submit at kickoff, for Palm Tran's Acceptance, a master project schedule (MPS) that shall include project related tasks in sufficient detail to manage the project, communicate status, identify milestones, and report about the completion of milestones. The CONTRACTOR shall be required to maintain the approved MPS throughout the period of the Contract in accordance with the provisions herein.

6.2 Work to be Performed by Palm Tran

Palm Tran will name a Palm Tran Project Manager (PTPM) who will be the main Point of Contact (POC) and decision maker throughout the project. The PTPM will have the authority to approve and direct the work of the CONTRACTOR. The PTPM shall have the right to accept or require revisions to any material

provided by the CONTRACTOR to ensure compliance with the Contract and shall supervise the actual FARE SYSTEM Equipment installation.

For installations on Palm Tran property, Palm Tran will provide a contact person, if different from the PTPM, for coordinating and monitoring the installations. Please note the PTPM will still be the governing authority regarding any approvals and directions for the project, including installations.

Additionally, Palm Tran will coordinate the marketing and public relations related efforts, with the assistance of the CONTRACTOR and its selected Community Outreach provider. Also, Palm Tran will provide CONTRACTOR Required Safety Training to all personnel who will be working in and around Palm Tran Facilities.

When scheduled, Palm Tran shall make buses available to the CONTRACTOR for installation work. Palm Tran personnel shall be provided for the movement of buses. Any installation or other work will need to be scheduled outside the normal operational day to minimize impact to regular services; i.e., evenings and weekends.

Palm Tran shall provide climate-controlled office space in the existing buildings to house the computers, and other FARE SYSTEM components required for the transmission and reporting of data. The CONTRACTOR shall make required provisions to ensure proper operation of the CONTRACTOR-supplied FARE SYSTEM components in the space provided by Palm Tran.

6.3 Guiding Principles for the FARE SYSTEM Design

The FARE SYSTEM shall be developed and configured under open architecture principles, complying with applicable standards and allowing subsequent addition of functionality and unrestricted access to data without recourse to the original CONTRACTOR's services for modification of software or hardware.

Palm Tran's expectation is that the proposed system can be expanded to incorporate new technologies and features as they become available or linked to other systems to create a more powerful whole. The Contract relies on a number of principles to achieve this expandability, including open architecture standards and principles in the FARE SYSTEM design, excess memory and processing capability incorporated into computer systems, use of openly available standards, and the availability of third-party supplier Application Programming Interface (API) specifications, etc. Therefore, the CONTRACTOR shall provide all documentation describing all APIs and messaging interfaces that will facilitate expanding the system, including a third party to interface/integrate into the proposed system.

Regarding the FARE SYSTEM User Interface (UI), Palm Tran strongly desires the FARE SYSTEM application to enhance the overall User Experience (UX), for both Palm Tran and Palm Tran's customers. Palm Tran will evaluate favorably those Proposers who are able to demonstrate an enhanced UX for their proposed FARE SYSTEM, at both the frontend devices and backend system.

Proposers are requested to demonstrate in their Proposals ways in which their proposed systems meet and exceed Palm Tran's desire for a system that can grow over time to meet new needs and continually enhance the overall UX for all of Palm Tran's users.

6.4 Quality of Work

The workmanship employed by the CONTRACTOR shall be of the best quality and to the highest standard of commercially acceptable practice for the class of work and shall result in the FARE SYSTEM components having a neat, clean finished appearance.

Acceptance by Palm Tran of any submitted plans of the Bidder or CONTRACTOR shall not relieve the CONTRACTOR of its responsibility to adherence of the requirements of the Contract.

All materials and equipment shall be new and not used or remanufactured. The new materials and equipment shall not have had a shelf life or be of such age that it would adversely affect the performance of the equipment.

To the maximum extent possible, modular construction techniques shall be employed in the manufacture of the equipment provided. All given items of equipment whose quantity is greater than one, shall be identical in manufacture and function and the parts within shall be interchangeable.

Any retrofit or post-delivery change made to any one unit of the FARE SYSTEM, equipment or FARE SYSTEM component shall be made identically to all units at any time during the warranty period or while a maintenance agreement is in effect; except as may be otherwise authorized by Palm Tran for the purpose of experimentation, test, or evaluation. This provision does not apply in cases of minor changes to subcomponents that do not impact performance or functionality of the FARE SYSTEM.

6.5 Design Life and Non-Proprietary Technology

In general, the required useful life of the software and hardware composing the proposed FARE SYSTEM delivered under this Contract shall be designed to provide a minimum usable life of at least 15 years. The proposed FARE SYSTEM and underlying designs upon which the CONTRACTOR's FARE SYSTEM components are based shall be Revenue Service Proven.

In addition to the above, the FARE SYSTEM shall comply with the following:

1. The FARE SYSTEM shall be scalable such that incorporating technology upgrades may be done with minimal, if any, redesign of components or modules, extensive software revisions or other extensive work.
2. Wherever possible, commercial-off-the-shelf (COTS) components should be used in the design and development of the FARE SYSTEM. These COTS should be available from multiple suppliers.
3. The FARE SYSTEM shall be designed using open commonly accepted standards for all components of the FARE SYSTEM, including media, interfaces, software design, communications protocols, and other relevant design components.
4. All APIs, software developer kits (SDKs), interfaces and protocols shall be defined, documented and licensed, including associated intellectual property, to Palm Tran.
5. Media designed for use within the FARE SYSTEM; e.g., smart card, shall be available from multiple sources. The CONTRACTOR shall provide Palm Tran with the specifications and documentation necessary to support future procurement of the FARE SYSTEM media.
6. All Documentation shall be licensed to Palm Beach County and Palm Tran, Inc.

6.6 Materials and Workmanship

For FARE SYSTEM Devices, all finishes shall resist corrosion, abrasion and scratching. All exterior surfaces shall be made of brushed or satin finish stainless steel, suitably reinforced for rigidity, and with no external or removable fasteners that provide access to the interior of the FARE SYSTEM Equipment. All exterior surfaces shall be clean with all corners rounded and edges deburred. There shall be no exposed bolt heads, nuts, sharp edges or cracks on the outside surfaces. Wherever stainless steel is used in the

FARE SYSTEM, it shall be 304-Grade. Where dissimilar metals are in contact, adequate protection shall be provided to prevent galvanic corrosion in the contact areas with the exception of plating.

The materials used for the other FARE SYSTEM components of the proposed system should be suited for the environment in which these will be installed without compromising on security and prevention of theft, unauthorized access and vandalism.

All basic lowest replaceable units (LRUs) shall be fully interchangeable between similar FARE SYSTEM Equipment without the need to adjust for compatibility, except for required software adjustments relating to the location of the FARE SYSTEM Equipment or other identifying information. Electrical and mechanical components within the LRUs shall be built to tolerances that permit full interchangeability of components while minimizing wear. Standard, commercially available components shall be used wherever possible, particularly for items that require replacement at predictable cycles or time intervals.

Tolerances shall be established for initial manufacturing, and wear limits shall be defined for service life expectancy. A minimum of adjustment points shall be required to compensate for wear.

No screws or other fasteners shall be permitted to protrude from the exterior of any enclosures. All exposed fasteners shall be stainless steel of an accepted tamper-proof design. No self-tapping screws shall be used in areas where dismantling can normally be expected more frequently than once every five (5) years. The CONTRACTOR shall minimize the number of different sizes and styles of fasteners used. All fasteners that are not stainless steel shall be plated with cadmium or zinc.

In addition to the above, the FARE SYSTEM shall comply with the following:

1. The CONTRACTOR shall be responsible for all materials and workmanship. It is the CONTRACTOR's responsibility to design, select and apply all materials and workmanship to meet the stated requirements.
2. The CONTRACTOR shall furnish equipment and materials from the manufacturers identified in the CONTRACTOR's submittals, unless otherwise approved by Palm Tran.
3. If, at any time prior to FARE System acceptance and throughout the Warranty, it is found that sources of material that have been approved do not furnish a uniform product, or if the product from such sources proves to be unacceptable, the CONTRACTOR shall, at no additional expense to Palm Tran, take any and all steps necessary to furnish acceptable materials.
4. The CONTRACTOR shall select and supply parts, components, subassemblies, modules, and complete assemblies, as well as software and other essential elements of the FARE SYSTEM, based on projected availability and anticipated provision of long-term Original Equipment Manufacturer (OEM) support appropriate with the Design Life.
5. The CONTRACTOR shall alert Palm Tran in writing whenever a necessary part, component, subassembly, module, complete assembly or support for OEM material is being discontinued or whenever any such module is nearing obsolescence, during the life of the contract. The CONTRACTOR shall supply such alerts at least 90-days in advance to enable Palm Tran to make necessary provisions to maintain FARE SYSTEM functionality beginning at System Acceptance.

6.7 Physical Characteristics

The FARE SYSTEM components and respective mounting fixtures shall be designed and constructed to protect against and deter theft, unauthorized access and vandalism. In addition, the design and

construction shall minimize the effects from vandalism and prevent unauthorized removal of FARE SYSTEM Components from installed Locations. Also, the design and construction shall facilitate access by authorized personnel.

6.8 Environmental Conditions

This section describes environmental factors to which, at a minimum, the FARE SYSTEM Equipment shall be subjected to during their operation, and for which they must be designed to preclude from impacting FARE SYSTEM operators.

The CONTRACTOR is to assure proper operation and make provisions for the supplied FARE SYSTEM Equipment to work in the climate limits existing at the locations. The components composing the FARE SYSTEM will be selected to withstand the typical conditions within a public transit environment and that of Palm Beach County and the South Florida Region, which can experience extreme levels of humidity, heavy precipitation, and hurricanes, as well as salt given its proximity to the ocean.

All equipment to be installed in Palm Tran facilities shall be designed specifically for that space. Normal operation of such equipment in this environment will not in any way impair equipment performance or operational life.

The FARE SYSTEM shall be designed to detect failure of any climate controlling device, record such failures in an event database record, issue a notification of a maintenance event through the FARE SYSTEM Device Monitoring System described in Section 30.8.2, and execute a controlled shutdown of FARE SYSTEM components.

6.8.1 TVM Equipment Environment

TVM Equipment shall be designed for installations in an open environment with no shelter provided over the TVM Equipment. The TVM Equipment shall be exposed to elements including direct sunlight, wind-driven rain (hurricane categories 1 through 3), severe lightning, snow, ice and presence of salt and other pollutants. The TVM Equipment shall be able to withstand the conditions of the service operating environment encountered. The TVM Equipment shall operate reliably when subjected to dust, moisture, electromagnetic interference, power fluctuations, vibration and other adverse conditions. TVM Equipment shall function within the range of environmental conditions found at the locations in the West Palm Beach region.

6.8.2 Off-Board Climate

The TVM Equipment shall be capable of being operated at the specified performance levels, stored, and maintained without impairment resulting from the natural or induced environmental conditions within which Palm Tran will operate or store the equipment. The CONTRACTOR shall design the TVM Equipment to be impervious to liquid ingress caused by driving rain and incidentally splashed water such as would occur during routine equipment and/or platform cleaning. TVM Equipment enclosures shall comply with International Electrotechnical Commission Standard 529 (IEC 529) to level IP34 or equivalent.

The coin, bill, ticket and other openings and enclosure joints for FARE SYSTEM Equipment will be subject to incidental moisture from power washing, patrons and cleaning solutions, and shall be designed to assure proper operation of such equipment under such conditions. All exposed surfaces including any push buttons, display screen, coin and bill components, smart card readers, etc. shall be unaffected by detergents and cleaning solvents used by Palm Tran. Means shall be provided to expel moisture within



the devices to assure continued, reliable operation. Refer to EN60529 (1992) IP54 standards for enclosures.

The CONTRACTOR shall use the following climatic factors as design guidelines and shall consider these as operational requirements. Actual localized temperatures and conditions within the TVM Equipment may be more severe than the ambient climatic conditions specified in Table 3 - Off-board Climatic Conditions. Accordingly, the CONTRACTOR shall be responsible for evaluating these during its design effort. Additionally, the CONTRACTOR shall be responsible for advising Palm Tran if there are any special environmental factors to which its equipment may be sensitive that are not listed below. The CONTRACTOR shall ensure that no equipment damage occurs during manufacture, storage, and shipment resulting from climatic conditions, which differ from those specified below.

The TVM Components shall be able to operate and not suffer any degradation in performance under the following environmental conditions:

Table 3 - Off-board Climatic Conditions

Requirement	Description
Storage Temperature	-25°F to +150°F
Operating Temperature	-15°F to +120°F
Thermal Shock	±40°F in 1 hour (non-condensing)
Solar Radiation	250BTU/hr./ft²
Relative Humidity Range	30% to 99% including condensation (FARE SYSTEM Components need not function when wet, but must function properly under humidity conditions experienced in the South Florida Region)
Wind	Hurricane Category 3
Rainfall	8 inches per 24-hour period
Airborne Dust	Airborne particulates shall not affect the operation of FARE SYSTEM equipment at rail platforms (Tri-Rail locations). Up to 180 micrograms per cubic meter, with iron and salt particles -- SAE J145
Inclination	0° to 4° off vertical
Elevation	800ft above sea level (max)
Water/Solvent	Water spray on equipment from cleaning floors and walls, industrial cleaning solvents and standard cleaning chemicals used by Palm Tran, and incidental rain, mud, salt, snow and slush will come in contact with FARE SYSTEM Equipment.
Primary Voltage	Source power of 120 VAC (+/-10%), single phase, 3-wire, 60 Hz (+/-1%) Micro cuts in the power supply of up to 15 ms, with a recurrence of 100 ms The following voltage excursions: <ul style="list-style-type: none">• Sag: -15%• Surge: 15%• Transient Impulse: 75 volts• Common Mode Noise: 5 volts
Grounding/Lightning	Good ground available/Lightning protection available to protect from high voltage (1000V) spikes from lightning

6.8.3 Shock and Vibration

The FARE SYSTEM components shall be designed to withstand structure-borne stresses and vibrations caused by the motion of buses, trains and other vehicles, daily customer usage, passing of trains or other vehicles, as well as emergency braking of fully-loaded trains.

The FARE SYSTEM Components that are sources of vibration shall be sufficiently damped to eliminate externally audible resonance or affect the integrity of other internal components.

The FARE SYSTEM Components shall be designed to withstand structure-borne stresses and vibrations caused by the passing of vehicles.

The FARE SYSTEM Components, including all interior-mounted components and assemblies, shall resist horizontal shocks equal to $5\text{ g} \pm 20\%$ (where "g" is the earth's gravitational constant or 9.81 meters per second, squared) and in the vertical axis equal to $1\text{ g} \pm 20\%$ for $10\text{ ms} \pm 2\text{ ms}$ without permanent deformation or failure of the FARE SYSTEM Components.

There shall be no failure of mounts or decrease of operational characteristics of any subsystems under conditions simulated by a sinusoidal sweep vibration test at a sweep rate of one-half octave per minute, from 5 Hz to 25 Hz to 5 Hz, at a peak vibratory acceleration of 0.25 g for a minimum of 50 cycles when applied to each of the three axes and repeated continuously for 5 complete cycles. These tests shall be performed during the Environmental Test. If any assembly or component is a source of vibration, measures shall be taken to dampen the resonance.

The FARE SYSTEM Components and mounts shall be sufficiently constructed to comply with Florida State and Local Codes where applicable regarding stability of structures and contents in earthquakes, flooding, high velocity wind and other natural phenomena.

6.8.4 Farebox Components Environment

The Fareboxes and associated components to be provided by the CONTRACTOR for installation and use on-board Palm Tran's vehicles shall be designed, built, and installed for the harsh, high shock and vibration operating environment in which these Fareboxes are to operate with high volume customer use. All Farebox Components shall be available at the instant of engine start, including buses stored outside, and remain operational throughout the time air conditioning and/or heating systems bring the vehicle to normal ambient conditions. Operation of the FARE SYSTEM equipment in a revenue service environment will not in any way impair such equipment performance or operational life, during the contracted/specified operational life of such equipment.

All CONTRACTOR-provided Farebox Components will remain operational and shall operate properly in the presence of any common or typical airborne particles, greases, oils, fuel vapor and exhaust and other contaminants accumulated on coins, tokens, bills and contactless smart card (CSC) media, as well as, under the environmental conditions encountered on-board the vehicles including conditions pertaining to temperature, humidity, dust/dirt, power variations, vibration, and electrical interference. All equipment housings shall be weather-proof and dust-proof.

Because of bus interior cleaning, which may involve pressure washing with hoses, as well as persons boarding during snowy, rainy and humid conditions, the interior of the bus can be expected to become wet, and there may be accumulations of moisture, salt, mud, dust, detergents, solvents and tarnishes. All Farebox Components shall be adequately protected and not suffer any damage or degradation of operation because of the introduction of water from windblown water or snow, or by water dripping from patron's clothing, body, accessories, coins, bill currency, fare media, or other sources. Additionally,



the Farebox Components mounted on the vehicle floors can be expected to become wet and will accumulate salt, mud, and moisture. The design of the Farebox Components shall be such to protect the FARE SYSTEM from these conditions and to prevent degradation of operation under long term exposure to these conditions. All Farebox Components shall be protected to prevent degradation from exposure to moisture or dust raised by interior cleaning.

The Farebox Components provided by the CONTRACTOR shall be tested and certified to meet the more stringent of the standards below:

- Standard transit agency specifications to which this document is attached.
- SAE J1455 and all standards contained therein.

The Farebox Components shall be able to operate and not suffer any degradation in performance under the following environmental conditions:

Table 4 - On-Board Environmental Conditions

Requirement	Description
Storage Temperature	-25°F to +150°F
Operating Temperature	+32°F to +110°F
Thermal Shock	±15°F in 1 hour (non-condensing)
Solar Radiation	250BTU/hr./ft²
Relative Humidity Range	13% to 95% including condensation (FARE SYSTEM Components need not function when wet, but must function properly under humidity conditions experienced in the South Florida Region)
Vibration	Operating: 1.5g RMS, 5 to 150 Hz Endurance: 8g RMS, 100 to 1,100 Hz Mil Std 810C
Shock	30g of 6ms Mil Std 810C
Airborne Dust	Up to 180 micrograms per cubic meter, with iron and salt particles – SAE J145
Inclination	0° to 10° off vertical
Elevation	800ft above sea level (max)
Water/Solvent	Water spray on FARE SYSTEM Components from cleaning floors and walls, industrial cleaning solvents, rain, mud, snow and slush may come in contact with FARE SYSTEM Components. <ul style="list-style-type: none">• Refer to EN60529 (1992) IP54 standards for enclosures.• Fully protected from power washing (to be tested during <u>Factory Integration Testing (FIT)</u>)
Primary Voltage	12VDC nominal; 10VDC – 18VDC for short duration up to 1000V spikes of a few milliseconds in duration
EMI	Heater and air conditioning controls high voltage arcs (300V)
Grounding/Lightning	Good ground available/Lightning protection available to protect from high voltage (1000V) spikes from lightning

Any Farebox Components installed on the exterior of the bus (including cable Runs under the floor) shall be thoroughly sealed in a manner Acceptable to Palm Tran, such as to prevent leakage of rain or bus washing water, detergent and solvents into the bus throughout the life of the installation.

Computer FARE SYSTEM Components provided to support bus operations shall meet the same applicable environmental requirements as TVM Components.

6.9 Security

In general, all FARE SYSTEM devices shall be designed and constructed with security in mind. This applies to both HW and SW components. All HW shall be designed to prevent/deter unauthorized access by ensuring there are no seams, gaps, fasteners, etc. that would allow use of pry bars or other tools to gain access. Any attempts at gaining access should leave clearly visible indications. All SW shall be designed to detect and report any attempts to gain access to the FARE SYSTEM, whether authorized or unauthorized. All data shall be secured and protected, especially any personal and/or financial data collected, transmitted and stored via the FARE SYSTEM. All data transactions, records, events, alarms shall include identifiers for date, time, location, user, machine, as well as other information required for the type of data being recorded.

Additionally, encryption shall be employed when transmitting information, especially personally identifiable information (PII), revenue data, and other information deemed sensitive in nature. Further, account access should utilize strict username/password best practices as well as two-factor authentication.

6.9.1 FARE SYSTEM Revenue Components

All FARE SYSTEM Components used to house revenue and/or fare media pre-encoded with value, shall be designed and constructed to ensure the highest level of security for the storage and transfer of revenue. The FARE SYSTEM Revenue Components shall be constructed in a configuration to fit within the dimensions of the respective FARE SYSTEM Device. Any FARE SYSTEM Revenue Component designed to contain a mixture of coins and bills shall be designed to keep the coins and bills physically separated.

All FARE SYSTEM Revenue Components shall be designed with an interlock function that will preclude operation of the respective FARE SYSTEM Device to accept coins/bills without a properly configured FARE SYSTEM Revenue Component inserted. Proper configuration shall be achieved through authorized Revenue Servicing of the respective FARE SYSTEM Revenue Component. Clearly visible indicators shall be designed in each of the FARE SYSTEM Revenue Components that allow visual inspection to determine quickly whether the Component has been serviced or not. Typically, a Green/Red color indication is used; where, 'Green' indicates 'Good' and 'Red' indicates 'Needs Servicing'.

The materials and construction techniques shall be such that a fully loaded FARE SYSTEM Revenue Component, if dropped to a hard floor and landing on any side or corner from a height of forty-eight inches (48"), shall not suffer any security breach. The FARE SYSTEM Device and associated FARE SYSTEM Revenue Component when fully loaded will not be distorted.

All FARE SYSTEM Revenue Components shall be serialized with a unique serial number clearly indicated on the outside of the component with a weather resistant barcode. No two serial numbers or barcodes will be the same.

In addition, each FARE SYSTEM Revenue Component shall be equipped with a contactless Radio-Frequency Identification (RFID) "label" (RFID-Tag), which contains the unique serial number that can be read by the respective FARE SYSTEM Device upon insertion.

Each individual FARE SYSTEM Revenue Component shall be able to report the history of its movement as well as be tracked throughout the entire FARE SYSTEM, from first insertion through revenue servicing,

to/from repair/storage, and back in to a FARE SYSTEM Device. Accurate transmission and recording of a FARE SYSTEM Revenue Component identification code shall occur automatically.

If the RFID-Tag requires a battery, it shall have a minimum lifetime of three (3) years. Low battery conditions shall be recorded and reported to the FARE SYSTEM Backend. Replacement of the battery shall not require replacement of the RFID-Tag, nor unsoldering or soldering of the battery or other components.

The FARE SYSTEM Backend shall maintain an inventory of all FARE SYSTEM Revenue Component Serial Numbers in the entire FARE SYSTEM and shall automatically report any FARE SYSTEM Component that fails to meet location and movement criteria.

6.9.2 Locks and Keys

Where required by the design of the FARE SYSTEM Components, High Security Locks and Keys, which are unique and specific to Palm Tran, as defined herein, are to be used.

If keys are used, they must be unique and different in design and tumbler code from all other keys used in the FARE SYSTEM and at other agencies with similar FARE SYSTEM Devices. All High Security Keys and associated removable assembly must have that key's unique serial number engraved/inscribed or affixed on the assembly and the key. A list of all serial numbers will be provided to Palm Tran's Key Security Representative (KSR) prior to delivery of any such keys to any Palm Tran property.

If keys are used, all locks and keys used in the FARE SYSTEM shall be Medeco or equivalent high security type, or equivalent, defined as follows:

- Shall be pick resistant and employ a multi-tumbler;
- Shall employ hidden or complex keyways requiring the insertion and/or removal of the key only in the designated rotational positions;
- Shall be such that impressions or duplications are not possible to create unauthorized facsimile of the key(s) that would work in the lock(s);
- Shall be registered and new;
- Additional keys shall be available only from the manufacturer (or authorized agent) by authorized personnel; and
- Shall have a unique serial number engraved on the keys and associated removable assemblies.

~~For any FARE SYSTEM Device maintenance, non-revenue, opening(s), Palm Tran requires use of a high security programmable electronic type; e.g., Videx Cyberlock or equivalent. The CONTRACTOR shall be responsible for the electronic key system set up and configuration. The CONTRACTOR shall supply any required electronic keys, associated management software, and a key programming device, as well as provide training to Palm Tran on how to change the keys when necessary.~~

All associated Keys and Locks information shall be described in the Proposer's Proposal and provided as part of the PDR (PDR - 1).

To be included with the PDR – 1 package, but delivered separately, the CONTRACTOR shall provide a document illustrating all key types and combinations. This document shall be delivered only to the KSR and marked as secure and confidential.

It is incumbent upon Proposers to familiarize themselves with exposures to violate the security of the FARE SYSTEM, especially the revenue components, and the methods that may be utilized to compromise such security.

Keys are to be delivered to the KSR as part of the FDR (FDR - 1). The CONTRACTOR must have in place secure procedures for ordering, manufacturing, and delivering initial and subsequent key orders. This procedure is to be provided as part of the PDR (PDR - 2). The CONTRACTOR shall be fully responsible for any losses resulting from keys improperly delivered or handled by its personnel. If the proper procedure is not followed by CONTRACTOR staff and a key is lost or compromised, Palm Tran may decide to rekey all associated locks at the CONTRACTOR's expense.

The CONTRACTOR shall maintain a registry of personnel authorized by Palm Tran to obtain High Security keys. Only personnel whose names and signatures are on this list will be provided with High Security replacement keys or locks. Throughout the life of the FARE SYSTEM and before sending such material the CONTRACTOR shall check all orders against the list of authorized personnel.

6.9.3 User Account Security

The CONTRACTOR is responsible to ensure that any feature, function, capability, account, etc., requiring authenticated access are structured as follows:

- Usernames, Passwords and any other credentials are never sent via clear text.
- Password resets and associated reset tools never have access to the current encrypted passwords.
- Passwords shall be stored using a high-level encryption; e.g., Triple-DES or AES, and should be both salted and hashed as per the U.S. Department of Defense regulations.
- For additional security, two-factor authentication shall be employed.
- For the protection of user data, any signup page shall utilize Secure Socket Layer (SSL) protocols.

The Proposer shall describe within their Proposal their proposed security schemes associated with the proposed FARE SYSTEM accounts.

6.10 System Security

The FARE SYSTEM shall be designed to use a tokenization process that meets or exceeds PCI tokenization guidelines. To strengthen the system security further, Palm Tran would like the FARE SYSTEM to have a certified Point-to-Point Encryption (P2PE) solution for all Payment Data. The purpose of the Tokenization and encryption solutions is to alleviate the need to store, and will allow secure processing of, payment data within the FARE SYSTEM.

In addition to the above, the FARE SYSTEM shall comply with the following:

1. The CONTRACTOR shall ensure that hardware firewalls are established around all system-specific servers, in addition to software firewalls and other traffic filtering security measures as required.
2. Security sensitive Information will be handled separately according to Palm Beach County's ISS Guidelines and a procedure to be jointly developed between the CONTRACTOR and Palm Tran, and subject to Palm Tran approval. Security Sensitive Information will include:
 - Information that would allow an individual to duplicate, skim or counterfeit media or FARE SYSTEM accounts.
 - Information that would allow an individual to overcome locking features or interlocks intended to prevent access to revenue.

- Other information that would allow an individual to divert revenue, whether electronic or cash, from the FARE SYSTEM, without such diversion becoming evident to Palm Tran through normal reporting by the FARE SYSTEM.
 - Any other information designated by Palm Tran.
3. Any FARE SYSTEM equipment that will capture, store, transmit or process payment card data will be certified compliant with all applicable PCI standards, either by the CONTRACTOR or by the OEM (as applicable). The CONTRACTOR shall be responsible for demonstrating that all applicable components of the FARE SYSTEM are PCI compliant before acceptance from Palm Tran.
 4. The CONTRACTOR shall be responsible for providing a PCI compliance plan as part of design review and supporting certification for the FARE SYSTEM. The CONTRACTOR and their QSA shall work with Palm Tran's merchant acquirer and QSA to finalize such plan, subject to the approval of the merchant acquirer, the QSA and Palm Tran. The CONTRACTOR shall be responsible for conducting all testing required to achieve certification and achieving consensus between their QSA and Palm Tran's QSA, prior to System Acceptance.
 5. As delivered, all relevant FARE SYSTEM Equipment with bank card readers shall be certified as compliant with PCI and EMV standards in effect at the time of installation for the acceptance of magnetic stripe, Contact Media and Contactless Bank Cards and (if applicable) MSD bank cards.
 6. The CONTRACTOR shall be responsible for ensuring compliance with all requirements associated with EMV payment acceptance in the U.S., as they are defined by the card associations and issuers.
 7. Applicable portions of the FARE SYSTEM software shall be certified to newer versions of the EMV standard as they are published during the warranty and any exercised maintenance contract periods at no cost to Palm Tran.
 8. The approach to FARE SYSTEM security will include not storing Personally Identifiable Information (PII) and payment card data whenever possible, and only storing or transmitting PII or payment card data in tokenized or encrypted form, when necessary and otherwise in compliance with all applicable law and PCI requirements.
 9. The FARE SYSTEM components that will capture, store, transmit or process PII will comply with all relevant Florida State Laws, and otherwise comply with all applicable laws and PCI requirements.
 10. Interfaces between the FARE SYSTEM equipment and the FARE SYSTEM Backend will be over an Internet Protocol (IP) network, or equivalent secure networking protocol (Proposer shall explain how the alternative protocol works, what are the advantages, and how security of transactions are maintained). Where required by Palm Tran, the Interfaces will be secured using TLS, or equivalent strong encryption protocol.
 11. All payment data will be secured from the point when it is provided by the user to when it is received by the merchant acquirer. All points of interaction, including any card readers, will be SRED certified, unless otherwise approved by Palm Tran, to support P2PE and/or token generation of payment card data, as deemed necessary during design review. When communications are over public networks, Virtual Private Networks will be used to increase security. VPNs will be used for all communications where practicable.

12. Any portion of the FARE SYSTEM vulnerable to cyber-attack will comply with the NIST Cybersecurity Framework, standards consistent with NIST security standards and guidelines and all applicable state and federal law.
13. The CONTRACTOR shall actively monitor the FARE SYSTEM to detect potential intrusions. The CONTRACTOR shall submit, among other plans, a data breach prevention and response plan for Palm Tran's review and approval, and the CONTRACTOR shall comply with the accepted plan throughout the Term of the contract.
14. The FARE SYSTEM will include robust anti-virus protection. The choice of anti-virus software will comply with Palm Tran IT Security Standards and will be subject to Palm Tran's review and approval during design review. The CONTRACTOR shall be responsible for keeping all anti-virus software up to date.
15. UI access to all elements of the FARE SYSTEM Backend and FARE SYSTEM Back Office, and backup and disaster recovery systems, will support two-factor authentication and be managed using Active Directory.
16. The FARE SYSTEM shall have the ability to quickly recover from power Failures. The FARE SYSTEM shall automatically return to its operating state, without loss of FARE SYSTEM Data.
17. The FARE SYSTEM security features will be maintained, and all security issues will be addressed by the CONTRACTOR as they arise. The CONTRACTOR shall provide software updates, including software patches, bug notifications and refinements to address identified security issues, all as further set out in the Contract Documents. This will include testing of and certification for use of security updates required by the server operating system or database system.
18. Physical access to FARE SYSTEM hardware containing PII and/or payment data will be restricted through the use of physical keys, employee IDs and passwords.
19. Physical security for the FARE SYSTEM will comply with the latest PCI standards, applicable law and best practices.

6.11 Modular Design and Interchangeability

The FARE SYSTEM shall have a modular and interchangeability design for all relevant software and hardware components. In the event of a failure, these modules will allow quick and easy field replacement to return the device back in to service in a minimal time. The modular design shall accommodate upgrades and configuration changes without requiring significant system replacement or redesign.

All given FARE SYSTEM Equipment, such as Farebox, TVM, cashboxes, vaults, etc. whose quantity is greater than one, shall be identical in manufacture and function; where their parts within shall be interchangeable.

All parts, components, modules, assemblies and removable devices included in the FARE SYSTEM shall be fully interchangeable among devices of the same function without the need to make adjustment for proper compatibility.

All like printed circuit boards shall be interchangeable between FARE SYSTEM component groups without additional adjustment, except for required software adjustments.

6.12 Safety

All of the CONTRACTOR and subcontractor employees working on rail platforms, rights-of-way, buses and garages will comply with applicable Palm Tran operations rules and procedures, including safety rules and regulations, to be provided by Palm Tran staff at the initiation of project tasks utilizing external staffing.

The CONTRACTOR shall name a Safety Coordinator, whose role could be fulfilled by the CONTRACTOR's PM, to coordinate with Palm Tran's Safety Representative and PTPM to have trained all CONTRACTOR staff who will be working in the field and/or Palm Tran premises.

6.13 Human Factors

The principles of human factors engineering shall be applied throughout the design of the FARE SYSTEM to facilitate ease of use and safety for passengers, operators, maintainers, servicers, and FARE SYSTEM components.

6.13.1 Accessibility for Passengers with Disabilities

The FARE SYSTEM shall comply with the Americans with Disabilities Act (ADA), including ADA Regulations governing Operation, Instructions, etc., and relevant regulations at the federal, state and local level, at NTP.

Proposer shall provide with its Proposal, documentation illustrating how its proposed FARE SYSTEM complies with ADA. Further, as a part of the CDR package (CDR - 1), ADA compliance will be verified.

6.13.2 Title VI

Proposer shall provide with its Proposal, documentation illustrating how it will comply with Title VI provisions and language for English, Spanish and Creole.

6.14 Aesthetic Requirements and User Interfaces

The CONTRACTOR shall employ expertise and best practices in ergonomics, human factors, and industrial and graphic design to assist in the development of passenger and operator interfaces for all system components. The CONTRACTOR shall support internal and external research with stakeholders and a representative cross-section of customers, including ADA customers, to ensure input from the customer perspective.

All FARE SYSETM field device components — including interface display, lettering, lights, colors, tactile feedback, brightness, graphics, animation, screen savers, surface texture, component size and height — will be designed with consistent Palm Tran's branding and submitted to Palm Tran for approval.

All FARE SYSTEM field device components shall provide a consistent customer experience, with similar look and feel across FARE SYSTEM Equipment, and FARE SYSTEM Websites and consistent interface structure and logic. Palm Tran and designated representatives will participate in an industrial design review with the CONTRACTOR to define the customer experience for field device components.

The FARE SYSTEM and all field devices shall comply with the latest applicable ADA standards. The FARE SYSTEM will comply with the most recent version of the ADA Accessibility Guidelines (ADAAG). The

CONTRACTOR shall submit descriptions and drawings of how each FARE SYSTEM component will achieve ADA compliance at the Preliminary Design Review, for Palm Tran's review and approval.

The FARE SYSTEM Equipment displays, graphics, signage and all other instructions, labels and information contained on such equipment will be visually readable within all positions of the visual patron interfaces.

The FARE SYSTEM Equipment will provide patrons with displays, graphics and signage, controls and mechanisms that are easy to understand, simple to use, and conveniently located. By following instructions given on and by such equipment, an inexperienced user shall be able to understand all transaction processes and results. All such UIs will be user-friendly; that is, safe, predictable, simple to use and in accordance with other applicable human engineering principles.

The FARE SYSTEM Equipment will accommodate the broad range of patrons that use public transportation. The range of patrons paying fares will include commuters, infrequent riders, children, the elderly, patrons with impaired vision, patrons in wheelchairs, patrons with limited communications skills including the illiterate, and customers who are hearing impaired.

The FARE SYSTEM Equipment, including the FARE SYSTEM Websites, will be compliant with Title VI, including support of multiple languages, with provision of both audio and text translations for Creole, English and Spanish. The audio and text translations will be submitted to Palm Tran for approval.

6.15 Expandability

The FARE SYSTEM Backend shall support integrated data reporting between all deployed devices. The FARE SYSTEM is to be expandable to allow for the addition of data from other entities, which may join with Palm Tran in its FARE SYSTEM. Sufficient expandability shall be provided to allow incorporation of additional features in the future; as such features become available.

6.16 Electrical Requirements

All electronic FARE SYSTEM Equipment/Components shall be fully solid-state and using the CONTRACTOR's latest technology. Design and construction shall be consistent with commonly accepted and industry recognized engineering practices. Design and construction shall be executed in a neat and skillful manner. All FARE SYSTEM components shall be new and of the latest version. All FARE SYSTEM components and work shall meet or exceed the applicable standards codes, as well as state and local installation and construction codes in effect at NTP.

All memory, for all computers contained within the various FARE SYSTEM components, shall be available for data storage, program execution, and all input/output (I/O) operations, without restrictions. The memory of each delivered computer shall be expandable, in the field, four to six times the size of the originally delivered memory configuration.

All electronic storage systems shall be fault tolerant, providing security for and retention of data and revenue in the event of any error or other conditions exceeding the normal operating parameters.

Processing capacity for each computer shall be sufficiently sized such that under peak load no more than fifty percent (50%) of its processing capability is utilized. The CONTRACTOR shall demonstrate, through simulation, the processing capability at peak loads as part of the PDR (PDR - 3).

All storage devices shall have sufficient storage capacity, under peak loading conditions; such that after one (1) year of use, only fifty percent (50%) of each storage device's capacity shall have been used. All

computers shall allow for the installation of additional storage devices up to at least six times the delivered storage capacity. When the capacity of any storage device exceeds approximately 75% of its storage capacity, the affected FARE SYSTEM Component shall send an Event Message to the FARE SYSTEM Backend. This notice shall remain in effect until the remaining storage capacity is below 60%. When the capacity of any storage device approaches 100%, the affected FARE SYSTEM Component shall send an Event Message to the FARE SYSTEM Backend and be placed Out of Service until the storage capacity is below 60%. All FARE SYSTEM Components shall be capable of operating off-line for a minimum of 72 hours without losing any information in storage.

All storage device access and transfer times shall be sufficiently fast enough such that for any I/O operation, under peak load, there will be no degradation in I/O performance.

All FARE SYSTEM Components must be delivered fully configured, debugged and stabilized, operating systems installed, disk drives formatted to full capacity and the FARE SYSTEM having gone through full testing of all components. All manuals appropriate to the operating systems and commercial applications installed on the FARE SYSTEM must be included. Appropriate software master media, licenses, and documentation shall come with the FARE SYSTEM.

All FARE SYSTEM Components shall be tested in-house with test software and proposed printers for compatibility before delivery and shall be proven in operation before delivery. If any software package has difficulty running on the microcomputer, or a hardware problem occurs, the CONTRACTOR shall correct the problem at its own expense. Test cases for pre-shipment testing are to be developed by the CONTRACTOR and provided as part of the FDR package (FDR - 2).

Commercially available operating systems shall be used and identified in the Proposer's Proposal. Application software shall be provided by the CONTRACTOR and shall include all software required to provide the proposed FARE SYSTEM functionality. Commercial programs provided with the FARE SYSTEM must be in production and commercially available in the open market current. The most recent version must be provided for all delivered software. Technical support must be readily available from the original software publisher.

6.16.1 Electrical Design Criteria

Hardware, including the case, heat sinks, mounting brackets, etc., shall be protected against moisture, oxidation, and common airborne contaminants. Hinges and latches shall be of a metal not subject to corrosion.

The need for manual adjustments shall be avoided wherever possible by using appropriate circuitry, stable components, software adjusted parameters, and high tolerance circuits.

All FARE SYSTEM Equipment that must operate independently and conduct time-sensitive transactions shall contain a real time clock to store the time and date. This information shall be retained and supported by a lithium battery when power is not applied.

All FARE SYSTEM Equipment shall incorporate power sensing circuitry and/or logic to detect power levels and protect against and prevent damage and/or loss of information. The complete loss of power to FARE SYSTEM Equipment shall not cause any information or data contained in electronic memory to be lost or altered. The unit shall be able to hold and support the volatile portion of the memory after being removed from power for not less than thirty (30) days after removed from a primary power source. Lead acid batteries, which may leak, shall not be used for this purpose.

The circuits shall be designed and assembled to permit testing and/or voltage measurement of the various components/boards.

The arrangements of the electrical and electronic components shall be such as to permit adequate ventilation to disperse the heat created and to preclude degradation of components and performance.

6.16.2 Semiconductor Standards

All transistors, diodes, integrated circuits and electrical components shall be available from at least two different U.S. suppliers, except where specific supplier requirement of the Contract make this infeasible.

6.16.3 Printed Circuit Board Standards

Printed Circuit (PC) boards shall be of the glass epoxy type with conducting copper laminate. The copper laminate shall be firmly attached to the board. The copper laminate shall be firmly attached to the board and shall be resistant to blistering and peeling when heated with a soldering iron.

The component side of the board shall be printed with the component references and such other information as may be required to aid in repair and troubleshooting of the board. Sufficient clearance between components shall be provided to allow testing, removal, and replacement without difficulty due to lack of space.

CONTRACTOR's PC boards shall be at a minimum National Electrical Manufacturers Association (NEMA) Grade FR-4.

All circuit boards having on-board processors shall be provided with polarized plug connectors. No harness wiring shall be directly connected by means of solder to any board that must be removed for maintenance or inspection. Boards used solely for mounting sensors and incorporated into LRUs may have solder connections.

All printed circuit boards shall be industrial grade with heavy-duty traces allowing multiple replacement of the same component. Holes shall be double plated through.

All printed circuit boards shall meet the following requirements:

- Be conformal coated to resist the effects of moisture, or
- Be mounted in an enclosure that meets CENELEC protection code IP 55 (Dust-protected and protected against water jets) and CONTRACTOR warrants them for the life of equipment against degradation due to moisture, fungus, dust and corrosion.

All circuit boards shall be factory pre-tested for a minimum of seventy-two (72) hours prior to their final inspections and installation within any of the FARE SYSTEM components.

Provisions shall be made on all PC boards for connector "keying" to prevent incorrect insertion.

6.16.4 Microcomputer Standards

On PC boards, EPROMs and microprocessors shall be installed in standard sockets or surface mounted; all other integrated circuits shall be soldered. In locations where vibration can result in release of the microprocessor from a socket, the microprocessor shall be soldered in place.

6.16.5 FARE SYSTEM Processor Logic Boards

Each FARE SYSTEM Computing device shall be equipped with one or more USB ports to provide for programming information, or the upload and download of data. The USB port shall be at least Version 2.0 and a Standard-A Receptacle. The position of the USB port shall allow clearance for easy insertion and removal of USB plug devices.

A real time clock shall be included to store or calculate the time, date, and day-of-week to the level of seconds. For any 24-hour period, the clock shall not deviate more than ± 2 -seconds and accommodate Daylight Savings Time and Leap Year adjustments correctly and automatically. The clock function shall be retained and supported by a lithium battery for a period of not less than 180-days when power is not applied to the main logic board. Correct time shall be provided by the FARE SYSTEM Backend clock when the FARE SYSTEM Device establishes communication with the FARE SYSTEM Backend.

The degradation or complete loss of electrical power to the logic board shall not cause any information or data contained in memory to be lost, altered, or otherwise corrupted. In the absence of external electrical power, the logic board shall be able to hold and support the non-volatile portion of memory for not less than 30-days and shall be fully functional upon the application of external electrical power with no maintenance or other special action. Lead-acid batteries shall not be used for this purpose.

Data shall be protected so that, in event of failure of the main logic board, data generated by the FARE SYSTEM Device prior to the failure may be retrieved through authorized means. Specific means are to be described within the Proposer's Proposal.

Each FARE SYSTEM Computing device shall be designed to place the counting of inserted coins or bills in precedence over any other function. The FARE SYSTEM logic board shall be active and fully capable of processing input at all times, requiring no manual intervention to activate the FARE SYSTEM logic board processing except as required by logical input.

6.16.6 Electrical Devices and Hardware

Palm Tran's preference is for an all solid-state technology design; however, if some elements are not, then fuses, circuit breakers or other protective devices shall be employed to protect the electronics, motors and other components from overload and damage. If and where used, they shall fall under the fingertip replaceable requirements and generally shall be accessible without disassembly of components. Location shall permit inspection and/or replacement through normal maintenance access doors or panels. CONTRACTOR shall use non-proprietary protective devices. The following shall apply:

1. All switches and controls shall be provided with debouncing circuits.
2. All fuses shall be of the standard and commercially available.
3. Contact tips shall not be placed in parallel for carrying a current load at or above the relay manufacturer's rating.
4. All relays shall be installed such that they are fully accessible for inspection, repair, or removal and replacement.
5. All relays must be socketed with captive spring retainers to hold relays in socket.
6. Switch poles shall not be placed in parallel for carrying current loads equal to, or in excess of the switch manufacturer's rating.

7. Switches shall be keyed such that, after installation, the body of the switch cannot rotate, except if reed switches are used.
8. Circuit breakers shall be either one- or two-pole devices. The ON, OFF, and TRIPPED positions shall be permanently marked on the breaker.
9. The trip elements shall be thermal-magnetic or magnetic as appropriate for the application and shall indicate when tripped.
10. All circuit breakers shall be labeled by function.

6.16.7Wiring

All wiring shall be stranded wire and be fabricated into convenient units (harnesses) and installed in standardized locations within the FARE SYSTEM Equipment. Each branch of each circuit shall be easily separated from others for troubleshooting.

Conductors that operate at potentials differing by 50V or more shall not be within the same cable. Wiring shall be point to point. If signals need to be divided or routed to different components or FARE SYSTEM components, such as interface panels, then terminal strips shall be provided. Wire dress shall allow sufficient slack for three additional re-terminations without excess tension, as well as, during maintenance functions to prevent damage to wire, cable, or subsystem modules when unpacking FARE SYSTEM components for removal or servicing. Wire shall include no butt splices. Wire and cable ties shall be snug but not so tight as to cause indentation and cold flow damage to the insulation. Adhesive installed mounting bases may be used for ties and cable support where this follows industry accepted best practice.

All wire bundles and cables within an enclosure shall be protected with flexible conduit, cable protection or edge protection, if necessary. All cables shall have strain relief and be clear of objects, moving or fixed, that could damage either objects or cable.

All major electrical, electronic sub-assemblies and devices shall be interconnected by means of polarized positive plug connectors. All connectors shall be self-locking to assure proper connections and preclude intermittent performance due to poor contacts. Connector materials shall be of the non-corroding, non-ionizing type. All plug-in components shall be retained with a positive force or locking features to hold them in position to ensure they do not work loose with the vibration that can be expected in the operating environment. Wires and multi-conductor cables shall be color-coded, marked or documented to permit positive identification.

6.16.8Electrical Noise Requirements

The CONTRACTOR's approach to electromagnetic compatibility (EMC) shall ensure that the electrical and electronic components and subsystems shall operate without being affected by or causing harmful electromagnetic interference (EMI). Protection shall be provided against radio frequency interference (RFI) emission sources, as well as internal conductive or inductive emissions.

Operation of the FARE SYSTEM Components shall not be affected by the electromagnetic fields generated by traction power (overhead catenary or third rail) at distances as close as 20 feet, or local high voltage power distribution lines at distances as close as 50 feet. Nor shall the operation of the FARE SYSTEM Components be affected by Palm Tran equipment such as lighting and communications equipment within immediate proximity to the FARE SYSTEM Components.

The Farebox Components shall be unaffected by interference such as radiation from coach equipment, including radio, lights, electronic destination signs, air conditioners, and generators shall not affect the operation of the Farebox Equipment. The Farebox Components shall not emit measurable EMI or RFI that produces harmful interference with any other on-board electronic device or system.

The CONTRACTOR shall certify the EMC of FARE SYSTEM Components to be furnished. The existing analysis and data on EMI susceptibility and EMI conductive or inductive radiation of the proposed FARE SYSTEM Components shall be properly documented and verifiable for applications that are identical or manifestly similar, may be submitted for Palm Tran Acceptance. In addition, the CONTRACTOR shall provide results of interaction analysis and testing of each FARE SYSTEM Component with regard to frequency distribution, amplitude, and harmonic content. Existing certifications, interaction analysis, and testing shall be submitted to Palm Tran for review and Acceptance during the FDR (FDR - 3). If existing test certifications are not available, then the testing shall be completed, and results submitted for Acceptance before First Article Testing.

Additional inspection and testing required to determine EMI susceptibility and to assure EMC shall be performed during the environmental testing. All inspections, tests, and analyses submitted shall conform to the requirements of ANSI C63.022, ANSI C63.4, and FCC Part 15.

Farebox Components shall comply with MIL spec 461E.

6.16.9 Grounding

All FARE SYSTEM Equipment enclosures, chassis, assemblies, panels, switch boxes, terminal boxes, and similar enclosures or structures shall be grounded. Protective grounding shall be provided to ensure that all exposed metal on any supplied FARE SYSTEM Components and are connected to a common ground point in the cabinet.

The CONTRACTOR shall meet safety requirements for the grounding system that conform with the National Electric Code (NEC), Underwriter Laboratories (UL), Society of Automotive Engineers (SAE) and local codes where applicable.

The CONTRACTOR shall provide Certification that the TVM Components furnished under this Contract have been tested to meet UL Vending Machine Criterion Number 751. Documentation citing UL Certification or Acceptable test results from independent, third-party testing of the FARE SYSTEM Components according to the procedures and requirements stated in UL Number 751 shall be submitted to Palm Tran for review and Acceptance during the FDR (FDR - 3). Prior certification of identical equipment for other projects, and "UL Field Evaluated Marked" shall be acceptable.

All FARE SYSTEM hardware will contain internal power conditioning equipment capability to handle any stray currents or grounding loops in stations without impact to operations. The design approach to address stray currents or grounding loops for above and below-ground stations may differ. It should be noted that conditions may differ between above or below ground stations and a single solution shall address both deployments.

6.16.10 TVM/Farebox Equipment Power and Voltage Requirements

The CONTRACTOR shall design, supply, install, test, and commission all elements to provide required electrical power to all FARE SYSTEM Components and systems included in the work. Electrical power shall be obtained from Palm Tran's existing power sources and shall be filtered, transformed, converted, battery-stored, and/or distributed, as required, including all necessary connections and terminations as well as being protected against damage caused by overload and electrical surge.

6.16.10.1 TVM Equipment

Each unit of TVM Equipment shall operate from a single-phase power source of 120V, 60 Hz, and 20 amps maximum. All TVM Equipment shall be designed to operate with a plus or minus ten percent ($\pm 10\%$) fluctuation in line voltage without any damage or service interruption.

Primary power shall be available at the center of the base of each piece of equipment. Any conditioning of the primary power or the addition of line interface filters or power supplies shall be the responsibility of the CONTRACTOR, and if required, shall be located within the equipment enclosures.

The power consumption of each type of TVM Equipment shall be submitted by the CONTRACTOR as a part of the PDR package (PDR - 4).

6.16.10.2 Farebox Equipment

Farebox Equipment shall be designed to operate on coaches providing 12VDC power. All Farebox Equipment shall operate reliably from a transit coach's direct current power source of 10VDC to 18VDC, without Malfunction. Farebox Equipment/Components shall be protected against damage, loss or modification of data caused by:

- Voltage, lower or higher, in the range between 0VDC to 50VDC;
- Reverse polarity of the input voltage;
- Temporary voltage variations associated with starting of coaches or operation of coach equipment and accessories; or
- Voltages fluctuating between 10VDC and 18VDC.

Maximum current draw (including card processors) shall be 10A instantaneous, 5A in operation (excluding momentary surges) and 0.5A when idle.

The Farebox Equipment power supply shall be large enough to provide adequate power to the various components.

Farebox Equipment electronic system shall be designed and manufactured to provide under voltage and over voltage protection. Voltage spikes in excess of 250V (for durations of 10ms) may be experienced in the bus's electrical system, due to the turning on/off of various On-Board devices, such as lights and fans. The Farebox components shall not suffer any damage, loss of operations, or data in the event of such conditions.

Farebox Equipment electronics and logic shall be protected against stray Electro Magnetic Interference (EMI) radiation, vibrations, ultraviolet light, or other environmental conditions which would cause the FARE SYSTEM Components to become inoperative and/or lose the data contained therein.

Farebox Equipment circuits shall be designed to draw minimum power from the vehicle battery.

Farebox Equipment power supply shall include adequate filters and components so as to regulate the coach supplied voltage and render it devoid of power spikes and noise which could contribute to erroneous registration, data generation and recording. Provisions shall include elimination of electronic interference caused by such items as florescent light power units, coach alternators, air conditioning units, radio communication units, and other accessories characteristic of Palm Tran's coaches. Adequate protection against transient surges on the coach power supply shall be incorporated to the extent necessary to prevent damage to electronic components.

Power Sensing means shall be incorporated within Farebox Equipment/Components power supply to cause the Farebox Equipment to be switched off automatically if the supply voltage increases or

decreases to levels beyond the voltage tolerance supplied, if this could result in erroneous registration, data generation or recording in memory. Loss or reinstatement of power shall not result in any corruption of the data in memory.

The Farebox Equipment shall retain all information that it has in memory under any condition of power supply. No condition occurring in the power source shall cause any degradation to fare media such as Contactless Smart Cards (CSCs) being processed when the power condition occurs.

The power consumption of each type of Farebox Equipment shall be submitted by the CONTRACTOR as a part of the PDR package (PDR - 5).

The arrangements of the electrical and electronic components shall be such as to permit adequate ventilation to disperse the heat created and to preclude degradation of components and performance.

A master "disconnect" switch shall be provided, internal to the Farebox to disconnect the FARE SYSTEM from the incoming power supply. This switch shall be identified and marked and be of the two-position type.

6.16.10.3 Retail Sales Terminals and Customer Service Terminals

Each RST/CST shall operate from a single-phase power source of 120V, 60 Hz, and 20A maximum. Each RST/CST shall be designed to operate with a plus or minus ten percent ($\pm 10\%$) fluctuation in line voltage without any damage or service interruption.

Primary power shall be available through a convenience outlet provided in the vicinity of the RST/CST. The RST/CST shall include a power cord of a minimum of three feet (3') in length. Any conditioning of the primary power or the addition of line interface filters or power supplies shall be the responsibility of the CONTRACTOR.

The power consumption of each RST/CST shall be submitted by the CONTRACTOR as a part of the PDR package (PDR - 6).

7 FARE SYSTEM Software Requirements

The FARE SYSTEM, to the greatest extent possible, shall be designed and deployed using Open Source software, consistent with Palm Tran's goal of open architecture. Where possible, the CONTRACTOR shall use software which is readily usable, readable and able to be compiled without requiring proprietary tools or being vendor-specific. Where use of non-proprietary software is not feasible, the CONTRACTOR shall use COTS software to the greatest extent possible in the design and deployment of the FARE SYSTEM. If a majority of proposed FARE SYSTEM is proprietary, the CONTRACTOR shall explain why within its proposal and how Palm Tran's goals of open architecture and use of non-proprietary HW/SW components could be met.

The FARE SYSTEM shall Be developed by the CONTRACTOR employing a programming language commonly in use that is fully functional within its implementation for the selected microprocessor system and shall be commercially available in English. To the greatest extent possible, all parameters, values, and so forth will be configurable and downloadable by Palm Tran from the FARE SYSTEM Backend.

The CONTRACTOR shall furnish all software fully debugged and documented, in English, and in accordance with the Contract, including all approved revisions introduced up to the time of System Acceptance. At the PDR (PDR - 7) and FDR (FDR - 4), the CONTRACTOR shall provide for Palm Tran

Acceptance full up-to-date documentation, including flow diagrams, data structures, parameter tables, and all other design and development documentation, with each software package. Such documentation shall be accompanied by a functional description of the software as applicable to Palm Tran's FARE SYSTEM. Release notes and updated documentation shall be included with subsequent version updates.

Also, a list of Commercially Available software to be employed in the FARE SYSTEM, including a description of the proposed capabilities and functionality, including Data Analytics and Business Intelligence, of such software shall be submitted to Palm Tran for review at the PDR (PDR - 8) and Acceptance at the FDR (FDR - 5). All software documentation and licenses shall be provided by the date of delivery of the first FARE SYSTEM Components and included as part of the FDR (FDR - 10). Updated versions of such documentation, reflecting any prior changes made in the FARE SYSTEM, shall be provided within five (5) days of any applicable FARE SYSTEM change. Final versions of such documentation shall be provided as part of FARE SYSTEM Acceptance.

The FARE SYSTEM's design shall allow for information and software to be downloaded without requiring the removal or replacement of any components. Software shall be designed such that CONTRACTOR Trained Palm Tran personnel may change and reconfigure all Palm Tran specific related operating parameters and configurations (e.g., fare expiration parameters, user permissions, active/inactive states, accepted coins/bills, user security levels, etc.) specified herein as modifiable/configurable remotely from the FARE SYSTEM Backend¹ and locally at the FARE SYSTEM Equipment. All such modifications shall be at no cost to Palm Tran and will not require any software to be developed or modified by the CONTRACTOR and/or a third-party software developer.

The FARE SYSTEM shall be delivered without sensitivity to specific calendar dates, periods, transitions or irregularities, including rollover of registers when they reach maximum count. All software, databases, computers, data, clocks, calendars, and devices delivered, as part of the FARE SYSTEM, shall perform properly and automatically without regard to specific calendar dates, periods, transitions, or irregularities, including the correct calculation of leap years.

In addition to the above, the FARE SYSETM shall comply with the following:

1. The CONTRACTOR shall supply, design and configure all FARE SYSTEM software for optimal system performance.
2. Palm Tran will be granted ownership or a perpetual, non-exclusive, irrevocable and royalty-free license to use and distribute the licensed software in conjunction with its operation of the FARE SYSTEM. This ownership/license shall extend to the other agencies within the South Florida Region.
3. If the CONTRACTOR obtains any licensed software from a subcontractor, contractor or other vendor during implementation of this contract, the CONTRACTOR shall obtain from them, for the benefit of Palm Tran, a software license in accordance with the terms of this contract.
4. As delivered to Palm Tran, the FARE SYSTEM shall have the capacity to support at least the equipment quantities as described in Section 5.1 and transaction volumes described in Section 5.1. The FARE SYSTEM shall be designed to accommodate an expansion to support all of the

¹ The CONTRACTOR shall be responsible for managing and maintaining the parameters and configuration associated with the hosting of the FARE SYSTEM Backend.

agencies within the region, described in Section 4.1, and at least two times the current number of transactions for the region.

5. All features and functions of the FARE SYSTEM software shall be testable on a systems level. Specific approval by Palm Tran is required for any feature that is not testable on a systems level.
6. The FARE SYSTEM software shall:
 - Include provisions for setting and verifying date and time, with automatic adjustments for leap year and daylight savings time changeovers.
 - Be fully integrated with the operating system software to support all required functions of the applications programs in both a networked and a stand-alone environment.
 - Except as expressly permitted, not utilize or employ hard coding of configuration parameter values.
 - Allow for the distribution of software updates to all FARE SYSTEM Equipment from the FARE SYSTEM Backend.
 - Be fully versioned controlled, with the ability to revert to previous software updates.
 - Support audit trails of activity to show when FARE SYSTEM software changes were made, by which user, and to show Palm Tran authorization for such changes, all in accordance with good change management practices.
 - Securely support software updates at the device level without mechanical intervention or component replacement.
 - Be designed using best practices that shall easily, yet securely, accommodate operating system and database patches and upgrades with minimal required testing. The CONTRACTOR shall certify that it has tested and verified such patches and upgrades prior to introducing these to Palm Tran's Production System.
 - As part of the CONTRACTOR's software version control and change management practices, the CONTRACTOR shall utilize central tables and other documentation detailing codes with versioning and values for each function and provide a service update of such tables and other documentation prior to the implementation of changes, with an effective date designating the actual implementation of each change.
 - Any software update that require a shutdown and reboot will be done at pre-defined times with Palm Tran's prior written approval and staggered within a station to ensure that no more than one device is affected at a time.
 - Be updated to operate on the currently shipping version of the Server Operating System or Database system within 18 months of the release of new versions of these systems from the manufacturer.
 - Sample all input conditions at rates sufficient to detect and remedy all unsafe or damaging conditions in the shortest possible time.
 - Perform self-diagnostic routines and respond promptly, safely and predictably to detected Failures.
 - Respond safely and predictably when powering up or recovering from power interruptions.
 - Permit thorough interrogation of all input, output and internal conditions by external diagnostic equipment.
 - Provide software error codes that contain easily understood explanatory text and include the manner in which the error can be corrected.
 - Provide open-source configuration/deployment management of software using commercially tools such as Ansible, Juju, Puppet or CHEF.

- Conduct meaningful Data Analytics and Business Intelligence to provide usable information about Palm Tran's operations.
 - Include a software license management process to track compliance with third party licensing requirements, compatible with current Palm Tran practices.
7. The FARE SYSTEM will be built using COTS software where feasible, and non-COTS software only upon Palm Tran's formal approval.
 8. The CONTRACTOR shall ensure that Palm Tran has all necessary Intellectual Property Rights in the FARE SYSTEM to allow Palm Tran to engage third parties to perform the CONTRACTOR's obligations, including to provide the same integration, support and other services provided by the CONTRACTOR.
 9. FARE SYSTEM software updates will be centrally managed and fully regression tested prior to installation. The FARE SYSTEM shall be able to roll-back to previous software versions without adversely impacting operations.
 10. All third-party COTS software will be the latest commercial release at the time of conceptual design review (CDR). If a release candidate is pending, Palm Tran will review and approve the version that will be deployed in the FARE SYSTEM.
 11. All FARE SYSTEM software (including data exchange formats and software Interfaces) will be testable on provided test units.

7.1.1 User Interface and User Experience Design

In keeping with Palm Tran's desire for a FARE SYSTEM that can readily, and cost effectively incorporate changes in technology, Palm Tran fully expects the proposed FARE SYSTEM software to provide the user, be it Palm Tran or Palm Tran's customers, a truly enriching UX. In order to enhance the UX, the CONTRACTOR shall follow commonly accepted UI/UX software design guidelines for the developing the FARE SYSTEM Application and all Graphical UI (GUI) elements associated with all workstations, reporting, configuration, user application screens, etc., throughout the FARE SYSTEM. The Proposer shall include sample screen shots of the various UIs included with its Proposed FARE SYSTEM as well as a description of how its FARE SYSTEM application has been developed adhering to commonly accepted UI/UX principles.

7.2 Maintainability and Serviceability

FARE SYSTEM hardware shall provide reliable operation over the FARE SYSTEM's Design Life, and shall be designed to require simple, minimal scheduled and unscheduled maintenance tasks. All FARE SYSTEM hardware will include a barcode for asset management purposes.

The interior of the FARE SYSTEM hardware shall be designed to allow easy and safe access to service equipment and subassemblies. Where applicable, adequate space shall be available to insert keys, to grasp, lift and turn internal components, and to remove and replace units, components, connections, cash storage vaults and ticket media employing "fingertip maintenance"; i.e., without the use of tools. As appropriate, guides, rails, tracks, handles and captive fasteners shall be provided to facilitate installation and removal. There shall be no sharp edges that may injure service personnel.

Any FARE SYSTEM hardware component that must be lifted (except cash containers when full) shall not weigh more than 20 pounds. Any exceptions to this weight limitation shall be subject to Palm Tran's written approval.

No more than one person shall be required to perform on-board and on-site Corrective Maintenance on an individual unit of FARE SYSTEM hardware.

For ease of service, all electrical connections between FARE SYSTEM hardware components and subassemblies shall be established by means of keyed connectors to allow rapid removal of a component and/or subassembly. Plug-in connectors shall be equipped with strain relief to prevent damage to cables and connectors and shall be labeled to indicate clearly the correct connection points.

The FARE SYSTEM hardware components requiring frequent adjustment shall be designed and located within the device for convenient access by maintenance staff to facilitate access and adjustment utilizing fingertip maintenance techniques.

The FARE SYSTEM shall be designed incorporating automatic diagnostic test routines and test equipment shall be provided to aid in troubleshooting malfunctions in the field and within Palm Tran Test Facilities. These test routines shall provide the ability to isolate defects to lowest level replaceable unit (LLRU). Location of test points shall be easily identified. All relevant FARE SYSTEM hardware shall have clear labels and symbols that at a minimum indicate safety, warning, servicing steps and wiring connections.

The time for entry into a machine, removal and replacement of a component of FARE SYSTEM hardware, and restoration of the same to a revenue service state (including testing) shall take no longer than 10 minutes.

The means to access FARE SYSTEM Equipment to service, remove and replace all Palm Tran-serviceable FARE SYSTEM modules shall be subject to Palm Tran's review and approval at the Preliminary Design Review.

All FARE SYSTEM field devices shall incorporate a test mode. In this mode, such hardware shall have full functionality and only process test media. Test transactions shall be segregated in reporting from revenue transactions.

During the Preliminary Design Review (PDR), the CONTRACTOR shall provide the following:

- A list of all Preventive Maintenance (PM) tasks to be performed, including a brief description of the work, time required to complete, and any tools, parts, materials or components required.
- A table describing the PM frequency for all FARE SYSTEM hardware based upon time and number of transactions.
- Documentation that clearly defines Corrective Maintenance tasks that can and cannot be easily completed on-site within the defined time parameters.

7.3 Codes, Regulations & Reference Standards

The FARE SYSTEM provided under this Contract shall be configured to support an Open Architecture design, meeting or exceeding the following applicable codes and standards. The codes of the West Palm Beach area and the State of Florida shall prevail where applicable. Additionally, it is required that the FARE SYSTEM provided under the terms of this Contract shall be compliant with the most recent versions of applicable standards of the following regulatory and advisory organizations at NTP to ensure the following:

- Presents no safety hazards for Palm Tran's passengers and employees.
- Will withstand the rigors of the environments in which the FARE SYSTEM hardware will be installed, and the public use to which it will be subjected.
- Provides for the secure storage and transmittal of FARE SYSTEM Data.

- Is designed using state-of-the-art methods to maximize quality, performance and functionality.
- Satisfies federal, state and other requirements for ergonomics and usability.

The list of applicable codes, laws, ordinances, statutes, standards, rules, and regulations will include, but is not limited to, the items below. The latest revisions in effect at the time of Final Acceptance will apply.

- Americans with Disabilities Act (ADA)
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Advanced Encryption Standard
- ANSI X9.24, Financial Services Retail Key Management
- City of Phoenix Cloud Computing Security Standard
- European Norm EN55022, Emissions standards for CE marking
- European Norm EN55024, Immunity standards for CE marking
- FCC Part 15 Class B – Radio Frequency Devices
- FIPS 140-2
- IEEE 802.11 b/g/n standard for wireless data communications
- IEEE 802.11i standard for wireless data network security
- International Electrotechnical Commission Standard 529 (IEC529)
- ISO/IEC 7810, Identification Cards – Physical Characteristics
- ISO 9001
- ISO/IEC 8583 – Financial transaction card originated messages
- ISO/IEC 14443 Parts 1 through 4 – Contactless Smart Card Standard
- ISO/IEC 18092 / ECMA-340, Near Field Communication Interface and Protocol-1
- ISO/IEC 21481 / ECMA-352, Near Field Communication Interface and Protocol-2
- National Electrical Code (NFPA 70)
- National Electrical Manufacturers Association Publication 250-2003
- National Electrical Safety Code (ANSI C2)
- National Fire Protection Association (NFPA) 130
- NCITS 322-2002, American National Standard for Information Technology – Card Durability Test Methods
- NIST 800-171
- Occupational Safety and Health Administration (OSHA)
- Payment Card Industry Data Security Standards (PCI-DSS)
- Payment Card Industry Payment Application Data Security Standards (PA-DSS)
- Society of Automotive Engineers SAE J1113-13 Electrostatic Discharge
- Society of Automotive Engineers SAE J1455 Vibration and Shock
- UL Standard 60950, “Information Technology Equipment – Safety”
- World Wide Web Consortium, Mobile Web Application Best Practices
- Web Content Accessibility Guidelines WCAG 2.0

All work shall meet or exceed all applicable federal, state and local laws, codes and regulations.

Notwithstanding, where CONTRACTOR equipment, designs, or processes do not adhere to the applicable standards or guidelines as referenced, the CONTRACTOR shall provide such notice. For equipment, designs, and processes that the CONTRACTOR may claim as compliant, Palm Tran reserves the right to require evidence of compliance.

Additional standards are provided in other sections of the Contract. In case of any conflict between standards, the CONTRACTOR shall meet the more stringent standard. All FARE SYSTEM Components shall be suitable for the intended purpose.

In the case of conflict between the provisions of codes, laws, ordinances, statutes, standards, rules, and regulations, the more stringent requirement will apply.

8 System Architecture

The FARE SYSTEM will be built using an account-based open architecture and will also support limited card-based media. The FARE SYSTEM will accept and process both closed-loop and open payment contactless media.

8.1 General Architecture

The FARE SYSTEM will be designed using an account-based architecture for the sale and distribution of fare products (i.e., stored value, rides and passes), as well as for the processing and validation of fare payments. Accounts will be able to be linked to all media accepted by the FARE SYSTEM, including contactless smart cards, contactless bank cards, mobile wallets, media with a printed barcode, and mobile apps that generate an electronic barcode.

8.1.1 Account-Based System

The CONTRACTOR shall design and implement an account-based system, which manages the majority of the transactions occurring within Palm Tran's FARE SYSTEM program. The FARE SYSTEM account-based program shall allow for both unregistered (anonymous) or registered accounts and comply with Palm Tran's fare policies and business rules governing both types of accounts. Except for ~~card-based media~~, newly detected tokens or authorized identifiers associated with both closed-loop and open payments will result in the creation or modification of an individual Transit Account within the FARE SYSTEM automatically. The loading of fare products and execution of fare payments shall be performed using transit accounts maintained within the FARE SYSTEM. Transit accounts will be accessed using media accepted by the FARE SYSTEM, including Palm Tran-issued media (EU/LU smart media), third party-issued media, contactless bank cards, NFC-equipped devices, barcoded media electronic forms, and other media as may be issued and/or authorized by Palm Tran.

Media will serve as a token for accessing a FARE SYSTEM account, and no data will be written to the media when loading fare products or paying a fare, ~~with the exception of card-based media as determined by Palm Tran. With the exception of card-based media, f~~For closed-loop payments, all fare products loaded by the customer will be stored in a transit account and reduced or validated as it is used for payment.

For open payment transactions, a transit account will maintain a record of payments processed against the financial account being used and allow for the conferring of fare discounts and transfers, as defined by established Business Rules and Palm Tran fare policies. The FARE SYSTEM will manage, batch and submit Open Payment transactions to the Payment Application, as necessary. The FARE SYSTEM will be scalable such that the FARE SYSTEM will, at a minimum, support 200 percent of current Palm Tran (approximately 12 million annually), and transfers to/from BCT (30,584) and Tri-Rail (73,202), as well as the regional ridership needs.



Table 5 - Regional Ridership²

Agency	RIDERSHIP 2017
MIAMI-DADE TRANSIT	89,465,160
BROWARD COUNTY TRANSIT	29,764,400
PALM TRAN INC.	9,775,152
TRI-RAIL	5,207,014
TOTAL	134,211,726

In addition to the above, the FARE SYSTEM shall include the following capabilities:

- Manage transit accounts,
- Calculate open and closed-loop fares and fare products (based on established business rules and Palm Tran fare policies), and
- Perform fare processing and validation at the time of payment, validation and inspection.

8.1.2 ~~Card-Based Products~~

~~Some products, such as single ride tickets, may not be associated with transit accounts but will be tracked as a transaction with all relevant message details at the FARE SYSTEM Backend; i.e., The FARE SYSTEM will support the use of card-based products. Other products, as defined by Palm Tran, may be supported in the future on card-based limited use media. Possible fare products will be defined during design reviews, and shall not impact the cost, operation or performance of account-based fare products.~~

~~Card-based products and other limited stored trip fare products can be initialized with:~~

- ~~• Pre-set validity period~~
- ~~• Activated upon first use~~
- ~~• Activate upon sale~~
- ~~• Media expiration period~~

~~Details of card-based fare products will be defined during design reviews.~~

~~8.1.10~~ 8.1.2 Online Communications

All field devices will be equipped with online communications to the FARE SYSTEM Backend and the Device Monitoring System. The communication interfaces will support the immediate loading of fare products through all distribution channels; processing of open and closed-loop fare payments onboard vehicles and at platforms.

The lowest-latency connections possible will be employed, using hardwired, cellular and Wi-Fi connections, as appropriate for each device. Any devices using cellular communications will operate on a 4G LTE data network (or faster).

The FARE SYSTEM will support offline operation to perform essential validation and payment functions. In offline operation, devices shall operate according to defined business rules, and store/and forward transaction data as soon as communications are reestablished. Any offline authorization will be recorded as part of the transaction data so that offline transactions can be easily identified and tracked.

² Source from NTD Reports

~~8.1.11~~ 8.1.3 Risk Mitigation Techniques

The Account-Based Transaction Processor (ATP) shall support risk mitigation techniques to limit fraud, provide accurate transit account information and control risk as necessary. The ATP may support limited writing of data to closed-loop media for the purposes of fraud mitigation, accurate transit account information and risk management, all as necessary. Details will be determined during system design review upon approval by Palm Tran.

Any data written to closed-loop media will be used to supplement or mirror ATP Transit Account Data, and will be limited in nature; i.e., the last X transactions, basic account balance or status bits to indicate various account states. All transit account data shall be encrypted and secured. If there are conflicts between the Risk Mitigation Data written to closed-loop media and the FARE SYSTEM Backend, the transit account stored in the FARE SYSTEM Backend shall remain the authoritative record. Timestamps and synchronization logic will be built into the ATP.

If used, positive and negative lists will be regularly pushed to field devices and may also be mirrored at ancillary locations (for example, bus garage computers) to ensure up-to-date and prompt retrieval by field devices. Any mirroring will accurately reflect the master positive and negative lists stored in the FARE SYSTEM Backend, with instant updating and version control in place to ensure accurate synchronization.

8.2 Open Architecture

The FARE SYSTEM will be designed and implemented using an open architecture approach to provide flexibility as both technology and Palm Tran's needs change. The open architecture shall apply to the entire FARE SYSTEM, including all media, devices, interfaces and transaction formats for the management, distribution, payment and inspection of fares.

8.2.1 Media Formats

The CONTRACTOR shall design, develop, test and provide ISO/IEC-14443 compliant closed-loop contactless media (e.g. "Palm Tran Card") that will be accepted by the FARE SYSTEM. Fully functional extended-use and limited-use closed-loop media will be provided by the CONTRACTOR for issuance by Palm Tran. Additional Palm Tran-defined formats may be identified during system design that conform to the design principles in this section.

All CONTRACTOR-supplied media - with the exception card-based media described in Section 1.1.1 – will be account-based and support the secure storage of a unique token used to access a transit account in the FARE SYSTEM, without the necessity to write additional data to the media. Exceptions include risk mitigation techniques specified in Section 8.1.3 – Risk Mitigation Techniques. The secure transit account token stored on the media will not be the media serial number (i.e., UID) or transit account number used within the FARE SYSTEM and will not be printed on the media or otherwise accessible using a non-FARE SYSTEM device. The format of the transit account token and transit account number will be subject to Palm Tran's review and approval as part of design review.

Test cards will be provided for each version of fare media, including closed-loop extended-use and limited-use media, and open payment cards. For open payment test cards that require pre-payment or other special financial consideration, the CONTRACTOR may submit costs for reimbursement.

The CONTRACTOR shall provide documentation detailing all card formats supported within the FARE SYSTEM, including all information necessary to generate required security keys. The card formats shall

be fully owned by Palm Tran, including the right to distribute specifications to third-parties for media production and to support multi-application smartcard implementations.

8.2.2 Transaction Formats

The CONTRACTOR shall provide documentation detailing the format of all transactions generated and used within the FARE SYSTEM. This will include any data formats, message elements and containers, and transport protocols which are not already covered by the required APIs, which Palm Tran will be free to use or distribute without cost or restriction.

Transaction formats shall be based on published industry standards wherever possible, including those used in the processing of open payments and those used to interface with commercial software packages, such as the Financial Clearing and Settlement System. The transaction formats shall be designed to meet the system performance requirements defined by Palm Tran of the account-based open architecture and online communications architecture.

8.3 Open Payment Architecture

The FARE SYSTEM will be designed to accept open payment media (i.e., contactless bank cards and their mobile wallet equivalents) for the payment of transit fares wherever fares are paid. This includes validators installed onboard vehicles within the Fareboxes, and off-board within the TVMs installed at station platforms.

The requirements of the FARE SYSTEM and transaction flow necessary to support open payments include:

- The authorization of payments for transit fares using contactless bank cards at all points where fares are paid, including onboard and off-board vehicles Real-time communication with Palm Tran's merchant acquirer for the purpose of authorizing open payment transactions.
- Security protocols required for the latest PCI and EMV compliance associated with the capture, storage, transmittal and processing of payment card data.

All open payment fare transactions flowing through the FARE SYSTEM will be processed by Palm Tran's merchant acquirer(s) via the CONTRACTOR-supplied Payment Application. Data flows for transaction processing through the Payment Application will be submitted to Palm Tran for review and approval.

8.3.1 Supported Formats

The FARE SYSTEM will support all mobile wallets and all open payments bank cards. Proposers should state within their proposal which wallets and open payment bank cards their proposed FARE SYSTEM supports. If not all, Proposers should explain what limitations their proposed FARE SYSTEM has regarding the support of mobile wallets and open payment bank cards.

The FARE SYSTEM shall accept the following mobile wallets:

- ApplePay
- GooglePay
- SamsungPay
- MasterPass
- Visa Checkout
- PayPal Mobile

The FARE SYSTEM shall accept ISO 14443 compliant credit and debit cards, including the following association-branded formats:

- Visa payWave
- Master Card PayPass
- American Express ExpressPay
- Discover Zip

The FARE SYSTEM will support any payment formats that comply with existing open payment and contactless communication standards, such as NFC (ISO 18092)-enabled phones or tablets with a mobile wallet application. Validators will also support any mobile wallet provider-specific terminal protocols that enable a streamlined experience for customers using the provider's wallet for payment.

The FARE SYSTEM will support payment using any contactless EMV card. The CONTRACTOR shall be responsible for ensuring compliance with all requirements and best practices associated with EMV payment acceptance in the United States, as they are defined by the card associations and issuers, including support for Dynamic Data Authentication (DDA) and Combined Data Authentication (CDA) offline card authentication, merchant routing for debit transactions (i.e., related to the "Durbin Amendment"), etc.

8.3.2 Open Payment Authorizations

The FARE SYSTEM will be configurable by Palm Tran to be able to accept open payments. A valid fare payment signal will be given, and enough card information to complete the transaction will be securely stored in the FARE SYSTEM Backend (and secured to comply with PCI), and transmitted for authorization as soon as the connection is restored.

TVM/Farebox Equipment shall communicate with the FARE SYSTEM Backend, which will determine whether to submit the transaction to the merchant acquirer for authorization.

Prior to seeking payment authorization from the merchant acquirer, the FARE SYSTEM will perform basic validation checks on the payment card being used for payment and enforce basic fraud controls. These validation checks will include at a minimum:

- MOD 10 check of card PAN (Luhn algorithm)
- Check of card expiry status
- Palm Tran-configurable velocity check (i.e., limit on frequency of use within the system)
- Permitted IIN and other payment card identifier checks (i.e., to permit or block acceptance of specific card brands, issuers, card types, etc.)

The card validation checks shall be performed at the device level whenever possible and shall be remotely configurable via downloads. No payment authorization request will be sent for cards that fail any of the validation checks, unless configured by Palm Tran.

The FARE SYSTEM will support real-time, or near real-time, fare calculation and authorization of open payments. If the card being used for payment passes all supported validation checks (to be defined during design review), the FARE SYSTEM will issue a limited authorization (e.g. by FARE SYSTEM device or server), and request payment authorization through the merchant acquirer.

Declined open payments shall be tracked as a negative balance in a transit account associated with the payment instrument. The instrument will be removed from the negative list if the customer resolves the issue and pays the outstanding balance. Customers will be able to resolve outstanding balances associated with open payment media via all self-service sales channels (e.g., FARE SYSTEM Websites).

In all cases where an online authorization (if attempted) is not possible, the FARE SYSTEM will not provide any feedback to the customer or operator to indicate that an authorization was not received.

8.3.3 Payment Aggregation

The FARE SYSTEM will be able to aggregate open payment fare transactions generated using the same payment instrument to reduce payment processing fees. Aggregation will be configurable by Palm Tran. On first use of a payment instrument, the FARE SYSTEM will process a pre-authorization for a pre-determined, configurable amount or perform applicable transaction in accordance with card brand rules and begin transaction aggregation. Transactions will be aggregated over a specified time period and up to a specified value, which will be configurable by Palm Tran, the initial settings will be defined during design review.

The CONTRACTOR shall be responsible for ensuring compliance with all payment card association rules and other applicable banking rules and regulations, including those regarding the aggregation of payments. The FARE SYSTEM will accommodate scenarios where the aggregation rules vary by card product, association and issuer by determining the card brand using the Issuer Identification Number (IIN) or similar identifier.

8.4 Software Development Kits/Application Programming Interfaces

As part of the design and development of the FARE SYSTEM, the CONTRACTOR shall provide Palm Tran with the Application Programming Interface (API)s to facilitate other third-party systems to with the FARE SYSTEM. The APIs shall cover all elements of the FARE SYSTEM conducting exchanges of data. In addition to the APIs, where possible, the CONTRACTOR shall provide Software Developer Kit (SDK)s to provide maximum flexibility to build applications and interfaces with the FARE SYSTEM, without requiring CONTRACTOR support.

The CONTRACTOR shall provide SDKs/APIs that support core FARE SYSTEM functions and enable access to these functions for any device or system associated with the FARE SYSTEM that requires use of them, and such devices or systems may make use of more than one SDK/API to support desired functionality.

The CONTRACTOR shall provide full SDK/API documentation that specifies the process for sending messages between FARE SYSTEM components, and all supported messages including message description, format and timing requirements.

The CONTRACTOR shall provide the following SDKs/APIs, including:

- Fare distribution (device/system to the FARE SYSTEM)
- Fare payment (device/system to the FARE SYSTEM)
- Fare inspection (device/system to the FARE SYSTEM)
- Transit Account management (device/system to the FARE SYSTEM)
- Patron account management (device/system to CAM System)
- Device management (device-specific)
- Palm Tran Bus systems integration (onboard communications)
- Payment (device/system to single payment gateway)
- Mobile Ticketing system integration



The CONTRACTOR shall implement strong security features to prevent fraudulent use and authenticate users of all SDKs/APIs based on industry-accepted best practices. The CONTRACTOR shall demonstrate use of SDKs/APIs as part of FARE SYSTEM implementation and testing, and the CONTRACTOR shall provide all associated SDK/API documentation and the CONTRACTOR shall provide updated SDK/API documentation should any SDKs/APIs change during implementation and testing.

Following implementation, interfaces developed with SDKs or the APIs will become the property of, or fully licensed to, Palm Tran with the right to use. Proposers shall describe the proposed APIs and SDKs, illustrating the level of functionality that would be accessible through the use of the CONTRACTOR’s APIs and SDKs.

9 Reliability, Accuracy and Availability Requirements

9.1 Reliability Requirements

This section describes Palm Tran’s reliability requirements for the Proposed FARE SYSTEM. The definitions for Mean Cycles Between Failure (MCBF), Mean Time Between Failure (MTBF), and Mean Days Between Failure (MDBF) are defined in Table 2 4 Reliability Requirements, which the Proposed FARE SYSTEM shall meet.

	TVMs	Fareboxes	FRCS	SCU	RST/CST devices	Data Transmission Network and FARE SYSTEM Backend
Reliability	10,000 MCBF, MTBF of one failure per TVM per 45 calendar days, calculated as an average of all machines in service over a period of 90 calendar days. Rebuilt/modified TVMs shall meet reliability established per baseline testing specified herein.	10,000 MCBF, MTBF of one failure per Farebox per 45 calendar days, calculated as an average of all machines in service over a period of 90 calendar days. Rebuilt/modified Fareboxes shall meet reliability established per baseline testing specified herein.	10,000 MCBF, MTBF of one failure per FRCS per 45 calendar days, calculated as an average of all machines in service over a period of 90 calendar days. Rebuilt/modified FRCSs shall meet reliability established per baseline testing specified herein.	20,000 MCBF	50,000 MCBF	200 MDBF
Accuracy	99.5% (aggregate – individual units may have specific Accuracy requirements discussed in the Contract)	99.5% (aggregate – individual units may have specific Accuracy requirements discussed in the Contract)	99.5% (aggregate – individual units may have specific Accuracy requirements discussed in the Contract)	100% for CSC transactions.	100%	100%
Availability	99.7%	99.7%	99.7%	99.75 at pullout	99.7%	99.95%



MCBF for each FARE SYSTEM Components shall be calculated by adding the total transactions for FARE SYSTEM Components of the same type installed under this Contract for revenue service and dividing this total by the number of failures of FARE SYSTEM Components of that same type installed under this Contract. Non-chargeable and chargeable failures are defined in Sections 9.5 and 9.6, respectively.

In the event that the FARE SYSTEM Components do not meet the required MCBF during the Acceptance Testing, the CONTRACTOR shall identify and implement remedial action. The action shall include, at no additional cost to Palm Tran, modification of the FARE SYSTEM Components and on-site services of an engineer or competent service technician.

If a single TVM, Farebox, FRCS, RST, CST, or SCU experiences a failure rate greater than 1.5 failures per month during the Acceptance Testing, the CONTRACTOR shall identify and implement remedial action.

Electronic boards on buses including associated electronic components shall be capable of operating an average of fifty thousand (50,000) hours between failures provided there is no abuse, vandalism, operation beyond standards or lack of maintenance per the CONTRACTORS instructions.

In the event that the FARE SYSTEM Components do not meet the requirements described in the Contract during testing, the CONTRACTOR shall identify and implement remedial corrective action. The action shall include, at no additional cost to Palm Tran, modification of the FARE SYSTEM Components and on-site services of an engineer or competent service technician.

All of the above reliability requirements shall be reportable from the FARE SYSTEM as part of the Proposed FARE SYSTEM’s standard Maintenance Reports.

9.2 Accuracy

Overall Accuracy of the FARE SYSTEM elements shall be as define herein and presented below:

9.2.1 Electronic Payment

The electronic payment functions of the devices shall have an Accuracy rate of 100%. Accuracy for electronic payments is defined as the mean ratio of the transactions recorded by the devices to the actual transaction records received and processed by the FARE SYSTEM Backend.

9.2.2 Coin Acceptance and Accuracy

At a minimum, the coin acceptor/verifier for each TVM/Farebox shall comply with the following Acceptance Rates (AR):

- A. 98% of valid coins shall be accepted upon initial insertion.
- B. 99% of valid coins shall be accepted upon one reinsertion.
- C. All known counterfeit coins, tokens, common slugs, foreign coins, and coins of denominations not accepted by the TVM/Farebox shall be rejected upon every insertion.

The AR is defined as follows:

$$AR(\%) = \frac{L - R}{L} \times 100$$

Where: L = Total number of valid coin insertions
 R = Total number of valid coin rejections

For each TVM/Farebox, the coin acceptor/verifier shall identify valid acceptable coins with at least 99.95% accuracy. Accuracy (A) is defined as follows:

$$A = \frac{V - M}{V} \times 100$$

Where: V = Total number of coins accepted
M = Total number of misidentified coins

9.2.3 Bill Acceptance and Accuracy

At a minimum, the bill validator for each TVM/Farebox shall comply with the following acceptance rates for bills:

- A. 95% of valid bills shall be accepted upon initial insertion.
- B. 97% of valid bills shall be accepted within two insertions.
- C. All known counterfeit bills, color photocopies of valid bills, duplicates made by other known means including those generated by a computer, foreign bills, and bills of denominations not accepted by the TVM/Farebox shall be rejected upon every insertion.

The AR is defined as follows:

$$AR(\%) = \frac{L - R}{L} \times 100$$

Where: L = Total number of valid bill insertions
R = Total number of valid bill rejections

The bill validator, for each TVM/Farebox, shall identify valid acceptable bills with at least 99.99% accuracy. A is defined as follows:

$$A = \frac{V - M}{V} \times 100$$

Where: V = Total number of bills accepted
M = Total number of misidentified bills

9.2.4 Smart Cards

Documents processed by any reader provided shall be accurately read on the first tag not less than 99.0% of tags, assuming each document is valid, and the document is not damaged sufficiently to destroy the ability of the reader to read correctly the coded data. Validity on a second tag shall be no less than 99.9% of tags.

9.2.5 Data Transmission

Data transmission between FARE SYSTEM Components (Fareboxes, SCUs, TVMs, RSTs and CSTs) and the FARE SYSTEM Backend shall be 100% accurate. Data shall be fully protected from loss or modification at all points, including the point of generation, up to and including FARE SYSTEM Backend and interfaces to non-Palm Tran systems.

9.3 Availability

Availability is defined as the probability that a device or an element of the FARE SYSTEM Backend is operating in accordance with the Contract. The base equation that shall be used to calculate Availability is as follows:

$$\text{Availability} = \frac{\text{Operating_hours} - \text{Device_Out_of_Service_Hours}}{\text{Operating_Hours(PalmTran_Service_Hours)}}$$

Non-chargeable failures, as defined in Section 9.5, shall be excluded. In addition, only FARE SYSTEM Components in revenue service shall be taken into consideration.

During the warranty period and during any Maintenance Contract, Availability of Farebox Components (allowing pullout of scheduled, serviceable buses in the morning and afternoon peak) shall be no less than as allowed above. This shall assume that every defective unit reported by bus operators has been checked by repair technicians before the pullout, and repairs have been made where possible. Units that have been reported defective but not inspected shall not be included in the calculation of unavailable units; however, if the CONTRACTOR is responsible for conducting the inspection, then these shall be included in the calculation. Units that have been inspected and cannot be repaired shall be included in the calculation of unavailable units. Buses out of service or not scheduled for service shall not be included in the calculation, unless the Bus is out of service due to a failure of the FARE SYSTEM.

Any computers supplied as part of this Contract shall have Reliability and Availability of greater than 99.95%.

9.4 Failure Review Team

A Failure Review Team (FRT) consisting of the PM, CONTRACTOR's QA representative, PTPM and two Palm Tran representatives shall be established at project onset. This FRT shall participate during the Design Reviews as well as review and evaluate all testing results and reports throughout the project, including, the reliability, maintainability and accuracy data to determine if the remainder of the FARE SYSTEM can be installed. Further, the FRT will be kept in place through FARE SYSTEM Acceptance and during the Warranty Period to review on a regular basis all Palm Tran warranty claims. The purpose of the FRT is to determine through its analysis of the testing results and reported failures/defects, any changes that will be required in the project design and/or what items are chargeable against the CONTRACTOR's reliability requirements and/or are valid warranty claims. The FRT shall define additional chargeable and non-chargeable failures as required. All Failures and Malfunctions shall be subjected to a Root Cause Analysis. The Proposer shall describe within their Proposal their Root Cause Analysis methodology, which should be included as a part of its Quality Assurance Program (QAP).

Reports shall be produced by the FRT documenting all activities during the testing and review periods, results obtained, direction given, corrective action taken, etc.

For any disputes, the FRT shall attempt to resolve in accordance with the Contract. Should no resolution by the FRT be reached within ten (10) days, Palm Tran's Program Director shall make the final and binding decision.

9.5 Non-Chargeable Failure

A Non-chargeable Failure is a Malfunction caused by a condition external to the FARE SYSTEM Components under consideration, which is neither a functional, environmental, nor a test requirement in this specification. Further, non-chargeable failures are not expected to occur during normal operation of the FARE SYSTEM Components.

Non-chargeable failures shall not affect the Acceptance Testing MCBF or Availability calculations, and shall include the following, at a minimum:

- Jams caused by foreign materials other than United States (U.S.) bills, U.S. coins, CSCs and credit/debit cards inserted in the appropriate Device slots;
- Failures caused by fluids intentionally injected into the slots;
- Accident or Mishandling of FARE SYSTEM Components;
- Failure of test facility or test instrumentation, except where test facility or instrumentation is under the control of the CONTRACTOR, then failure shall be chargeable;
- Any failures caused by externally applied stress conditions in excess of the accepted specification requirements contained herein;
- Failures caused by incorrectly exercised operating, maintenance or repair procedures where correct procedures have been correctly documented and properly trained by the CONTRACTOR, except where procedures are exercised by the CONTRACTOR, then failure shall be chargeable;
- Jams caused by damaged and or bent U.S. coins or cards inserted in the wrong Device slots;
- Failure caused by vandalism;
- Failures caused by out of specification CSCs;
- Communications failures beyond the control of the CONTRACTOR;
- Third party equipment and services not required to be provided by the CONTRACTOR or Subcontractor under this Contract;
- Downtime due to scheduled maintenance;
- Normal operating adjustments as prescribed in the accepted CONTRACTOR's FARE SYSTEM manuals; and,
- Failures of expendable items operated beyond the manufacturer's specified life expectancy.

All other failures shall be considered relevant and chargeable unless determined to be Non-Chargeable by the failure review process. The failure review process shall be applied as needed during Acceptance Testing.

9.6 Chargeable Failure

Any failure not listed in Section 9.5 shall be considered chargeable, including, but not limited to any of the following:

- A Malfunction preventing the FARE SYSTEM Component from performing its designated function, or meeting its performance criteria, when used and operated under the environmental and operational conditions stated herein;
- A Malfunction that might cause a threat to the FARE SYSTEM Components, passengers, employees or others;
- A random occurrence that does not cause the FARE SYSTEM Components to be inoperable, but would normally require some form of maintenance attention to restore normal function;

- Any occurrence where data is not successfully transmitted between elements of the FARE SYSTEM and/or correctly stored in the FARE SYSTEM;
- Exposed revenue under normal and prescribed operating conditions shall constitute a failure for the type of FARE SYSTEM Components involved; and,
- Unauthorized access to the FARE SYSTEM and/or data that otherwise should have been preventable.

Failure of any electronic component (including boards) within a larger subsystem shall contribute to the calculation of failure for that subsystem, as well as the failure of that subsystem if a separate failure rate is required herein.

In addition to the above items, the following specific conditions, at minimum, shall be considered chargeable failures:

- Software anomalies and bugs;
- Hardware failures that are not clearly a result of conditions outside the requirements of this specification;
- Data storage failures, including those due to insufficient space;
- Audio language failure;
- Coin jams;
- Failure to issue CSC media;
- Data storage and/or alarm transmission failure;
- Exposed currency;
- Short change -- Providing less change than required when the patron has not selected the "Accept Overpayment" button;
- Failure to return escrowed money;
- Partial or complete failure of passenger display;
- CSC media jams;
- Failure of the language selection operation (once activated);
- Incorrect data printed on CSC media;
- Failure to properly register and report any transaction;
- Undesired shutdown of the FARE SYSTEM; and
- Electronic payment request/authorization transmission failures.

10 Maintainability Programs

Maximum consideration to maintenance, troubleshooting, component removal, repair and replacement, and inspection shall be given in the design of all FARE SYSTEM Components. The objective of the CONTRACTOR's Maintainability Program shall be to minimize maintenance labor and materials costs and FARE SYSTEM Components downtime.

10.1 Maintainability Design Checklist

At a minimum, the FARE SYSTEM Components shall meet the following maintainability design criteria:

- FARE SYSTEM Components shall utilize standard, Commercially Available hardware and components that maximize interchangeability in use and maintainability supporting "fingertip

maintenance”; e.g., the ability to clear most maintenance problems with minimal time and without the use of tools in the field.

- All assemblies of a given type shall be identical, interchangeable and removable.
- Automatic diagnostic test routines and test FARE SYSTEM Components shall be included in the FARE SYSTEM Components to aid technicians in troubleshooting Malfunctions. Functional testing shall be straightforward, assisted by these self-diagnostic functions. These routines shall guide technicians through test procedures to isolate defects to the lowest level replaceable unit. These routines shall be used to check and indicate FARE SYSTEM Components readiness to perform.
- Systematic fault isolation procedures shall be developed for inclusion in the maintenance manuals;
- Built-in test points shall be provided and clearly marked;
- Failure indicators shall be provided and identified on all FARE SYSTEM Components;
- All FARE SYSTEM Devices must have clear labels and/or symbols that at a minimum indicate safety, warning, servicing steps and wiring connections.
- All test points, failure indicators, modules, wire junctions, wires, etc., shall be identified by nameplates, color coding, number coding, or other means to assist the maintenance personnel, as Accepted by Palm Tran;
- Components requiring frequent adjustment shall be located to facilitate access and adjustment utilizing "fingertip maintenance" techniques. Components requiring the most frequent maintenance or adjustment shall be placed in an easily accessible position;
- Standard, Commercially Available industrial components and hardware shall be used wherever possible;
- Built-in diagnostic routines shall be used to check and indicate FARE SYSTEM Components status;
- Captive fasteners shall be used on hinged covers and access panels;
- Major components shall be designed for ease of removal; and,
- TVM: Major subassemblies shall be housed on telescopic slides for easy maintenance access to these modules and any components housed behind these modules in the TVM. Units requiring removal for off-site maintenance shall be limited to a weight of fifty pounds (50lbs U.S.). Units that weigh more than twenty pounds (20lbs U.S.) shall be provided on hinges and/or roll-out slides.
- Customized carrying cases for sensitive components, to protect against damage in transport, shall be provided in quantities sufficient to support the level of maintenance necessary.
- Where dissimilar metals meet, protection against galvanic corrosion shall be provided.
- Removable non-volatile memory units, Lowest Level Replaceable Unit (LLRU), etc., shall be designed to facilitate exchange or replacement using self-alignment mechanisms, which shall minimize or eliminate adjustments or calibrations.
- All serialized FARE SYSTEM Components shall have a durable, weather resistant barcode attached to them. Placement of the barcode shall be in a location that can easily be read – an RFID tag option is acceptable. No two serial numbers or barcodes will be the same.

Repair shall be defined as the field diagnosis, removal and replacement of one or more defective assemblies (such as a coin mechanism, bill transport, electronic board, etc.) to put a FARE SYSTEM Components back into operating condition. Bench or shop repair of the defective FARE SYSTEM Components shall not be included in mean time to repair (MTTR).

10.2 TVM Components Maintainability Requirements

TVM Components: No more than one (1) maintenance or repair person shall be required to restore an TVM Components back into service from its installed location in the field. The CONTRACTOR shall demonstrate that an in-the-field MTTR for CONTRACTOR trained Palm Tran Maintenance Personnel shall not exceed thirty (30) minutes and is achievable for any failure of the FARE SYSTEM Components. The time to restore to service shall be measured from the moment the service door is opened to the moment the FARE SYSTEM Components has been tested and verified as fully functional and has been restored to revenue service. The time to restore to service shall be measured as the total elapsed time including troubleshooting and replacement or repair, using the diagnostics, special tools, and procedures provided by the CONTRACTOR under this procurement.

Average maintenance time per month shall include failure diagnosis, all repairs (including bench repair) and preventive (scheduled) maintenance time by Palm Tran personnel who have received and completed training provided by the CONTRACTOR. Failure of the CONTRACTOR to perform adequate training shall not relieve the CONTRACTOR of this requirement. This shall include division revenue handling equipment.

10.3 Farebox Components Maintenance Requirement

Maintainability of Farebox Components shall have a demonstrable MTTR of ten (10) minutes, with an average maintenance time per month per equipped bus of ten (10) minutes. The CONTRACTOR shall demonstrate that an in-the-field MTTR for CONTRACTOR trained Palm Tran Maintenance Personnel shall not exceed ten (10) minutes.

Average maintenance time per month shall include failure diagnosis, all repairs (including bench repair) and preventive (scheduled) maintenance time by Palm Tran personnel who have received and completed training provided by the CONTRACTOR. Failure of the CONTRACTOR to perform adequate training shall not relieve the CONTRACTOR of this requirement. This shall include division revenue handling equipment.

All Farebox modules shall be designed to allow quick swap-out of identical modules, with repair of the module to take place off the vehicle. Normally, repair of any LRU within a module shall be accomplished off the vehicle. The system shall be designed so that a vehicle with a defective module can be put back into service within ten (10) minutes, measured from the time a repair technician boards the bus, either through swap out of the module or elements of the module. No more than one (1) maintenance or repair person shall be required to restore an Farebox back into revenue service. The CONTRACTOR shall demonstrate that an in-the-field MTTR for CONTRACTOR trained Palm Tran Maintenance Personnel shall not exceed ten (10) minutes.

Design of quick disconnects to support this maintenance philosophy shall be long life, not subject to degradation or failure to maintain continuous electrical contact due to vibration, dirt and capable of at least one-thousand (1,000) disconnect/connect cycles.

The CONTRACTOR shall demonstrate that an in-the-field MTTR for CONTRACTOR trained Palm Tran Maintenance Personnel shall not exceed ten (10) minutes, is achievable for any failure of the Farebox Components. The time to restore to service shall be measured from the moment the maintainer first touches the FARE SYSTEM Device to the moment the FARE SYSTEM Components has been tested and verified as fully functional and has been restored to revenue service. The time to restore to service shall

be measured as the total elapsed time including troubleshooting and replacement or repair, using the diagnostics, special tools, and procedures provided by the CONTRACTOR under this procurement.

10.4 Preventive Maintenance

Preventive maintenance shall not be required more often than once every thirty (30) days first. The following activities shall be defined as preventive maintenance:

- Inspect functions of indicators and fasteners;
- Clean major subsystems;
- Lubricate subsystems;
- Vacuum cabinet interior;
- Clean exterior weekly.

FARE SYSTEM shall be designed so that preventive maintenance in the field can be completed, under normal circumstances, within thirty (30) minutes per device. The CONTRACTOR shall demonstrate that an in-the-field Preventive Maintenance for CONTRACTOR trained Palm Tran Maintenance Personnel shall not exceed thirty (30) minutes per device. The CONTRACTOR shall specify each component to be inspected, the corresponding procedure and the time interval for inspection. This information shall be subject to Palm Tran Acceptance as presented in the Preventive Maintenance Manual.

10.5 Revenue Servicing

Revenue servicing by a single person shall not require more than ten (10) minutes to complete. The CONTRACTOR shall demonstrate that an in-the-field Revenue Service for CONTRACTOR trained Palm Tran Maintenance Personnel shall not exceed ten (10) minutes. Revenue servicing shall be limited to the following activities (as appropriate for the device):

- Coin vault exchange;
- Bill vault exchange;
- Farebox vault exchange;
- Supplementary change storage units (auxiliary hopper) exchange;
- CSC media reloading;
- Accountancy CSC media printing;
- Data collection (if upload to FARE SYSTEM Backend is not operational at the moment, data in the Device must be stored for later upload even if data is collected from the Device by servicers or maintainers); and,
- Receipt stock reloading.

The following revenue servicing activities shall be collectively accomplished in maximum of three (3) minutes total within the standard pre-value settings:

- Coin vault exchange;
- Bill vault exchange;
- Farebox vault exchange; and,
- Supplementary change storage units exchange.

This interval shall begin from the moment the front door of the FARE SYSTEM Device is opened to the moment the front door is latched closed and the FARE SYSTEM Device is back in operation. This parameter shall be tested during the Maintainability Test. The CONTRACTOR shall demonstrate that an

in-the-field Revenue Service for CONTRACTOR trained Palm Tran Maintenance Personnel shall not exceed three (3) minutes.

Upon completion of service actions, the unit shall automatically perform a diagnostic check to ensure that all components are properly operating before returning to operational status. The FARE SYSTEM Device shall return to operational status within sixty (60) seconds of the time the appropriate service command was executed. When a FARE SYSTEM Device reset (complete shutdown and restart) is required, the FARE SYSTEM Device shall return to operational status within a maximum of six (6) minutes. The FARE SYSTEM Device shall perform the same diagnostic testing (at minimum) at reset or power-up as after completion of service actions. Reset shall not be required for routine maintenance and never required for normal revenue servicing.

11 Stand-Alone Operation

FARE SYSTEM Components shall be capable of operating in a stand-alone mode. Data will be uploaded to the FARE SYSTEM Backend whenever the bus enters the Wireless LAN at Palm Tran garage facilities or future Palm Beach County WAN. In case of a communication system outage, all data that is normally transmitted to the FARE SYSTEM Backend shall be stored by the individual FARE SYSTEM Components until communication is restored.

FARE SYSTEM Components shall not go out of service due to a full memory condition. The FARE SYSTEM shall report imminent memory saturation conditions allowing data in memory to be transferred efficiently to the FARE SYSTEM Backend.

Parameters normally downloaded from the FARE SYSTEM Backend shall be loadable locally; using CONTRACTOR provided encrypted USB Memory Stick, or other approved method. The encrypted USB Memory Stick shall also facilitate the transfer of all information/data to/from the FARE SYSTEM Component and the FARE SYSTEM Backend via a CONTRACTOR provided Maintenance Tablet/PC. All data/information shall be encrypted using AES or equivalent.

11.1 Self-Diagnostics

To facilitate the FARE SYSTEM State of Health monitoring and reporting, FARE SYSTEM Equipment/Component self-diagnostics shall be employed to the maximum extent possible. Also, self-diagnostics shall assure the highest possible availability. Self-diagnostic programs shall be provided for the FARE SYSTEM Equipment/Components to assure the FARE SYSTEM is in a state of good health; e.g., communications on-line, device battery charged, cash vault empty, etc. If problems are identified by the self-diagnostics, the FARE SYSTEM shall automatically alert Palm Tran of the problem(s) without immediately interrupting or preventing FARE SYSTEM operations.

At any given time, the FARE SYSTEM shall provide Palm Tran the functionality to view the health of the entire FARE SYSTEM and to be able to “drill” down to individual FARE SYSTEM components to determine accurately whether a given FARE SYSTEM component is operating correctly. This functionality should be provided in a user-friendly graphical display; e.g., equipment icons and color codes overlay on a system/station map. When a device/component is selected, information, including error codes, media/revenue capacity levels, and other pertinent information shall be displayed. Such information shall be able to be sent in a report, to a printer, and/or in an electronic message.

12 Fare Policies

12.1 General Fare Policy Requirements

In addition to Palm Tran’s current fare policy as described in Section 4.2, this section describes Palm Tran fare policies that will be supported by the FARE SYSTEM. The CONTRACTOR shall develop, document and implement all business rules necessary to support enforcement of current Palm Tran fare policies. The CONTRACTOR shall develop, document and implement all fare tables, fare instruments and transaction processing necessary to support Palm Tran business rules.

All media (when used as a time-based fare product) will be designed to be usable by one person at a time; that is, only one passenger per contactless media, except in the instance of stored value or stored ride transactions that are not subject to fare capping or other Palm Tran-defined restrictions or group fare products provided through Special Programs.

The FARE SYSTEM will support Palm Tran configurable velocity checks and other fraud prevention measures to prevent passback and unauthorized sharing of media. For stored value fare products, the FARE SYSTEM will support separate Palm Tran configurable measures to prevent passback and sharing of media if fare capping applies or other Palm Tran defined restrictions, or to prevent accidental multiple payments.

Multiple fare products will be able to be associated with one customer account simultaneously (e.g., stored value and a pass products). One customer account will be able to support up to 10 different fare products, depending on business rules determined during design reviews. Fare precedence rules will also be established in business rules documented during design reviews.

12.2 Fare Payment Options

Customers will be able to pay in advance by pre-funding a transit account (pay-in-advance) or perform open payments at the point of entry into the transit system (Pay-As-You-Go or PAYGO). Closed-loop, pay-in-advance payments will use Palm Tran- or third party-issued media, linked to a closed-loop transit account, to enable the payment of fares. The following summarizes the fare payment options that will be available to customers.

The FARE SYSTEM shall support pay-in-advance through pre-funding a transit account, linked to any supported closed-loop media, with stored value, time-based fare products, and other fare products to be determined during design review. The FARE SYSTEM shall support payments at the point of entry using a contactless open payment media, including contactless credit cards and NFC mobile wallets (PAYGO). Stored value will also be supported as a payment method for the purchase of fare products through all sales channels, by presenting the associated media, or logging into an associated customer account.

12.3 Fare Structure and Pricing

The current Palm Tran fares are described in Section 4.2. The FARE SYSTEM shall support at minimum the current Palm Tran fare structures, fare products and reduced fare products, including Palm Tran’s Transportation Disadvantage (TD), with pricing and fare products configurable by Palm Tran. This shall include all possible fare products and other fare structures as may be defined and used in the future.

Additional fare products and categories may be defined during design review, including passes (calendar-based, trip-based, mode specific), bonus fares, fare differentials, location-based fares, service-based fares, peak/off-peak pricing and distance-based fares.

12.3.1 Fare Pricing

Each boarding will be priced at a single fare based on the zone and fare category associated with the transit account, with exception of fare products with unlimited rides for a period of time where individual fares do not need to be paid.

For Palm Tran service, fare payment using the FARE SYSTEM will require a single tap of contactless media at a bus, platform, or Palm Tran Connection validator. For future consideration:

- The FARE SYSTEM shall support distance-based fares, including zone-based and point-to-point fares.
- The FARE SYSTEM shall be capable of supporting a one-time charge for issuance of a new extended-use or limited-use media.
- The FARE SYSTEM shall be capable of supporting a premium pricing structure for certain types of fares, such as single ride tickets.
- Fare pricing for each service type, zone, time of day and fare category shall be defined during design review and shall be configurable by Palm Tran.
- The FARE SYSTEM shall support fare pricing based on the service type, including “premium service” (e.g., express bus service) that is priced higher than the base fare and other services which may be priced lower than the base fare.
- The FARE SYSTEM shall support differential fare pricing based on the type of media or fare products used for payment (e.g., a fare paid using extended-use closed-loop media may be discounted over open payment or limited-use media).
- The FARE SYSTEM shall support configurable time-based fare pricing for closed-loop and open payment fares. The FARE SYSTEM shall support peak/off-peak pricing, weekday/weekend pricing, and free-ride days and hours (e.g., free after 7 p.m. (ET) on Dec. 31 only) by service type.
- The FARE SYSTEM shall support configurable fare incentives, such as providing a free ride after a certain number of rides have been purchased, or a value-based bonus which shall be automatically added to a customer account when value is added.
- The FARE SYSTEM shall support “step-up” fares and fare capping, using stored value to pay the difference between the value of a flat fare and a higher-priced service or zone.
- The FARE SYSTEM shall support time-limited fare products that are activated on first use and expire after a certain time interval, with the ability to put hard expiration date on card/account.

12.3.2 Stored Value/Trips

The FARE SYSTEM will support the loading of stored value to closed-loop transit accounts linked to all supported types of closed-loop media. The FARE SYSTEM will support stored value payment for full fare, reduced fare and all special fare customers. Stored value payments will deduct the correct fare on each entry into the FARE SYSTEM. Transit account balances will update in real-time, or near real-time, after each entry.

For transit accounts with stored value, the FARE SYSTEM will support a “floor” or value below which the transit account cannot fall. This “floor” or threshold will be defined during system design and will be configurable. The FARE SYSTEM will support the capability to assess escheatment which will be determined during design review and comply with laws of the State of Florida regarding escheatment.

The FARE SYSTEM will support the loading of trip-based fare products to closed-loop transit accounts linked to all supported types of closed-loop media. The capability for bonus trips or value (similar to existing fare policy) will be possible.

12.3.3 Time-Based Passes

The FARE SYSTEM will be able to support time-based fare products that may be configured by Palm Tran. The FARE SYSTEM will support the loading of time-based fare products to closed-loop transit accounts linked to all supported types of closed-loop media. The FARE SYSTEM will support the removal of unused passes from FARE SYSTEM Accounts (configurable and per approval by Palm Tran), which will be followed by typical accounting practices to correctly balance the general ledger.

The FARE SYSTEM will allow fare products that are valid for a rolling period of time that begins on activation in the FARE SYSTEM. For example, 31-day passes that are valid for 31 days from date of first use. Rolling passes shall have the capability to be set to expire at the end of a day, or after a specific time period. For example, a day pass can expire at a pre-defined time (2am), or 24 hours after first use. This will be configurable by Palm Tran when setting up the fare product.

The FARE SYSTEM will allow fare products that are valid for the calendar period in which they are activated in the system. For example, weekly passes valid Sunday through Saturday.

12.3.4 Fare Capping

The FARE SYSTEM shall allow for fare and/or ride capping for certain payment options (e.g., PAYGO) which may be offered in addition to or instead of current fare products. Fare capping will be supported for customers that pay fares using stored value in a closed-loop transit account, accessed using closed-loop or open payment media. Fare capping will be supported for customers that use PAYGO via open payment media. Fare capping will establish a maximum fare that a customer will be charged within a defined period (e.g., day, week, or month) either on a rolling basis or calendar basis.

The FARE SYSTEM will be configurable to support a range of capping periods, such as per day, week, or month. Unique full fare and reduced fare threshold values will be supported for all capping periods. The fare capping algorithm will support configurable accumulators and threshold values based on the payment type, customer fare category and Palm Tran and/or service type (e.g., local service, express service) being accessed. the algorithm will apply to the transit account and will allow for lost/stolen/expired media to be replaced without interruption of fare capping. The fare capping algorithm and threshold values will be defined during design review and will be configurable by Palm Tran.

12.3.5 Transfers

Transfers will be managed electronically by the FARE SYSTEM. The FARE SYSTEM will support all current Palm Tran transfer rules. Transfers will be supported for customers who pay fares using stored value in a closed-loop transit account, using closed-loop media. Transfers will be supported for customers using fare products stored in a closed-loop transit account, using closed-loop media. Transfers will be supported for customers using PAYGO with open payment media.

The FARE SYSTEM will support new transfer rules, configurable by Palm Tran. The transfer rules can be configured by number of taps, travel time, stop or station, route, time of day or some combination. The FARE SYSTEM will support transfers for multiple users using one media linked to a value-based fare

product or using open-loop PAYGO. The FARE SYSTEM will support transfer credits for boardings that occur within a configurable timeframe of tapping at a FARE SYSTEM Validator.

For riders who use their mobile device, contactless bank card, non-cash paying riders, transfers may be free for customers transferring between routes or services with the same fares depending on Palm Tran-configurable business rules. For customers transferring to routes or services with higher fares, the FARE SYSTEM will support charging an upgrade fare equal to the difference between the applicable fares. Other up charge amounts, and rules shall be configured by Palm Tran. Rules regarding allowable transfers will be defined during design review and will be configurable individually by Palm Tran.

12.4 Special Fare Programs

The FARE SYSTEM will support the transition of existing Special Programs to the FARE SYSTEM, including FAU, Lakes of Delray, Cen-West, Sun-Fest FAU Football and Minor League Baseball. The FARE SYSTEM will support at least the current range of Special Programs offered by Palm Tran today. Fare products offered by Palm Tran Sponsors/institutions (for example, employers, schools and social service agencies) will be managed and distributed using the B2B Portal and will not be available to the general public. The full set of special fare products to be offered will be defined during design review.

The FARE SYSTEM will support the group sale of media and value to employers, student organizations, social service organizations and others that may be designated by Palm Tran. The FARE SYSTEM will support special fare payments using extended-use closed-loop account-based media, limited-use closed-loop media, or via contactless interfaces using a third-party mobile application.

Participating organizations will manage closed-loop transit accounts assigned to their participants using the B2B Portal including adding value to transit accounts and updating FARE SYSTEM account information as participants enter and leave the special program.

Fare products available to special program customers will include stored value that is available to the general public, as well as special fare products (such as time- and ride-limited student passes, and non-revenue access passes). When paying fares using stored value loaded through special programs, full fare pricing will apply, unless a special programs account is specifically designated as reduced fare or non-revenue. The FARE SYSTEM will support transit benefit sales under the special programs, including order management, invoicing, payment processing and the bulk distribution of value.

The FARE SYSTEM will allow printing of photos on extended-use media in a card-based form factor and production of this media at designated customer service sites to support at minimum the following photo ID programs:

- Employee passes
- Reduced fare media
- Palm Tran Connection media

Data related to photo ID Media under the FARE SYSTEM, including employee information, reduced fare applications, photographs and access rights, will be stored in and managed by the Photo ID Module of the FARE SYSTEM Back Office (accessible via the CAM System). Administration rights for use of this Photo ID Module will be defined by Palm Tran.

The CONTRACTOR will manage the transition of any existing database for administration of student passes, including qualified schools, into the appropriate FARE SYSTEM database for administering the student program through the B2B Portal.

12.4.1 Transportation Disadvantage/Reduced Fare Program

Customers who qualify for reduced fares will go through Palm Tran's validation process before being issued personalized extended-use media linked to a closed-loop transit account designated as reduced fare. The media for reduced fare customers may contain a printed photo ID.

The FARE SYSTEM will support a reduced fare program for students, seniors and persons with qualifying disabilities to apply for reduced fare status. Reduced fare passengers currently pay half regular fares, but this amount will be configurable by Palm Tran.

The FARE SYSTEM will support storage of reduced fare applications and supporting documentation including photos for identification to be printed on extended-use media. Reduced fare customer information will be stored in the photo ID module of the FARE SYSTEM Back Office (accessible via the CAM System). The FARE SYSTEM will support a potential additional fee for media replacement rate above a certain threshold (e.g., two per year). The CONTRACTOR shall manage transition of all current reduced fare participant data from the existing systems to the appropriate FARE SYSTEM database.

12.4.2 Subscription (Autoload) Program

Existing subscription accounts will migrate to the subscription/autoload feature available for every closed-loop transit account within the FARE SYSTEM. The FARE SYSTEM will support a subscription/autoload that full fare and reduced fare passengers can opt into through their transit accounts, all in compliance with applicable law. Autoload will maintain current discount entitlements of the customer.

The FARE SYSTEM will support autoload of incremental value when a value-based transit account falls below a defined threshold, the threshold can be defined by the customer within limits configured by Palm Tran. The FARE SYSTEM will support autoload of a fare product or incremental value on a defined date (for example, load a monthly pass on the 20th which will be valid for the following month, or \$20 the first day of the month). These parameters will be configurable by Palm Tran.

The CONTRACTOR shall manage the migration of all current subscription accounts (and associated data) to the FARE SYSTEM.

13 Fare Media Types

The FARE SYSTEM will accept multiple media types for fare payment, including contactless open payment media, mobile wallets, a variety of closed-loop Palm Tran-issued smart cards, and barcoded media in paper and electronic form.

13.1 Open Payment Media

The FARE SYSTEM will accept open payment media in the form of contactless bank cards, and their mobile wallet equivalents, for the payment of fares. Open payment media will be able to pay for a fare at a FARE SYSTEM Validator at the time of entry into the transit system using PAYGO. Transfers will be enabled based on applicable business rules, configurable by Palm Tran.

The CONTRACTOR shall provide a mechanism to uniquely identify, and detect usage of all open payment media, including those with the same PAN. Companion media will be identified separately and the business rules to restrict or allow use will be configurable by Palm Tran.

If alias PANs or other tokens (short-term or long-term) are used by card issuers for open payment media, including mobile wallets, the CONTRACTOR shall provide a mechanism to link payments to actual PAN and/or individual customer for the purposes of aggregation, fare- or ride-capping, or the ongoing use of fare products stored in a closed-loop transit account, all in compliance with PCI-DSS and Palm Tran IT Security Standards. This shall also apply to instances where a customer obtains a replacement instrument or device that contains a new token (such as when a customer receives a new mobile phone).

13.2 Palm Tran-Issued Media

Palm Tran will issue extended-use (EU) media in the form of a transit card. Limited-use (LU) media will also be available to support various fare products as needed. Palm Tran will provide the CONTRACTOR with the approved artwork and graphics to use for pre-printed graphics on the EU and LU media.

13.2.1 General Requirements

The CONTRACTOR shall utilize either an industry standard transit payment application for closed-loop media, or a licensed open payment software application to support closed-loop fare payments. Either approach will require approval from Palm Tran during design review and will meet industry standards at time of FDR.

13.2.2 Transit Payment Applications

The CONTRACTOR shall utilize an industry standard transit payment software application to support closed-loop fare payments for multi-application smart cards. The software application may be the same software application that is developed for use on the LU Media.

The transit payment software application will be compatible with all chips in the product line of the associated multi-application smart card platform.

The transit payment software application will allow use of media issued by third parties that supports a multi-application smart card environment. Compatible media issued by third parties may include, but are not limited to:

- Corporate employee ID badges
- School ID cards
- Social service program cards
- Police ID cards

The FARE SYSTEM will include the necessary key management tools to support the sharing, loading and management of the transit payment software application in a multi-application smart card environment.

13.2.3 Alternative Form Factors

The provided media formats will support alternative contactless form factors that can be read by FARE SYSTEM devices. Alternative form factors may include, but are not limited to, smart bracelets, smart watches, smart tags or stickers and other compact formats such as key fobs.

13.2.4 Media Certifications

All CONTRACTOR-provided media will be certified by all parties involved in the design, manufacture, testing, licensing and issuance of media. Certifications may include, but are not limited to, ISO, NEC, MIL, UL, MIFARE, ADA, PCI-DSS, EMV and any applicable agency certifications related to media.

Media will undergo a comprehensive quality assurance process prior to delivery to ensure adherence to the required performance and certifications. Media that fails to meet performance and/or certifications requirements will be replaced at no cost to Palm Tran.

13.3 Extended Use Contactless Smart Cards

The EU media will be linked to a closed-loop transit account that holds fare products loaded by the customer and is used for payment when accessing the FARE SYSTEM.

EU media will be able to support all passenger types, including full-fare as well as reduced-fare or other special program customers who may receive personalized cards with printed photographs.

13.4 Limited-Use Contactless Smart Cards

LU media will be provided for the distribution of fare products to be determined by Palm Tran. The LU media will be linked to a closed-loop transit account that holds fare products (with applicable business rules) and is used for payment.

Transit Accounts associated with Limited-Use Media may be reloadable using the B2B Portal or by individual passengers as determined by Palm Tran. The FARE SYSTEM will support the issuance of pre-encoded LU media and the encoding of the LU media upon issuance by a FARE SYSTEM device, using the CONTRACTOR-supplied APIs.

13.5 Palm Tran Employee and other Partner ID Smart Cards

The FARE SYSTEM will support a secure identity access control employee card that includes a photograph of the employee. The FARE SYSTEM account linked to this media will not be allowed to load any value or fare products available to the general public but will provide non-revenue access to the transit system via an employee pass as configurable by the appropriate access provider within Palm Tran. Employee ID cards will contain an appropriate interface (magstripe, barcode) to allow access through the existing building and facility security systems. Integration with all applicable systems to be accessed using the employee ID cards will be the responsibility of the CONTRACTOR.

14 Palm Tran Mobile Ticketing Application

The CONTRACTOR will provide a mobile ticketing solution that includes a mobile device application to purchase/validate fares. Palm Tran prefers a unified mobile ticketing and FARE SYSTEM back office that shares common components (e.g., monitoring tool, configuration management, etc.). Any back-office modules that are unique to mobile ticketing will integrate with the FARE SYSTEM equipment, back office components, and other modules as necessary.

At launch, Palm Tran expects mobile ticketing to offer only full fare pass products (i.e. no reduced fare), limited to one-ways and select passes. Mobile ticketing shall support other fare categories and products, including stored value, should Palm Tran choose to expand their mobile offerings in the future.

14.1 FARE SYSTEM Integration

The mobile ticketing will share as many components with the FARE SYSTEM where possible. However, mobile ticketing products shall be separate and distinct from other FARE SYSTEM products (e.g., a 31-day pass purchased through the mobile ticketing application will not be available for use through that customer's smartcard). When a common interface or shared back office module is not possible, the mobile specific components will be distinctive and designed not to be confused with the FARE SYSTEM specific components.

In cases where the FARE SYSTEM requirements overlap or conflict with mobile ticketing requirements, the mobile ticketing requirements will supersede any FARE SYSTEM requirements as it relates to the mobile ticketing solution. If the mobile ticketing and smartcard accounts are shared, the FARE SYSTEM will prevent a customer from possessing two forms of media (i.e., smartcard and mobile) for the same product, in order to prevent fraud and misuse.

14.2 Mobile Platform

The mobile ticketing application will be developed for both Android and iOS mobile platforms. The Operating System (OS) support will include the current and the previous two (2) versions of the Android and iOS operating systems released at the time of design review. The mobile application code shall be portable to alternative mobile phone platforms if Palm Tran decides to support other platforms in the future. Palm Tran prefers the mobile application to be developed using native development tools per OS. As new OS versions and security updates are released, the CONTRACTOR will provide updates that will ensure compatibility and up-to-date security.

14.3 Application Design

The mobile application will employ a UI that is based on industry-accepted UI design standards, and consider ergonomics, human factors, and graphic design best practices to assist in development of the application layout and interaction. The user display, instructions and selection keys of the mobile application will be easy to read, understand and use. All text will have a high contrast color to its background to ensure easy legibility. The mobile application will be designed to provide quick and easy customer-initiated transactions. All selection keys and other hyperlinks in the mobile application will be accessible and responsive.

Screen layouts will be constructed to minimize the likelihood that a user will activate the incorrect key or more than one key with one touch. The mobile application will follow the common UX guidelines and adhere to Palm Tran branding requirements. A common set of screens and style guides will be used across all supported OS. The App will follow the latest ADA and accessibility guidelines for each OS.

The mobile application interface will allow customers to easily view all of their fare products. Order of precedence rules, to be defined during the design review, will determine which fare products are used first and under which scenarios. Customers will be able to select their fare and rider type via drop down menus. Multiple quantities of different rider and ticket types will be able to be purchased in one

transaction. All customer facing interfaces will be designed to adhere to the aesthetic standards of Palm Tran. All designs will be submitted as part of the CDR for review and approval.

The mobile ticketing will be designed to operate within the varying indoor/outdoor environmental and lighting conditions associated with rail vehicles, stations, buses, and bus stops. The mobile ticketing will be scalable and extensible to support growth based on increasing customer adoption of the system.

All graphics and logos will be in accordance with the graphics standards employed by and subject to approval by Palm Tran. The mobile ticketing will comply with all ADA standards and will comply with the most recent version of the ADAAG at the time of Final Acceptance (see ADA Compliance section).

The mobile application shall be compliant with the WCAG 2.0 standard for usability. Compliance will be affirmed by a third-party chosen by Palm Tran.

The mobile application will be available in English, Spanish, and up to three (3) other languages to be identified by Palm Tran during design review.

14.4 Mobile Application Distribution

Palm Tran will submit the mobile ticketing application under Palm Tran's App and Google Play store accounts. The CONTRACTOR shall support the maintenance of the mobile ticketing application in the appropriate app stores for both the iOS and Android mobile operating systems.

The CONTRACTOR shall be responsible for designing and developing the store content utilizing artwork and branding supplied and approved by Palm Tran. The CONTRACTOR shall be responsible for making the mobile ticketing application available and maintain updates during the duration of the contract.

Prior to public release of the mobile application on the app stores, the CONTRACTOR will provide a standalone version of the mobile application for testing and pilot purposes (see Section 37), such as an Android Application Package (APK) and iOS equivalent.

14.5 Mobile Fare Structure

The mobile ticketing will support all rider types (e.g., full fare, reduced fare) and fare policies specified in Sections 4.2 and 12. The mobile ticketing fare products will be distinct from their equivalent smartcard fare products. For example, a day pass purchased through a mobile ticketing account and made available in the customer's mobile product wallet will be distinct and separate from a day pass purchased by that same customer and loaded onto their smartcard.

The mobile ticketing will permit the addition, deletion, and modification of fare products and their parameters (e.g., validity periods, business rules, activation conditions) by authorized Palm Tran personnel through the FARE SYSTEM's fare configuration management tool. Fare products that have been added, removed, or modified by Palm Tran will be available on the mobile ticketing application within 72 hours of publication. The default fare set will be associated with transit accounts that have a Full Fare rider classification. Additional rider classifications, such as reduced fare, will be able to be defined and associated with unique fare sets (see Mobile Ticketing Reduced Fare section).

The rider classifications will be able to be modified manually, or automatically based on customer date of birth or the granting of a temporary classification with a configurable end date. The mobile ticketing will provide Palm Tran the capability to add new modes or participants (e.g., parking and bike share) with unique fare pricing as needed.

The mobile ticketing will support stored value (electronic cash) and fare capping, which will limit charging of stored value above a predetermined configurable limit. Additionally, the mobile ticketing shall support the ability to apply upcharges using stored value when a pass product is not sufficient for the service being used. The implementation of stored value/capping, upcharges and other mobile fare structure rules will be finalized during the CDR design review.

14.6 Account Registration

All customers will be required to register an account before using the mobile ticketing application. Depending on the structure of the mobile and FARE SYSTEM back office (i.e., shared or separate), all customers will either register a new mobile-specific account or input and link their smartcard transit account information. Customer information requested during account registration may include:

- Name
- Address
- Phone number
- E-mail address
- Username
- Password
- Security questions and answers
- Account PIN

The final list of customer information required for account registration will be determined during the CDR design review.

An active account can only be active on one mobile device at a time. If the user of an active account attempts to sign in on a new mobile device, the application will prompt the user that the account is already active on another device, and the customer must transfer their account to the new device via the application. Any personalization data including name, photo, group name, expiration date, and other transit account information will be made available to the mobile ticketing application during account registration. Customers will be able to transfer their account from one mobile device to another in case of a lost or new device. All purchased fare products and transaction history will transfer to the new device, and the account will be disabled from the old device. There will be a configurable number of times an account can be transferred within a period to prevent fraud (e.g., 5 times a year or 2 times a month).

Palm Tran staff will have the ability to verify, remove, transfer, and create accounts through the FARE SYSTEM back office. Bulk creation of accounts will be possible by uploading a spreadsheet or files with customer information.

14.6.1 Reduced Fare

Reduced fare purchases will be possible and require an initial registration of the user account to validate eligibility before reduced fare purchases are allowed. For example, a senior customer will have to input their valid reduced fare ID number in order to validate that their account is eligible to purchase reduced fares in the mobile application. Reduced fare registration will be part of a separate eligibility process.

Once the customer inputs the reduced fare smartcard ID number and their ID is verified, the customer will be provided with the full set of mobile reduced fare products for purchase. When a customer is registered for reduced fares through the mobile ticketing application, their ability to load/reload

reduced fares on smartcard will be disabled. Customers will be notified of this change, and will need to agree (e.g., “accept” the mobile notification) for mobile reduced fare products to become available for purchase.

The FARE SYSTEM will support the ability for customers to switch between reduced fares on mobile and smartcard. The system will prevent one (1) customer from having two (2) active forms of reduced fare media at any time. Rules for switching between media shall be defined during the CDR design review. A reduced fare ID number may be linked to only (1) mobile number. Once a valid ID number is used, it may not be used to activate another reduced fare transit account.

Palm Tran may provide a list of eligible reduced fare ID numbers in standard table format. The mobile ticketing back office will store these eligible IDs and assign them to active accounts as they are registered. Eligible reduced fare IDs may be checked against other customer information to prevent fraud. For example, a senior ID may be associated with a customer phone number. If a customer’s mobile phone has a number that is different than the mobile number associated with their reduced fare ID, the mobile application may choose to prevent the registration of that account as reduced fare. Verification of such customer information will be determined during design review.

Depending on the reduced fare ID number, the mobile application will enable the purchase of corresponding reduced fare products. For example, if a valid college ID number is used to register for reduced fares through mobile ticketing, the customer will have the capability to purchase college products.

The reduced fare registration process can occur during initial account creation, or after the account has already been created. Once the account is registered as a reduced fare account, it will maintain that status until an expiration date or other configurable parameter is met. Palm Tran staff will have the ability to verify, remove, transfer, and create reduced fare ID accounts through the FARE SYSTEM back office. Bulk creation of reduced fare accounts will be possible by uploading a spreadsheet or files with reduced fare registration information.

14.7 Purchasing

The mobile ticketing will accept the following forms of payment:

- Visa
- MasterCard
- American Express
- Discover
- Electronic benefits,
- Mobile Wallets (e.g., PayPal, Android/Apple/Samsung Pay)

Customers making payments with bank cards will be able to use up to two (2) payment methods to complete a transaction. Customers will automatically receive their receipt after purchase via email or SMS, based on customer preference. Once a successful payment is made, the purchased product will become available in the customer’s product wallet. Activation of the mobile ticket shall be configurable such that Palm Tran may choose to enable activation upon purchase or allow the product to stay inactive until the customer activates the product for validation (see Mobile Ticketing Validation section).

Customers will be able to purchase multiple fare products in a single transaction. Customers will also be able to store multiple fare products in their product wallet and will be able to navigate quickly and easily between them. The products can be used individually or in groups. For example, after purchasing six (6)

tickets, the customer can activate one (1) ticket, then three (3) tickets another day, and the remaining two (2) tickets a different day.

The mobile ticketing application will be architected and designed to allow customers to choose and purchase a fare product in 15 seconds or less (initial purchase/account set-up may take longer) under normal cellular data connectivity conditions.

14.8 Validation

Fare products purchased through the application will initially be inactive, and not available for immediate use. Customers will need to activate products prior to boarding. Upon activation, the mobile ticket will display a 2D barcode for validation on bus or station validators.

For subsequent rides on the same pass product (e.g. weekly pass, monthly pass, etc.), customers must open the active pass product prior to boarding and display the 2D barcode for validation. The validation screen will include a 2D barcode, an animation (run in the background while viewing the barcode), and standard proof of payment information including but not limited to pass type, activation date/time, expiration date/time, rider class, and other relevant fraud prevention information.

The 2D barcode will be dynamically generated and will have the ability to automatically “refresh” periodically to prevent duplication or fraud. Information in the barcode will be enough to verify electronically that the ticket is valid for travel. Possible data elements to embed in the barcode include but are not limited to:

- Account ID
- Account status
- Product type
- Rider class
- Activation time/date
- Expiration time/date
- Geolocation (latitude/longitude)

If the customer has more than one (1) active ticket at a time, one (1) scan can access information for all of the active tickets if necessary. When validating, the mobile application will set the screen brightness at 100%, after which the device screen will revert to its original brightness setting.

Farebox validators will be able to validate fare products presented via the mobile ticketing application with no interaction from operators. It will not require Palm Tran personnel touch customer devices. The response time from reading of the mobile ticket barcode by the validator to display of the result will not exceed 750 milliseconds.

~~For the first three (3) minutes (or configurable period) after validation, unique features will be visible on the ticket that indicate it was only recently validated, in order to deter customers from waiting for the presence of inspection staff to purchase and/or validate. The state of the ticket will always be apparent on the ticket.~~

The FARE SYSTEM shall have a means to detect when a fare product is activated and be able to filter out multiple uses (e.g., the same pass is opened multiple times at the same geographic location and within a short, configurable time frame). Unused fare products will automatically expire after a certain number of programmable days. Palm Tran will have the ability to adjust the expiration date. Customers will receive a notification on their device and/or email a configurable number of days before the expiration

of their unused fare product(s). Once a product expires, whether used or unused, the product will automatically be removed from the customer's product wallet.

The mobile ticketing will support offline ticket validation. In geographic areas without cellular service reception, or where service is intermittent, the application will be able to display and validate fares. The mobile ticketing application shall support other forms of validation technology, including ISO 18092 (NFC). The CONTRACTOR shall demonstrate NFC validation capabilities and describe potential benefits and limitations. The electronic validation technology will be transparent to the customer and will not require selection or additional complexity in the UI.

14.9 Customer Tools

The mobile ticketing application will allow customers to manage their accounts, and will support the functions including, but not limited to:

- Create a new account
- View and manage account settings and customer profile
- Add a funding source
- View transit account balance and status information
- View and download sales, usage, and adjustment transaction history
- Initiate a customer service request (e.g., refund request)
- Request an opt-out refund (e.g., close transit account)
- Opt-in and -out of email and SMS notifications
- Modify registration data

Final customer functions will be determined during the CDR design review.

Rider Tools in the mobile ticketing application will include but are not limited to:

- Frequently Asked Questions (FAQs)
- System maps and timetables
- Customer service and support contact information
- Service disruption and security alerts
- Ability to sign up for custom alerts (agency, line, etc.)
- System maps available offline for bus and rail systems

A final list of rider tools will be determined during the CDR design review.

Customers will be able to view Palm Tran contact information including customer service, law enforcement, application feedback, etc. The mobile ticketing application will allow customers to view FAQs, application settings, terms and conditions, and device information. If customers have to type in station or route names, the mobile ticketing application will use predictive text for suggestions.

The ability to include couponing, event branding, and advertisements in the application will be possible. The CONTRACTOR shall address how they could manage these possible features. Customers will be able to provide feedback on the application and provide suggestions for future improvements.

The mobile ticketing application will support links to external applications/websites and other tools including schedule, trip planning, rider alerts, etc.



14.10 Trip Planning

Proposers shall describe their trip planning functionality included within their proposed mobile ticketing application. The trip planning function should include functionality, such as:

- Link to embedded mobile-optimized trip planning website that seamlessly appears within application frame.
- Link to an external trip planning mobile application, to be selected by Palm Tran.
- Link to suggested trip planning application in respective mobile app store.

The initial trip planning solution will be determined during the CDR design review with the final solution being determined during the PDR design review.

The trip planning functionality will either be accessed from customer tools, or in an intuitive matter that improves the customer experience. The interface will be as seamless as possible to provide a consistent mobile ticketing experience.

The trip planning solution will have the option to use the device’s GPS for current location. The trip planner will include features to provide a rich customer experience, including information about the fare required for that trip.

The mobile ticketing application will be designed to “bolt on” to other trip planning applications such that they are able to launch the mobile ticketing application for fare purchases. For example, a Palm Tran-developed trip planning app will be able to launch the mobile ticketing app for the fare purchase portion of the trip planning process.

14.11 Mobile Security and Fraud Prevention

The mobile ticketing application will display unique animation(s) designed for Palm Tran with interactive features to minimize the risk of fraudulent tickets through screenshots or other means. For additional protection, other elements of design (color, text, etc.) will be dynamic. At minimum, the mobile ticketing application will support dynamic generation of 2D barcodes and real-time validation of fares to prevent duplication or sharing of tickets.

The mobile ticketing application will support configurable rules to prevent the sharing of fares and accidental payments through passback, or a configurable time period in which a transit account will not be accepted for payment at a device after an initial tap. Passback protection will be able to be configured by fare product and rider classification and will be configurable in the back office. All fraud prevention tools will comply with Palm Tran security standards in addition to PCI and ADA compliance regulations.

In order to prevent misuse, an active user account can only be active on one mobile device at a time. If the user of an active account attempts to sign in on a new phone, the mobile ticketing application will prompt them that the account is already active on another phone, and the customer must transfer their account to the new phone via the customer website.

The mobile ticketing will employ ongoing fraud detection and monitoring through real-time analysis of mobile ticketing activity. These techniques will help protect the data system from unknown cyber-attacks or computer viruses. All 2D barcode images or other validation techniques (NFC) will be secured via encryption or another method to ensure the integrity of issued tickets, and the system will utilize various features to minimize the risk of fraudulent tickets.

The mobile ticketing will contain a variety of security features to allow applicable personnel to identify easily any visually invalid, expired or fraudulent mobile tickets. The CONTRACTOR shall provide potential alternatives to help mitigate the risk of customers making on-board purchases or waiting to activate tickets upon the presence of inspection staff. The mobile ticketing will follow all applicable security, PCI, and privacy measures (see System Architecture section). Measures will be taken to ensure that any data stored on external devices, including users' mobile devices, will not compromise any components of the mobile ticketing application. Data security for the mobile ticketing application will ensure that all data is safeguarded from unauthorized access or use, and programs are protected from any known cyber-attack or computer virus. The mobile ticketing application will be able to detect and report any attempts to gain access to the system, whether authorized or unauthorized. Usernames, passwords, and any other security credentials will never be transmitted or stored as unencrypted text. Passwords shall be stored using a high-level encryption (e.g., AES), and shall be both salted and hashed as per the U.S. Department of Defense regulations.

14.12 Mobile Ticketing Back Office

The mobile ticketing back office will share as many components with the FARE SYSTEM as possible, with a preference for common back office modules and UI. Palm Tran will have access to the back office to view and analyze data, generate and run reports, audit transactions, manage and configure system parameters, administer and modify policies and products, and for other general back office related functions. The back office will include a blocking feature that will allow a customer's phone number to be blocked from using the mobile ticketing application to purchase tickets in the future under certain circumstances, such as repeated fraud.

The back office will have the ability for customer service and/or revenue departments to deliver a refund or a complimentary ticket electronically. The back office will support central management of all customer data, customer service tools, and product ordering and refunds. There is preference for a web-based solution. The back office will support customer service operations with a tool that provides a full transaction history, and enables creation, viewing, and modification of customer service requests.

The back office will be supported by an isolated customer information database, which will be fully compliant with all applicable PCI standards, and with all Palm Tran, state, and local policies for the handling of PII (see PCI/EMV section).

14.13 Cash Payments

The mobile ticketing will provide the ability to pay fares with cash via a network of retailers with existing POS devices. The CONTRACTOR will establish these retail programs to support this feature. The cash payment option will exist alongside credit/debit payments. The mobile ticketing application will launch an interactive map of retail locations where customers can pay with cash. After cash payment, the retailer POS will immediately communicate with the FARE SYSTEM back office to add the fare product to the Customer's account. The CONTRACTOR shall partner with a retail network provider or payment processor that currently offers cash payment options on mobile platforms.

14.14 Closed-Loop Virtual Cards

The CONTRACTOR will provide a closed-loop virtual card that will integrate with the FARE SYSTEM back office. The mobile ticketing application will include a payment credential which will be virtualized on the

Near Field Communication (NFC) secure element of the mobile device and will be supported once it is available in the industry.

The mobile ticketing application will allow a customer to procure a mobile closed-loop credential through in-app provisioning without the need for a physical card. The application will also enable conversion of a physical credential if a card has already been procured by the customer.

The mobile ticketing application will communicate with the Farebox's validators via ISO/IEC 14443 and the FARE SYSTEM back office to recognize, log, and report on the usage. The mobile application will generate and transmit additional data that enables and supports comprehensive reporting and analytics including mobile platform information and geocoding.

15 Near Field Communications and other Mobile Payment Devices

The FARE SYSTEM will support use of certain Near Field Communication devices as media, including mobile phones and tablets. The FARE SYSTEM shall support use of NFC devices following the ISO/IEC 18092 standard as media. Accepted NFC devices include mobile phones and tablets, in addition to NFC stickers, tags and other alternative ID media.

16 Third Party Media

The FARE SYSTEM will support acceptance of Palm Tran-defined third-party media, with mutually-agreed security measures defined for fare payment acceptance. All transactions and usage, approved or denied, will be recorded by the FARE SYSTEM. Acceptable third-party media and rules associated with their usage for transit or access services will be defined during design review and configurable by Palm Tran.

17 Fare Media Distribution

The CONTRACTOR shall develop a FARE SYSTEM that supports all fare distribution options detailed herein. The FARE SYSTEM Backend will serve as the system of record and reporting for all media and value sales. Palm Tran-issued media will contain all necessary information to enable the cards to function as required upon issuance. The FARE SYSTEM will support Palm Tran-issued media issuance and account activation through retail merchant locations, the APOS, and FARE SYSTEM websites. The FARE SYSTEM will support the collection and maintenance of deposits for each established transit account. The value of the deposit and any deposit refund policies will be configurable by Palm Tran.

The FARE SYSTEM shall support charging a one-time fee for issuance of Palm Tran-issued media, and the FARE SYSTEM shall allow for this fee to be transferred to a transit account as usable value upon registration or other activity determined by Palm Tran. Fees and account value "refunds" will be configurable by Palm Tran. This one-time fee will be configurable. The FARE SYSTEM will support account replenishment (reload) through retail merchant locations, APOS, FARE SYSTEM websites, and Subscription/Autoload. Replenished value may be distributed to various fare products associated with one customer account, subject to value "floors" and other restrictions to be defined and configurable by Palm Tran during design review.

17.1 Distribution Channels

Palm Tran-Issued EU Media will be distributed via retail merchant locations, through the mail, and at the Palm Tran Outlets. The FARE SYSTEM will support continued distribution of media by Palm Tran Retail Partners and third parties who will manage fulfillment of Palm Tran-Issued Media via the B2B Portal.

17.1.1 Retail

Refer to Section 31.1.

17.1.2 Mobile Ticketing Application

Refer to Section 14.

17.1.3 Autoload/Subscription Service

The FARE SYSTEM will include the ability to automatically reload value or products to closed-loop transit accounts when the Transit Account balance falls below a certain threshold or at a defined period. The CONTRACTOR-furnished FARE SYSTEM will include a subscription/autoload feature that enables the automated reloading of a transit account when the associated customer account is registered and linked to an accepted form of payment, including a credit or debit card, bank account (ACH transfer) or transit benefit allocation.

The subscription/autoload feature will support both threshold-based autoloads (reloading of value when a transit account balance falls below an established minimum) and calendar-based autoloads (reloading of value on a customer- or system-designated date every month). Both types of subscription/autoload shall allow customers to set their own thresholds, within limits configured by Palm Tran, or defaulted to Palm Tran configured settings.

Autoload shall be configurable by the customer using the FARE SYSTEM customer web and at the Palm Tran Outlets. Autoload funding source information will be stored within the CAM System in a tokenized form.

A customer may have two funding sources associated with their account, a primary funding source and a secondary funding source. The FARE SYSTEM will support splitting of a subscription/autoload payment between the two funding sources. Once a funding source has been established, customers will be able to be enable autoload using the FARE SYSTEM customer website and the Palm Tran Outlets.

The parameters governing threshold- and calendar-based subscription/autoloads will be fully configurable and established during design review. The account-based nature of the FARE SYSTEM will allow for subscription/autoload payment authorization prior to the loading of any value, and immediate use of the value once the load occurs. All subscription/autoloads (threshold and calendar) shall allow for setup and cancellation by the customer through various channels specified in this Section. The acceptable timeframe for cancelling an Autoload prior to its activation will be determined by Palm Tran during design review.

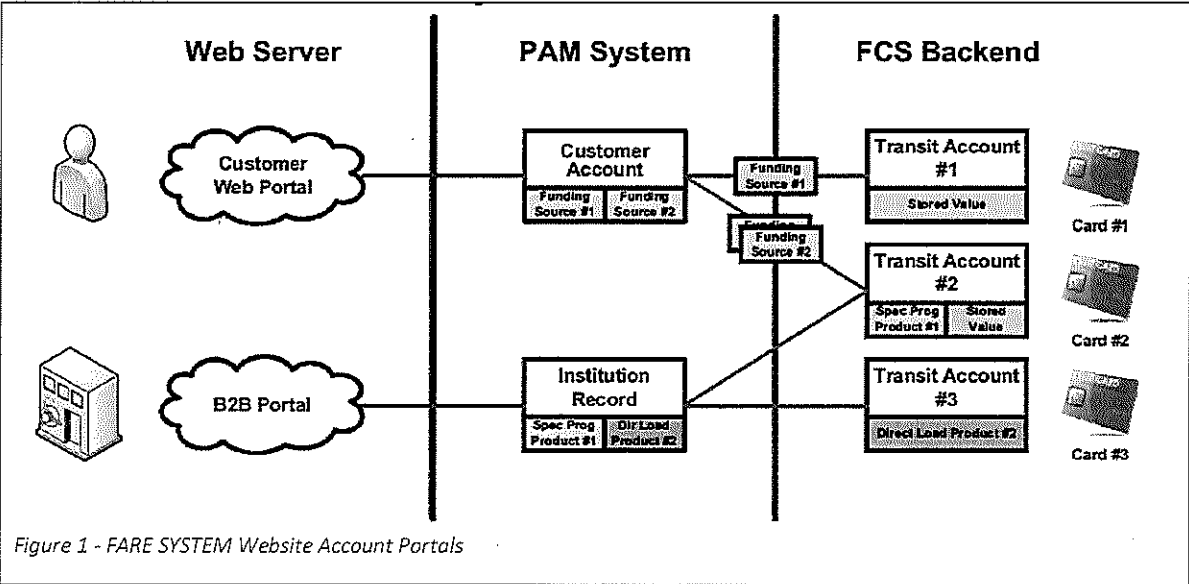
17.1.4 Palm Tran Outlets Agency Point of Sale (APOS)

Palm Tran will continue to operate the existing in-person Palm Tran Outlets, which will serve as a location for customers to make transit inquiries, add value or purchase media, set up a subscription or autoload, register transit accounts, and register for reduced fare classifications. Access to the FARE

SYSTEM to perform these functions will be via the APOS. The CONTRACTOR-provided APOS will support functions specific to operation of the Palm Tran Outlets, including acceptance of customer payments. The CONTRACTOR shall provide technical support for Palm Tran’s transition of current Palm Tran Outlets data and operations to the future FARE SYSTEM.

17.2 FARE SYSTEM Websites

The CONTRACTOR shall include a website to be used by the general public and a second for businesses for the distribution of media and value, and the management of accounts, as shown in Figure 1. This website will tie in with Palm Tran’s existing Website, either via page redirect or API; whichever is more efficient and available. Websites will be hosted by Palm Beach County ISS on their Microsoft Azure platform and should be designed similar to today’s Palm Beach County website to maximize security while minimizing PCI scope.



17.2.1 Website Design

17.2.1.1 Web Design Criteria

The FARE SYSTEM Websites will be compliant with all applicable ADA and Title VI regulations. The FARE SYSTEM Websites will be provided in multiple languages, including English, Spanish and up to thirteen other languages to be identified by Palm Tran prior to the completion of FDR.

The FARE SYSTEM Websites will be built using latest web design and e-commerce best practices, including dynamic design via HTML5, AJAX, and server-side programming languages. The development tools and design for the FARE SYSTEM Websites will be subject to Palm Tran's review and approval during design review. The CONTRACTOR shall work closely with Palm Tran's marketing, IT and web services teams to develop an approved UI design for all iterations of website design and testing throughout implementation.

The CONTRACTOR shall team or contract with a web design firm with extensive experience developing e-commerce, retail and social media websites. All interfaces between the FARE SYSTEM Websites and the FARE SYSTEM will be the responsibility of the CONTRACTOR.

The FARE SYSTEM Websites will adhere to the general design requirements described herein, especially those pertaining to:

- Aesthetic Requirements and UIs
- System Security
- Open Technology
- Software Requirements
- Performance Requirements
- Codes, Regulations & Reference Standards

The FARE SYSTEM Websites will be designed and tested for cross platform compatibility, including:

- PC Platforms: Windows, macOS, Linux and Unix
- Mobile Platforms: Android, Apple iOS
- Browsers: Internet Explorer, Safari, Chrome, Firefox, Edge and Opera

Other platforms and browsers may be specified by Palm Tran during design reviews. The CONTRACTOR shall provide detailed screen flows depicting wireframes and, at appropriate stages of design, mock-ups of each screen layout arranged as a logical flow chart for Palm Tran's review and approval. The flow charts will depict all web screen flows as they will be configured for revenue service, and as configured to support all transaction types decided during design review. Screen flows available to users during transactions will be logical and straightforward. The CONTRACTOR shall provide storyboarding and prototyping of the FARE SYSTEM Websites during iterative development and design reviews.

The FARE SYSTEM Websites will be developed using an agile or iterative design process, whereby design requirements are continually refined and improved with Palm Tran feedback. Wireframes and mockups will be utilized and updated during the iterative design process. FARE SYSTEM Websites testing will employ ongoing end-user testing with an established test group to validate display and operation across all supported PC and mobile platforms prior to the release of any changes. If specialized design and/or UI firms are employed, Palm Tran will be able to access firm resources and design data, including mockups and test results.

17.2.1.2 Website Payment Processing

All payments initiated via the FARE SYSTEM Websites will be accepted using e-commerce best practices and processed through the Payment Application. Application) in a manner compliant with the latest PCI requirements and Palm Tran's policies and procedures. Payments will be accepted based on configurable velocity checks. All Payment Card Data will be encrypted for transmission employing the Triple Data Encryption Algorithm (TDEA) and Transport Layer Security (TLS), at a minimum. All portions of the FARE SYSTEM Websites that transmit or receive customer data will be TLS-encrypted.

The FARE SYSTEM Websites will support Address Verification System (AVS) in a configurable manner that allows the AVS feature to be turned on or off by Palm Tran. The FARE SYSTEM Websites will prompt users when a payment is declined and allow entry of an alternate funding source. Failed payments will be recorded in a separate credit/debit card exception file (with denial code) by the Payment Application.

If a payment authorization is not completed within a configurable time period, or is interrupted, the FARE SYSTEM Websites will cancel the transaction and notify the customer. Any canceled transactions will be recorded in FARE SYSTEM monitoring logs. Users will be e-mailed a receipt for all successfully completed sales, including the fulfillment of an autoloading/subscription. Users will have the option of opting out of e-mail notifications.

17.2.2 Customer Website

The CONTRACTOR shall deliver a Customer Website for all customer interactions and provide software necessary to support website operations by Palm Tran, and all FARE SYSTEM Interfaces to FARE SYSTEM systems and external systems needed to perform the required functions and process payments. This website will be hosted by Palm Tran.

CONTRACTOR shall team with or employ professionals in website design and e-commerce to design, develop, and deploy a customer-facing website that is PCI and EMV compliant, and serves as a convenient and comprehensive online portal for the purchase of Palm Tran media, fare products, and management of closed-loop transit accounts, fare products, and media.

The customer website will include a mobile optimized site for mobile devices with the same features and functions.

17.2.2.1 General Requirements

The Customer Website will allow customers to perform the following functions, at minimum:

- Login using Palm Tran-specific credentials and third-user authentication/login services, such as Facebook, Google and Amazon.
- Purchase EU or LU media
- Register a closed-loop transit account
- Associate open payment media with a closed-loop transit account
- Load value and a fare product to a closed-loop transit account
- Set up, modify and cancel autoloans/subscriptions
- View and download transaction and usage history for both closed-loop and open payment media
- Manage account settings and customer profile
- Report a lost or stolen card
- Initiate a customer service request (e.g., refund request)
- Transfer transit value between transit accounts, as allowed by Palm Tran business rules (both for lost/stolen media and customer convenience purposes)
- Pay Invoice for Fare Not Paid charges
- Perform basic product purchase analytics, refund and missing transaction inquiry functions, as allowed by Palm Tran Business Rules
- Receive notifications via text, email, and other available methods, for certain events such as password changes, low balance, pass expiration, credit card expirations, etc.

The Customer Website shall include schedules, fares and other general transit information, and otherwise comply with Palm Tran's privacy policies and other online practices.

The CONTRACTOR shall provide Palm Tran with all requested access to reports and other tools to fulfill purchase and other transaction requests from individuals. Palm Tran shall have access to administrative pages and functions to facilitate operations and management of the FARE SYSTEM Websites.

The Customer Website will track multiple failure attempts by the customer to purchase media or add fare products by listing those charges in the customer's account temporarily until they clear.

17.2.2.2 Media Orders and Account Registration

The Customer Website will allow ordering of Palm Tran-issued media to be delivered by mail. Ordering of media via the Customer Website shall provide the ability to register the associated transit account at the time the order is placed.

The Customer Website will allow registration of a Transit Account associated with previously issued Closed-Loop Media, which will create an associated Customer Account in the CAM System.

The Customer Website will allow registration of open payment media, which will create a new transit account associated with the media or link an existing transit account if the media has been used previously within the FARE SYSTEM. In both cases, a new customer account will be created in the CAM System.

During registration the Customer Website will capture all necessary customer data and create a customer account that requires the setting of a username (or e-mail address), and password (or other appropriate security credential), and answers to security questions that will support the resetting of a password. Customers will be able to create a customer account without an email address if desired by Palm Tran. All customer account data, including username, email, answers to security questions, and passwords, will be stored in an encrypted form in the CAM System's customer database.

The Customer Website will support the linking of multiple transit accounts to a single customer account. Registered customers will be able to register new transit accounts under an existing customer account and add a single funding source to support the loading of value to all associated transit accounts.

Registered customers will be required to login using their username and password (or other appropriate security credential agreed during design review), to access account management and loading features of the Customer Website.

17.2.2.3 Value Loading

Registered and unregistered customers will be able to initiate a one-time load of value to their transit account using an accepted FARE SYSTEM payment method (credit, debit, ACH, etc.), as determined during design review. The Customer Website will support the selection of Fare Products and pre-defined stored value amounts, and the entry of custom stored value amounts (subject to configurable minimum and maximum limits).

Registered customers will be able to enable, modify and disable autoloading/subscriptions. As part of the Autoload setup process, the customer will select the fare product or amount of the autoloading (pre-defined and custom values) and the type of autoloading (threshold or periodic).

New autoloading/subscription setup will require the adding of a funding source in the form of a credit card, debit card, or bank account (i.e., ACH). Funding source information will be stored securely within the CAM System in a tokenized form.

For one-time and autoloading/subscription sales, the Customer Website will provide customers an option to split the payment between a minimum of two funding sources.

17.2.2.4 Balance and Transaction History

Registered and unregistered customers will be able to view balance information, and up to 12 months of prior transaction history, showing all replenishment, usage, reversals and other transactions for both closed-loop and open payment media, as allowed by Palm Tran business rules. The transaction history

will be viewable and sortable on the Customer Website, and able to be exported in PDF and Excel formats.

Account balance transfers will be possible between transit accounts that are associated with the same customer account. If permitted by Palm Tran business rules, balance transfers may be initiated as part of lost/stolen media replacement or per customer request.

17.2.2.5 Customer Service

Registered customers will have the option of initiating a customer service request. The request will generate an incident within the CAM System and assign the incident to the appropriate customer service staff.

The Customer Website will allow registered customers to report a card lost or stolen. Initiating this action will immediately result in the associated media being blocked from further use.

The Customer Website will include general information on use of the FARE SYSTEM, including an FAQ section, information on where to acquire media, how to pay, the cardholder agreement and general program information and updates.

The Customer Website will allow registered and unregistered customers to automatically resolve issues related to charging of a fare against an instrument other than that intended. This feature will allow customers to transfer existing charges to a designated alternative open payment card or transit account, as allowed by Palm Tran business rules.

17.2.2.6 Mobile-Optimized Website

The CONTRACTOR shall provide a mobile optimized version of the Customer Website that is integrated with existing Palm Tran websites and supports all the functionality described in this Section. Customers will be automatically redirected to the mobile version when accessing the Customer Website using a mobile device, or customers shall have the option of viewing the full Customer Website from their mobile device.

The mobile optimized version of the Customer Website shall include popular mobile platforms and browsers, and versioning for various screen dimensions, including:

- Platforms: Android, and iOS
- Browsers: Safari, Chrome, Firefox, Opera, Internet Explorer
- Screens: Mobile phones, tablets, PDAs

Other platforms and browsers may be specified by Palm Tran during design reviews.

The mobile optimized version of the Customer Website shall include all the functions and features specified for the PC browser-based Customer Website, unless otherwise noted by Palm Tran.

17.2.3 Business-to-Business (B2B) Portal

The CONTRACTOR shall deliver a business-to-business website (B2B Portal) and provide all hardware and software necessary to support website operations, and all FARE SYSTEM Interfaces to the FARE SYSTEM and external systems needed to perform the required functions and process payments.

CONTRACTOR shall team with or employ professionals in website design and e-commerce to design, develop, and deploy a customer-facing website that is PCI and EMV compliant, and serves as a convenient and comprehensive online portal for Palm Tran Retail Partners and other institutions to administer transit accounts on behalf of participants in special programs.

17.2.3.1 General Requirements

The B2B Portal will allow Palm Tran, employers, schools, social service agencies and other businesses to administer Transit Accounts on behalf of participants in the Palm Tran Sponsor Program and other Special Programs.

The B2B Portal will provide the following functions, at minimum:

- Register a new Palm Tran Sponsor (i.e., employer, social service agency, school, etc.)
- Add participants to a Palm Tran Sponsor account
- Delete participants from a Palm Tran Sponsor account
- Initiate value or fare product loads to participants' transit accounts
- Initiate a bulk order of EU or LU Media
- Configure a fare product subsidy
- Make a payment
- View invoicing and payment status

All data associated with Palm Tran Sponsor accounts will be stored securely in the PAM System. Funding source information will be stored in a tokenized form. The CONTRACTOR shall provide Palm Tran with all requested access to reports and other tools to fulfill purchase and other transaction requests from groups (such as employers, retail sales locations and other B2B Portal users). Palm Tran shall have access to administrative pages and functions to facilitate operations and management of the Customer Website and the B2B Portal. Reports and functions shall be configurable individually by Palm Tran.

17.2.3.2 Business Registration

Prior to using the B2B Portal, Palm Tran Sponsors will need to be approved by Palm Tran and have a customer account setup within the B2B Portal. Palm Tran shall have the ability to use the B2B Portal to add new Palm Tran Sponsors and remove those who are no longer participating and configure what fare products are available to them and payment terms. Following approval, a Palm Tran Sponsor administrator from the institution will be able login to the B2B Portal to perform all program administration functions. Palm Tran will be able to use the B2B Portal to serve as administrators for their own programs as necessary.

17.2.3.3 Adding and Deleting Participants

Palm Tran Sponsor administrators will be able to add participants under their Palm Tran Sponsor account individually, or through a bulk upload process. New and existing customers (with a registered transit account) will be able to be added as a participant to a Palm Tran Sponsor account. All new customers will be registered as part of the process. Palm Tran Sponsor administrators will be able to delete participants under the Palm Tran Sponsor account, individually or through a bulk process.

17.2.3.4 Placing Orders

Palm Tran Sponsor administrators will be able initiate the loading of value to participants' transit accounts individually, or through a bulk process using an imported file (in a defined format) with information on each Transit Account and product being ordered.

When adding value to participant transit accounts, Palm Tran Sponsor administrators will be able to select from the fare products configured for their transit account and choose whether to initiate a one-time or recurring load, on an individual participant basis. The periods available for recurring loads will be configured as part of setting up the Palm Tran Sponsor account.

If setup to do so, Palm Tran Sponsor administrators will be able to place bulk orders for EU and LU Media to be delivered by mail. If setup to do so, Palm Tran Sponsor administrators will be able to place bulk orders for fares/media to be delivered and available via the Palm Tran third-party mobile ticketing application.

17.2.3.5 Payment

Payment terms for Palm Tran Sponsor customers will be configured as part of the Palm Tran Sponsor account setup. Palm Tran will be able to configure transit accounts such that payment is required at the time an order is placed, or so that the Palm Tran Sponsor is invoiced based on established payment terms.

Palm Tran Sponsor where immediate payment is configured will be required to provide a funding source in the form of a credit card, debit card, or bank account (i.e., ACH). The funding source information provided will be able to be saved for future use.

For Palm Tran Sponsor orders where invoicing is configured, an invoice will automatically be generated by the FARE SYSTEMS and sent electronically or via mail to the Palm Tran Sponsor.

Palm Tran will be able to configure the placing of automatic holds on Palm Tran Sponsor accounts, and the loading of value to participant accounts, based on the status of outstanding receivables.

Palm Tran Sponsor/Special Program administrators will be able to view at least 12 months of invoice and payment history via the B2B Portal. The history will be viewable and sortable on the B2B Portal, and able to be exported in PDF and Excel formats.

The B2B Portal will support invoice-only “no value” transactions for Palm Tran Sponsors where funding is provided in bulk or where Palm Tran absorbs the costs.

17.2.3.6 Billing & Payment Terms

The FARE SYSTEM will support both pre-bill and post-bill payment for Special Programs:

Pre-bill – the FARE SYSTEM will generate sale transactions and require payment in advance of the media or value distribution

Post-bill – the FARE SYSTEM will track system access using non-valued fare products and provide the data necessary to post-bill Palm Tran Sponsors based on each participant’s actual use.

The FARE SYSTEM will support multiple payment types for Palm Tran Sponsor sales, including single payments, periodic payments (e.g., monthly or quarterly), and payments split between payment sources. The designation of billing and payment terms for Palm Tran Sponsor programs will be configurable individually by Palm Tran. Cash, credit, debit, check and ACH payments will be accepted for Special Programs.

17.2.4 Website Performance Requirements

The CONTRACTOR shall ensure that the FARE SYSTEM Websites meet all requirements for website performance set out in this Section. The performance requirements for the FARE SYSTEM Websites include periodically measured Key Performance Indicators (KPIs), which will also be part of Revenue Service Acceptance Testing. Note that performance may depend on user computer hardware, and that testing will be performed on standard hardware specified by Palm Tran.



	KPI	Definition and Measurement	Requirement	Period of Measurement
FARE SYSTEM Websites	Response Time	Time from user action (click) to FARE SYSTEM Website response	99% of actions less than 1 sec	Per week
FARE SYSTEM Websites	Workload	Number of concurrent users performing account modifications	Support 100,000 concurrent users, including peak period adjustments	Per day
FARE SYSTEM Websites	Scalability	Ability to increase workload capacity dynamically to match increased demand	Support up to 2X workload	Per day

18 Fare Accounts and Processing

The FARE SYSTEM will create transit accounts for any Palm Tran-issued account-based media to hold fare products and track payments and usage. These transit accounts will also exist to track the use of open payment media. If a customer chooses to register a transit account, then the transit account associated with her or his media will be linked to a customer account which will allow them to use features such as autoloading. If a customer does not register, the transit account associated with her or his media will remain anonymous.

18.1 Transit and Customer Accounts

The FARE SYSTEM will support establishment and tracking of all transit accounts, current and historical status and categorization of all fare products required by Palm Tran.

The following media types will be able to be linked to a transit account:

- Palm Tran-Issued EU media
- Palm Tran-Issued LU media
- NFC or other mobile payment media
- Open payment media
- Other media as determined by Palm Tran

Upon issuance of Palm Tran-issued media to a customer, the associated transit account shall be activated. If the customer registers the media, the customer account “profile” shall contain the user’s name and other information as detailed below; otherwise, the transit account shall remain in the default “anonymous” state. Some special program accounts may be activated prior to issuance of media, depending on the business rules of the special program.

Each entry in the registered customer account database shall include the following data fields at minimum:

- Account Number (unique for each account)
- Customer Name
- Address
- Primary Phone

- Secondary Phone
- Mobile Phone (for SMS text messages)
- Email Address
- User Login ID (unique for each account)
- User Password (with minimum security characteristics)
- Secret question & answer (no less than three (3) per account)
- Preferred communication method (primary / secondary phone, SMS, email)
- Special fare permissions (none, reduced fare, student)
- Special fare authorization information (e.g., case number, Medicare)
- Account Category / Class Code

For each data field in the customer account, Palm Tran shall be able to designate whether the field is required or optional and whether the field is restricted to Palm Tran use only. The FARE SYSTEM will allow account holders and authorized Palm Tran users to create, modify and delete customer accounts. All changes to customer account data, including the user making the change, shall be recorded in the account database. Access to customer account data shall be strictly password controlled and limited to authorized Palm Tran users. Authorized special program administrators will be granted limited and appropriate access to customer account data for the purposes of account management via the B2B Portal.

The FARE SYSTEM will secure all customer account data stored in and transmitted to the FARE SYSTEM Backend database. The FARE SYSTEM Backend will store no payment method data (such as credit / debit card numbers) covered by PCI and EMV requirements in the customer account database. 9.1-10. Payment media (credit, debit, EBT, ACH) may be registered to a valid customer account. Transit accounts will include information that will indicate operational status conditions, to be defined during design review.

18.1.1 Open Payment Media

The FARE SYSTEM will accept contactless media presented to a FARE SYSTEM Validator for payment ~~or HIT for inspection~~. The FARE SYSTEM will process the transaction as agreed to in design reviews. Based on Palm Tran business rules and card brand operating regulations (where applicable), the FARE SYSTEM will request bank authorization one or more times. If authorization requests are declined by the bank, the card may be added to a negative List.

A transit account will be established on initial presentation of a card to a FARE SYSTEM device. This transit account will track transaction history and will be available for registration using the card's PAN or other mechanism to uniquely identify open payment media.

18.1.2 Fare Products

The FARE SYSTEM will allow multiple distinct fare products specified in Section 42 to be associated with transit accounts. These fare products may be created, terminated or modified by Palm Tran. These modifications will also be available to customers via self- or customer-service options, and their availability will be configurable by Palm Tran.

Special fare products will be associated with a transit account only after eligibility has been established according to Palm Tran business rules. Eligibility may require creation of an associated customer account.

The FARE SYSTEM will support a configurable base limit to the value associated with a value-based fare product (a “floor”) so that any subsequent transactions will be denied pending adding of additional value to the transit account.

Rolling-period fare products associated with a transit account will be “pending” until first use at the point of entry.

The FARE SYSTEM shall support addition of bonus rides or value for a transit account based on configurable thresholds or fare product usage. The details of bonus rides and other supported fare products are in Section 0.

The FARE SYSTEM will force customers to remedy transit accounts that have dropped below the allowable “floor” whenever a customer performs a replenishment transaction at any distribution channel to restore the transit account deposit to the minimum value before making additional funds available for transit use. For example, if a customer’s account were negative by \$5 and they were to load \$20, they would have \$15 stored value available for use. The messaging regarding negative transit account balances and replenishment transactions will be defined by Palm Tran during design review.

18.1.3 Usage Transactions

FARE SYSTEM devices shall communicate with the FARE SYSTEM Backend or Payment Application in real-time (or near real-time) for the processing of media taps. Some fare products sold may be effective upon sale. As determined during design review, devices may reference an Account Master Status List for authorization or denial.

The FARE SYSTEM devices shall record the results of all transactions and transmit data to the FARE SYSTEM Backend. All transaction data will be available for viewing by Palm Tran and the customer via the FARE SYSTEM Websites.

Media associated with an active fare product will utilize that fare product first; if the fare product is unavailable or expired, the FARE SYSTEM will use stored value in the transit account. If stored value is not available and the media is open payment, the media will be used for a PAYGO transaction. Other fare precedence rules will be established in the business rules determined during design reviews.

18.1.4 Issuance, Usage and Replenishment Transaction Flows

The CONTRACTOR shall submit a series of flow charts depicting all media issuance, usage and replenishment transactions. The flow charts shall show all steps in the processing of an open payment and closed-loop transaction, as well as autoloading processes. Transaction flow charts shall cover all major transaction types and all fare policies.

18.2 Account Lists

As noted previously, the FARE SYSTEM may use, at minimum, positive lists and negative lists to allow for risk mitigation.

18.2.1 Palm Tran Account Lists

Every FARE SYSTEM device that processes fare payments will reference account lists (such as positive and negative lists) in conducting transactions as determined during design review. This will include an Account Master Status List, details of which will be determined during design review.

The FARE SYSTEM Backend shall update the contents of the account lists as necessary to reflect the most recent transaction results as reported by all FARE SYSTEM devices, sales and replenishment transactions from all sources, and deactivation, suspension and reactivation instructions conducted by authorized users.

The FARE SYSTEM shall broadcast account list updates to all relevant FARE SYSTEM devices at a Palm Tran-configurable frequency.

Each entry in the account lists shall contain sufficient information to enable a FARE SYSTEM device to conduct transactions in support of Palm Tran fare policies and to provide accurate and complete transaction results to the passenger, and as applicable, to the vehicle operator, sales clerk and/or fare inspector as determined during design review.

The FARE SYSTEM Backend will process transaction records received from devices and determine when a FARE SYSTEM account changes status, such as when the stored value balance falls below the floor threshold. In such cases, the FARE SYSTEM Backend shall update the FARE SYSTEM account's status on the account lists and with all other FARE SYSTEM account changes during the current calculating period and broadcast the updated account lists to all relevant devices.

If Palm Tran-issued media is reported lost or stolen, its invalid status will also be included in the account lists.

The account lists will be regularly pushed to field devices, with timeframes defined during design review, and may also be mirrored at ancillary locations to ensure up-to-date and prompt retrieval by field devices. Any mirroring will accurately update the master positive and negative lists stored in the FARE SYSTEM Backend, with instant updating and version control in place to ensure accurate synchronization. For example, a replenishment transaction that removes a customer from the negative list will result in the immediate ability to access the transportation system.

18.2.2 Third Party-Issued Valid Card List

The FARE SYSTEM will also track the status and history of any third party-issued cards that are allowed to be used as fare media. The FARE SYSTEM will track the appropriate secure identifier for these cards on an internal positive list; i.e., a list of known valid cards. These cards will be differentiated from Palm Tran-issued cards in the FARE SYSTEM.

The approved third party (or parties) shall be responsible for transmitting to Palm Tran (via a web portal) updated lists of known valid cards. The FARE SYSTEM Backend shall transmit the updated lists to all devices no less than daily.

All third party-issued media shall function as read-only credentials; the FARE SYSTEM shall make no alterations to the data encoded on these cards.

19 Validating Farebox

In addition to the requirements described in other sections of this document, the following section describes Palm Tran's functional requirements for an Electronic Validating Farebox with integrated Fare Media processing capabilities. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

The Farebox is an integrated unit that contains all functions necessary for the on-board aspects of the FARE SYSTEM including Farebox processing logic, data storage, and system controls. Nothing within the

architecture of the FARE SYSTEM or the Farebox shall prohibit appropriate CONTRACTOR supported integration with external devices or systems, such that fare collection activity, operations, and data may be used for the purpose of system interoperability and control.

The CONTRACTOR shall be required to provide for the CDR complete design detail (CDR - 4, CDR - 5, CDR - 7), which shall be finalized at the PDR (PDR - 13, PDR - 14, PDR - 15). A working prototype shall be provided for the PDR (PDR - 10). Specific details of system architecture, construction, and equipment shall be provided for review and Acceptance. The CONTRACTOR shall provide test criteria for review and acceptance as part of the PDR (PDR - 11).

The CONTRACTOR shall be required to provide as part of the FDR (FDR - 8) the final details of the Farebox system that fully demonstrates the operation and functionality as specified herein. Notwithstanding any acceptances, the CONTRACTOR shall not be relieved of providing a complete and working system that meets the language and intent of the Contract.

The new Farebox will replace Palm Tran's existing GFI Odyssey Fareboxes and these will be installed in the same location. The Farebox shall be positioned to allow passengers to enter the bus and easily use the new Farebox for processing their payment and/or fare media. The Farebox and integrated Driver Control Unit (DCU) shall be positioned for the driver to interact with the DCU and observe the passengers use of the Farebox from a normal seated position. The proposed Farebox shall be compliant with all applicable ADA requirements in force at the time of NTP.

When installed, the position of the Farebox shall allow all maintenance and service functions without requiring the removal, repositioning, or disassembling of the Farebox.

The Proposer/CONTRACTOR shall indicate if their proposed Farebox has any limitations preventing it from being installed in Palm Tran's existing fleet (refer to Table 1.1 Palm Tran Bus Inventory).

The new Farebox shall facilitate the processing of Palm Tran's Business Rules and Fare Policy as well as any of Palm Tran's Fare Media.

As indicated, the Farebox shall be an electronic validating Farebox based on solid state microprocessor(s) and electronic memory. It shall count and validate fares in the form of U.S. coins and bills, as well as Palm Tran's tokens and Electronic media. Additional fare transactions shall be registered by Driver interaction via the DCU or by inputs from external sources.

The Farebox shall function under the environmental and operational conditions stated herein and shall be designed and manufactured to provide a high degree of security against forced entry and/or unauthorized manipulation.

The function of the Farebox is to permit the passenger to "tap" their CSC to the Card Interface Device (CID), insert easily and rapidly the required fares, and for the Driver to ascertain readily that the correct fare has been paid, regardless of the fare media employed. Fare media shall include smartcard transactions and other supported fare types. The capacity of the Farebox shall be such as to retain securely the collected fares until they are removed under authorized conditions. The Farebox shall function in a reliable manner to provide service on an uninterrupted basis, consistent with the performance requirements contained herein.

The Farebox shall function to provide specific information relative to the daily operations of the Farebox, the revenue amounts, types and quantities of passengers, Driver/Route identification and other information, which may be used in providing audit trails and accountability of the specific items of equipment and system operations. The degree and extent of this information and the means and methods of its generation and reporting shall be as described in the Contract.

In addition to the above, the FARE SYSTEM shall comply with the following:

1. Fareboxes will satisfy all general design, security and performance requirements in Section 6 and elsewhere herein.
2. Fareboxes will satisfy all applicable ADA and Title VI requirements described in Sections 6.13 & 6.14.
3. Fareboxes shall comply with all applicable safety standards including Palm Tran operating procedures and practices described in Sections 6.12, 7.3, and elsewhere herein.

19.1 Mechanical Design Requirements

The following describes the mechanical design requirements of the Farebox. These requirements apply to all components of the FARE SYSTEM, including the Farebox and associated fare collection processing units.

19.1.1 Farebox Mechanical Design

The upper portion of the Farebox shall be provided with maintenance access to enable inspection, maintenance, or removal of the Farebox operating components and assemblies. The access shall be designed to provide ready access while the Farebox is installed in the vehicle and without the need to disassemble, remove, or otherwise manipulate equipment. Access to the Farebox shall not compromise the integrity or security of the revenue. It is incumbent upon CONTRACTORS to familiarize themselves with methods that may be utilized to gain access to the revenue area.

The lower portion of the Farebox shall be provided with controlled access to the revenue area for removal of the cashbox. The design of this access shall be of the highest quality and integrity to prevent unauthorized entry to the revenue area. It is incumbent upon CONTRACTORS to familiarize themselves with methods that may be utilized to gain unauthorized access.

19.1.2 Farebox Enclosure Construction

The Farebox enclosure, mounting pedestals and any external accoutrements (such as button panels) will be robust and vandal-resistant. The enclosure and pedestal design will be submitted for the Palm Tran's review and approval.

The cabinet will have a base or mounting pedestal constructed of Grade 316 stainless steel and will accommodate variations in bus design and type. Bases and pedestals for all machines will be sized according to need and direction to be provided by the Palm Tran at design review.

The cabinet will provide controlled levels of access to the interior maintenance personnel, revenue servicing personnel and cash processing personnel at the Palm Tran's servicing facilities, as defined by the Palm Tran during design review. The locks will be secured locks, programmable to more than one key and approved by Palm Tran.

The cabinet will provide, without undue delay, access to authorized personnel equipped with proper keys and individual access code(s) as defined by the Palm Tran during design review.

The cabinet will be constructed to provide the best possible protection against vandalism and burglary. Reinforcement will be provided at the positions where there is the possibility of burglary.

While all outer doors are secured, the machine will remain operational and undamaged after experiencing any impact resulting in a concentrated load of 400 pounds per one square inch to any part of the enclosure.

19.1.3 Farebox Maintenance

The CID, coin and bill processing units and any associated handling or transport mechanisms shall be modular in construction and removable for inspection and replacement.

The highest degree of security shall be employed in the design and manufacture to prevent access to the cashbox, revenue, or revenue areas when the coin or bill systems are removed. No seams and/or openings shall be permitted by which deposited money may be removed in an unauthorized manner. Between the (removable) coin/bill systems and the cashbox opening, there shall be a fixed metal made funnel/baffle system, which shall prevent access to, or “fishing” of coins/bills from the coin/bill compartments of the cashbox upon removal of the coin/bill modules from the cabinet.

Access to power supplies and other electrical components for maintenance, replacement or repair shall not require the removal of the cashbox from the Farebox or the removal of the Farebox from the transit coach.

All major subassembly modules LLRUs shall have a unique serial number and a barcode inscribed or permanently applied by adhesive labels – an RFID tag option is acceptable. No two serial numbers or barcodes will be the same. The CONTRACTOR shall provide Palm Tran with a list of all serial numbers and the modules to which they have been applied as part of the PDR package (PDR - 16).

Sub-assembly modules to which such numbers are applied shall include, but not be limited to, coin processing system, bill processing system, electronic lock, cashbox, upper case, and lower case. The CONTRACTOR shall provide barcode scanners suitable to read the barcode applied to these modules.

19.1.4 Locks and Keys

Within the Farebox upper portions, locks shall be provided to secure components and restrict access to revenue areas.

19.1.5 Electrical Design Requirements

In addition to the requirements described in Section 6.16, the following are applicable to the Farebox.

19.1.5.1 Wire Harness and Connections

The electrical termination of the Farebox, for purposes of connecting it to a power source shall be by means of a mil-spec polarized, self-aligning, self-locking, waterproof plug. The connector shall include positive retention means – screw, snap or lever connection.

19.1.5.2 Power Supply and Switches

The machine will be equipped with a modular, filtered power supply which will be connected to the incoming grounded electrical service and will deliver all of the necessary operating voltages for the machine.

The Farebox shall have no external power switch. When the vehicle engine starts (i.e., the ignition is turned to “on”), if powered off, the Farebox modules shall commence power-up sequence. While the vehicle engine is running, the Farebox shall remain powered.

The Farebox components will receive power from the 12 or 24 VDC batteries existing on the buses through a circuit breaker assigned to the Farebox. No external convertors or conditioning circuits will be required to permit the Farebox to operate on the battery circuits.

Appropriate warning labels will be provided on or near any components or cables that may have hazardous voltages present while the machine power supply switch is off.

Indicator lamps will indicate when all aspects of the power supply are functional.

All components, cabling, installation methods and mounting will be prototyped on each Palm Tran bus type and subject to written approval by Palm Tran before installation can proceed.

Overall, the Farebox shall be no more than 39.5" high, 10.4" wide, and 9.5" deep.

19.1.6 Physical Design Requirements

The following describes the recommended physical design of the Farebox unit. Alternative designs and modifications to the recommended designs may be considered provided they achieve or exceed to operating objectives defined by the requirements.

The Farebox required under this contract is a "regular" or standard Farebox, which shall be no more than 42" high.

19.1.6.1 Top Assembly

A top assembly shall be provided on the upper portion of the Farebox where the bezels for the entry of currency (U.S. coins and U.S. bills), fare media issuance, and the CID are situated, as well as, to provide access to the interior for the primary maintenance and inspection of the Farebox. This assembly shall have at least three slots, one for coins, one for bills and one for the issuance of fare media. The design of the slots shall be such to limit the insertion of inappropriate coin or currency and to discourage the introduction of foreign material or substances.

The design of the coin bezels and coin acceptor channel shall be such that a handful of coins can be dropped into the Farebox; channeled to the coin validator to ensure accurate and reliable identification; and accepted at the rate of eight (8) coins per second, without jamming.

The top assembly is utilized to provide maintenance access. It shall be secured to the upper portion of the Farebox by means of a continuous hinge and high security lock. Additional or alternative maintenance access doors may be provided to permit access to the interior of the Farebox. These shall be secured by high security lock systems and, unless otherwise approved, utilize a continuous hinge design.

If opening any maintenance access door or assembly is required to gain access to secondary maintenance access door, the operation of those secondary maintenance access door(s) shall be interlocked to assure they cannot be left in the open position when the top assembly is closed and locked.

Any opening of any door shall create a Door Open Event/Alarm Message, indicating at minimum, which door, date, Lower Assembly, time, FARE SYSTEM Device ID, Login ID.

The lower portion shall contain a revenue access door to gain access to the cavity that houses the cashbox. This door shall have a full-length hinge and be secured by means of at least a three-point locking bar, actuated by means of a high security electronic lock. The design shall be such that there shall be no gaps allowing prying to open the door with tools, chiseling or other methods. Illegal entry

shall be clearly indicated by noticeable damage to the Farebox and inability of the Farebox to function. Opening of the revenue access door shall generate a Revenue Access Door Open Event/Alarm Message, indicating at minimum, Date, Time, FARE SYSTEM Device ID, and Login ID.

Any keys or locks that are captive to the lower portion of the Farebox and used to interface with the cashbox shall be securely fastened and shall be removable only in an authorized manner. Guides shall be employed within the cashbox cavity to assure that the cashbox is in alignment for proper operations.

Wires and cables that are run through the lower portion of the Farebox to the upper portion shall be run in a protected channel or raceway. No wires shall be visible when looking at the cashbox cavity.

19.1.6.2 Cashbox System

19.1.6.2.1 Cashbox Design and Construction

The design and construction of the cashbox shall consider minimizing weight while ensuring adequate security. The cashbox may be made of plated or stainless steel, 1.5 mm minimum thickness, and if so, shall be a welded construction with no external fasteners exposed which affects security. Alternatively, the cashbox may be made of stainless steel reinforced molded polymer or of other material or design suitable to the service and security requirements of the application. All metal parts shall be painted, plated, or constructed of corrosion resistant material. The empty weight of a cashbox shall not exceed 18 lbs.

Those portions of the cashbox in direct contact with the Farebox shall be abrasion resistant. Neither insertion or removal of the cashbox into the Farebox in service operations, nor the vibration or shock experienced while the cashbox is in service in the Farebox, shall cause any distortion of the cashbox material, that may adversely affect its ability to function properly. The Farebox and cashbox assembly shall be designed and fabricated in such a manner as to prevent extensive tolerance buildup (wear) and the resulting excessive vibration that could be detrimental to the proper operation of the Farebox or cashbox.

The cashbox shall not have removable lids, covers or other elements that can be detached from the cashbox. The cashbox shall be locked and sealed unless it is secured in a Farebox or within revenue transfer equipment or facility. The operation of any keys within the locks shall not require excessive torque, which may damage either the key or the lock.

Any attempt to gain unauthorized access to the cashbox revenue shall be noticeable and such intrusive effort shall prevent the cashbox from being placed in an operational condition. It is incumbent upon CONTRACTORS to familiarize themselves with the conditions and damage that may result from attempts to gain unauthorized access to the cashbox, regardless of success, and to ensure those conditions preclude placing the cashbox into operating service.

The interior of the cashbox shall afford complete gravity discharge of coins and bills in the revenue transfer cycle, while maintaining their separation. No ledge or other areas shall be present where coins or bills may lodge and impede the operation of the cashbox. The design, and operation in the Revenue Receiver, shall ensure a positive and complete discharge of a full cashbox is accomplished in not more than 10-seconds as measured from the time the cashbox is inserted into the Revenue Receiver to the time it is removed from the Revenue Receiver.

The mechanism employed to open or close the cashbox shall be positive and smooth in operation. Internal locking mechanisms shall be constructed of strong and durable materials. The term "internal locking mechanisms" refers to all components, including levers, strokes, gears, pins, and locking feet that are required to release the cashbox from the Farebox or lock it in place in the Farebox.

The cashbox design and operation shall minimize the risk of injury to personnel handling cashboxes during the revenue receiver process. It is highly desirable the design supports a direct removal of the cashbox from the Farebox and insertion into the revenue receiving equipment with minimized need to twist, turn, or invert the cashbox. The handle placements, design, and operation of the cashbox shall be such to minimize wrists and arms bending or twisting in accordance with applicable human engineering standards and practices.

19.1.6.2.2 Cashbox Handling

The cashbox shall fit into the Farebox only in a single correct position and be placed into the ready position to collect revenue by a continuous single motion. The Farebox shall remain inoperable until the cashbox is inserted and ready to accept revenue, and the cashbox access door is closed and secured. Except as may be provided under a secure maintenance configuration, it shall not be possible to place the Farebox into a condition to accept coin or currency bills without the presence of a properly inserted and fully functioning operational cashbox.

The opening of the cashbox access door to permit removal of the cashbox shall be accomplished only through an authorization process and communication with the FARE SYSTEM Backend. The design and operation of the cashbox shall be such that the cashbox must be in a closed and locked condition to be removed from the Farebox unit. The design, mechanism, and operation of the cashbox shall be positive and at no time shall expose the interior of the cashbox or any of its contents during any portion of the collection or revenue transfer cycle.

The cashbox and Farebox shall be fitted with such devices to determine and report that the cashbox has been properly inserted into the Farebox and that the cashbox has been opened and is ready to receive revenue. Once determined, this will allow the revenue access door to be fully closed and locked. These devices shall be tamper-resistant, solid state and not subject to malfunction due to bus vibration.

19.1.6.2.3 Cashbox Reliability

The cashbox shall function in a dependable manner when used in the designed operating environment. The MCBF for the cashbox shall be 10,000 full and complete revenue deposit cycles between failures. A complete revenue deposit cycle is the period from removal from a Farebox of a cashbox containing revenue through the deposit of revenue into the FRCS, reinsertion and return to service in a Farebox, collection of revenue, and until subsequent removal.

At no time and under no circumstance shall a failure of the cashbox system or process cause any revenue to be exposed, accessible, or improperly processed.

19.1.6.2.4 Cashbox Capacity

The minimum Farebox cashbox capacity is \$450 in mixed coins and \$750 in mixed bills.

19.1.6.2.5 Backup Access to Cashbox Revenue Area

To facilitate authorized access to a Farebox cashbox revenue area when normal electronic data collection is not possible, a secure user ID and password-based process shall be provided to enable personnel to open the Farebox cashbox access door in an authorized manner using the DCU.

19.1.6.3 Farebox Installation

The CONTRACTOR shall install the Farebox and related fare collection equipment in Palm Tran's vehicles. The CONTRACTOR shall supply all labor, supervision and materials required for the proper installation of the equipment in the vehicles listed herein. All installation shall be performed at Palm Tran's Garage.

19.1.6.3.1 Farebox Installation Position

As stated previously, Palm Tran expects the proposed Fareboxes to be installed in the same location where the existing Fareboxes are currently installed; however, if it is necessary to install the proposed Fareboxes in a different location, then the Fareboxes will be installed in compliance with all applicable ADA regulations in effect at NTP and so that these will not interfere with access to the front heater/defroster compartment, the destination sign or any other unit on the bus and will permit complete unrestricted opening of all maintenance lids, doors and other access panels. The installation of the Fareboxes will not interfere with any aspect of the operation of the bus, including access to the driver's seat or access to operate the wheelchair lift. The Fareboxes will not restrict the operator's view of the steps, any part of the bus windshield, mirrors, or any part of the interior of the bus.

19.1.6.3.2 Farebox Installation Plan

The CONTRACTOR shall provide a description of its proposed installation plans by class of vehicle as part of the CDR (CDR - 6). To reiterate, Palm Tran's expectation is for the new Fareboxes to be installed in the same location as the current Farebox; however, it is the responsibility of the CONTRACTOR to ensure all requirements/regulations are met and to propose alternative mounting locations to ensure compliance with said requirements/regulations. The CONTRACTOR shall provide a complete description of the final installation plan for each class of vehicle, including descriptive drawings, location of drilled holes, power feeds, and data feeds as part of the PDR (PDR - 17).

It is incumbent upon the CONTRACTOR to identify at the CDR (CDR - 6) and to confirm at the PDR (PDR - 17) any requirement to relocate, reposition, remove, or otherwise modify vehicle handrails, or equipment to accommodate installation of the Farebox equipment. The CONTRACTOR shall inspect a sampling of each vehicle type to verify the capability of the vehicle flooring and structure to support the Farebox installation and shall advise Palm Tran if changes are required as part of the CDR (CDR - 6). The information to be supplied at CDR and PDR shall assume that the bus flooring and structure shall be the same for all vehicles of the same type as was determined during the inspection.

The CONTRACTOR shall supply and install all the necessary wiring, protective devices and mounting hardware necessary for the proper installation and operation of the Fareboxes. All new undercarriage wiring shall be installed in conduit and suitably protected against the road elements. All wiring and conduit shall be fastened in a manner so as not to interfere with normal bus operation and maintenance. No "butt connectors" or other splices shall be permitted under the bus flooring.

19.1.6.3.3 Farebox Mounting

The Farebox mount shall provide a secure, maintenance-free method securing the Farebox and associated fare collection equipment to the vehicle's structure. The FARE SYSTEM employed must ensure the security of the unit and must provide adequate stability and restraint to ensure the components, at maximum weight, will remain affixed to the mounting location under circumstances of a lateral force of 4g in any direction.

The design of the mounting fixture and Farebox structure shall be such as to provide the necessary lateral stability without secondary anchorage, and shall prevent oxidation, deterioration, which can allow the Farebox to be subjected to increased vibration, wear, shock, metal fatigue or other degradation. The inadvertent release or tipping of the Farebox shall be prevented by the design of the mounting fixture.

19.1.6.4 Farebox Operations

The following describes the Farebox operation, acceptance, processing, and secure deposit of passenger inserted coins, currency bills, and tokens.

The Farebox shall be designed to validate fully the deposit of coins, tokens, and currency bills to ensure, without intervention by Palm Tran personnel, the genuine validity of the deposited currency or tokens. Inserted coins, tokens or currency bills rejected or determined to be invalid shall be promptly returned to the customer without intervention by Palm Tran personnel.

19.1.6.4.1 Coin and Token Operation

The coin acceptor, referenced as the coin validator, shall be capable of continuously validating, processing, and accepting or rejecting handful of coins at the rate of not less than eight (8) coins per second. The coin validator shall determine the validity of inserted coins based on diameter, metallic content signature, and other such characteristics to validate and distinguish individually by transit property among not less than 6 distinct coin and token types.

19.1.6.4.1.1 Coin Validator Acceptance

The coin validator shall be configured to accept, validate, and count the value of pennies (1 cent), nickels (5 cents), dimes (10 cents), quarters (25 cents), and dollar coins (\$1.00) – Susan B. Anthony (SBA) and "Golden Dollar" (Sacagawea and Presidential). It shall be possible to configure the coin mechanism to accept, validate, and count coins or tokens with a diameter and thickness between that of the U.S. dime and the U.S. dollar coin.

It shall be possible to configure the coin mechanism and associated validation logic to accept, validate, and count other coins or tokens within the allowable system parameters without needing to replace or remanufacture the coin mechanism or to make any other hardware change.

19.1.6.4.1.2 Coin Validator Acceptance Criteria

The coin validator shall be capable of handling, accepting, validating, and counting minimally deformed coins or tokens – coins or tokens that are bent or bulged, not perfectly round, or have attached foreign material. The amount of deformity that shall be accommodated shall depend on the type of the coin.

The coin validator shall reject coins or tokens not configured to be accepted, bogus, foreign or counterfeit coins, or valid coins and tokens that are deformed in excess of the parameters specified herein. The coin validator shall correctly accept 96% or more valid coins on first insertion, and 98% on the second insertion. The coin validator will correctly reject 99.8% of invalid coins, tokens, or slugs and accurately count 100% of all accepted coins and shall do so at the rate specified.

Rejected coins or tokens shall be promptly returned to the passenger via the coin return cup. The coin return shall be designed to retain coins or tokens for easy retrieval by the passenger. The Farebox customer display shall show "Rejected" to alert a customer to returned coin(s) or token(s). The return or rejection of coins or tokens shall not reduce or otherwise diminish the coin validator handling rate or capability to accept, validate, process, and count valid coins or tokens.

19.1.6.4.1.3 Coin Validator Register

The Farebox logic shall maintain records of total coins, by denomination, and tokens processed and total coins, by denomination, and tokens rejected. These records shall be transmitted to the FARE SYSTEM Backend as part of each data upload.

19.1.6.4.1.4 Coin Bypass

The coin acceptance mechanism shall be designed in such a manner to prevent coins from jamming within the mechanism. Where ever practical, coin jams should be able to be cleared and the unit restored to normal operation by corrective action external to the coin acceptance mechanism.

Alternatively, the FARE SYSTEM shall be designed to facilitate easy clearance of any jammed coins in such a manner to preclude any access to coins that have been accepted, validated, processed, and counted by the FARE SYSTEM. This may include conveniences such as a "de-jam" function or access, or ready access to the acceptance mechanism for clearing a jam.

Should neither alternative be included, a Coin Bypass mechanism shall be provided for the passage of coins to the secure cash area in the event of a coin jam in the validation mechanism. The activation of any mechanism to bypass coin validation shall be by a required deliberate action. Upon activation, a Coin Bypass event record shall be created and transmitted to the FARE SYSTEM Backend. Coins processed while the mechanism is in bypass mode shall not be counted by the Farebox. After activating the coin bypass, it shall not be possible to reset the bypass without specific access rights to the Farebox controls. Upon reset, a Coin Bypass Reset event record shall be created and transmitted to the FARE SYSTEM Backend. The unit shall be provided with a clearly visible tamper-resistant indication of the bypass operating state.

When interrogated by the FARE SYSTEM Backend, a Farebox with the coin bypass mechanism activated shall indicate upon interrogation by audible or visual alarm the coin bypass is activated. The audible tone or visual alarm shall be noticeably different from any normal tone or visual alarm. The Farebox shall continue to indicate an alarm condition until the coin bypass mechanism is returned to normal state. Additionally, once interrogated or probed by authorized means for revenue removal, a Farebox shall not be capable of being returned to service condition until the coin bypass mechanism is return to the normal state.

The Farebox shall note in the FARE SYSTEM memory and retain for data transmission a transaction to indicate the exact time and date when the bypass was activated and deactivated. A record shall be created when the bypass is activated and again when the bypass is deactivated. Should the Farebox system not be powered at time the bypass is deactivated, the FARE SYSTEM shall recognize the change of bypass state at the time of power-up and a transaction record shall be created at that time.

A separate bypass Fare-set shall automatically be made effective any time a Farebox is placed into bypass. When the bypass is activated all buttons on the DCU keypad shall become tally counters. This Fare-set, along with the transaction records created when the Farebox is placed in bypass, shall segregate the tally counts for buttons when in bypass to allow separate calculation of estimated revenue received while in bypass mode.

When the coin bypass is activated, acceptance, validation, and counting of currency bills shall not be affected. When the coin bypass is activated, acceptance and processing of electronic fare media not requiring the deposit of coin shall not be affected.

19.1.6.4.2 Bill Validator Operation

The Farebox shall be capable of continuously accepting, validating, and counting paper currency bills at a rate of less than 2 seconds per bill. The paper currency acceptance slot shall be positioned in the general proximity of the coin insertion area and accept paper currency that has been opened to its full area and is inserted lengthwise.

The dimensions of the currency slot shall hinder the accidental entry of coins into it. The currency slot shall be illuminated to permit ease of bill entry under diminished lighting conditions. The mechanism

employed to transport the inserted bills shall be positive and not require precise insertion by the passenger. A guide plate shall be provided to assist in the entry of the bill into the Farebox. The paper currency shall be inserted approximately one-half inch before the mechanism shall become operational and advance the bill into the mechanism. The currency transport shall employ a system to engage positively an unfolded bill without force to cause the mechanism to start.

Unless otherwise configured by Palm Tran, the validator shall accept an inserted bill in any orientation.

19.1.6.4.2.1 Bill Validator Acceptance

The bill validator shall be capable of validating not less than ten (10) unique paper currency designs and shall be configurable to accommodate new or changed currency designs without disassembly or mechanical modification. The bill validator and the delivered supporting systems shall provide the means for Palm Tran to update the validator logic as necessary to support currency changes without CONTRACTOR assistance or return of the validator unit. Any new currency design must be comparable (size and detection technology) to banknotes in circulation at NTP. The validating logic of the validator shall examine the inserted bill for proper characteristics and upon validation of these characteristics shall accept and count the currency.

The validator shall validate and count U.S. one-dollar (\$1), five-dollar (\$5), ten-dollar (\$10) and twenty-dollar (\$20) banknotes of the types released into circulation during the period from 1990 until NTP.

The bill validator shall handle without jamming deformed paper currency as defined herein.

Currency rejected by the validator shall be returned to the customer through the bill return slot, which may be the original bill insertion slot. The currency returned shall be the currency inserted and rejected by the validator. The return or rejection of currency shall not reduce or otherwise diminish the currency validator handling rate or capability to accept, validate, process, and count valid currency.

19.1.6.4.2.2 Bill Validator Acceptance Criteria

The bill validator shall continuously accept, validate, and process, as well as, count and transport for deposit or reject currency less than 2.0 seconds per bill from the time of insertion. After acceptance, the currency validator shall be available and accept for processing within 0.25 seconds (250 milliseconds) another properly inserted bill. The currency validator shall be capable of consecutively processing and validating ten (10) properly inserted bills within a 22.25-second period.

The bill validator shall accept not less than 96% of all "street quality" U.S. currency meeting the physical conditions described herein, on 1st insertion and 98% on the 2nd insertion. Acceptance after more than two consecutive insertions will be considered as a rejection.

Bill counting shall have an aggregate accuracy of 99% when comparing Farebox and manual counts of the total value of bills collected. With correctness needed to meet the aggregate accuracy requirement, the bill validator shall reject inserted material that is not valid U.S. currency, is counterfeit, is non-U.S. currency, or is not of the designated currency value. The currency validator shall correctly count the value of 99.95% of any inserted, validated, and accepted bill.

19.1.6.4.2.3 Bill Validator Acceptance Override

It shall be possible to configure the Farebox bill validator to allow for insertion and transport of physically acceptable media, regardless of validity, upon operator entry of a designated control button (key) entry. This entry shall "override" the validation criteria for the acceptance and transport of one item per entry. Each override shall generate and transmit to the FARE SYSTEM Backend an event record. In case of such an override, the validation accuracy criteria for the Farebox shall not apply. Acceptance

and validation of a genuine or an "over-ride" paper item shall cause the item to be advanced to the cashbox.

The value of the over-ride accepted item shall be configurable through the FARE SYSTEM Backend by Palm Tran, and multiple buttons may have override functionality assigned to them, enabling them to tally different passenger types or items inserted. This functionality shall be controlled through the FARE SYSTEM Backend.

Items inserted in the Farebox when the override is used shall not be used to add value to smartcards.

19.1.6.4.2.4 Bill Validator Register

The Farebox logic shall maintain a record of total bills processed (by denomination), total bills rejected (by denomination) and total bills overridden (if allowed) in a register transmitted to the FARE SYSTEM Backend during each data download. Bills not properly processed due to a bill jam are handled in two ways. If a bill jams in the bill scanner system when the validation of the bill has not been completed, the value of the bill is not known and an "unknown document" event is recorded. If the jam occurs in the path down to the cashbox, the correct bill value shall be stored.

19.1.6.4.2.5 Fare Registration

Electronic logic incorporated in the Farebox shall receive value signals from the coin and currency bill modules. The electronic logic shall accumulate and store the amounts in an electronic register and such amounts shall be displayed on a display available to the Driver. The accumulated fares shall be recorded so that the total value received by the Farebox can be determined since the Farebox was last interrogated and the total value received by the Farebox since installation or clearing of the Farebox memory. Totals shall be reported for all cash revenues (by denomination), token unit count and bills.

All audit data reflecting electronic media processing shall be transmitted to the Farebox registers for readout with other accumulated Farebox data and transactions. Such action shall be automatic, requiring no action by the Driver.

Generation of ridership statistics shall include all electronic media and general cash payment activity. This shall be determined by menu driven report parameter entry in the FARE SYSTEM Backend. In addition, the FARE SYSTEM may generate aggregate electronic media and report data within the FARE SYSTEM by cumulating individual transaction records.

19.1.6.4.3 Fare Table

The Farebox shall maintain a Fare Table consisting of a minimum of ten (10) complete Fare-sets. Each Fare-set shall contain a pre-set fare amount, fare or control indicators for each key entry, and fare or control indicator for each of not less than 48 electronic or non-cash fare instruments.

In addition, each Fare-set shall be identified by a table of allowable service codes that shall be maintained in the FARE SYSTEM Backend. Not less than sixty-four (64) service codes shall be available. The service code(s) shall be selected as an additional Fare-set attribute selected at the time of system log-on and shall be used to segment fare collection activity accumulated under the same Fare-set but otherwise categorized separately by Palm Tran. It shall be possible to use the Service Code to identify and to report separately contracted services operated under a common Fare-set. Provisions shall be made in the FARE SYSTEM Backend to select and report separately by Service Code.

The Fare Table shall be maintained by the FARE SYSTEM Backend and shall be downloadable to the Farebox as required in conjunction with normal data probe or interrogation activity. The download of

Fare Table information shall not require the physical replacement of parts within the Farebox. All values and functions programmed in this manner shall constitute the Fare Table.

It shall be possible to select the operating Fare-set by any of the following means:

- Entry from the keyboard following a designated sequence;
- Smartcard entry;
- Signal sent through the J-1708 or another electronic interface; and
- Automatic by reference to a start time and date maintained in the Fare-set.

The FARE SYSTEM shall support having at least one (1) active and up to three (3) inactive Fare Tables at the FARE SYSTEM Backend, plus at least one (1) inactive Fare Table in the Fareboxes, at any given time. Inactive Fare Tables shall carry an activation time when they shall become effective, or no activation time if they are for test purposes only or still under development. Fare Tables shall be loaded to Fareboxes the next time it is "seen" by the FARE SYSTEM. Inactive Fare Tables may be loaded to test equipment for purposes of validation.

19.1.6.4.3.1 Pre-Set Fare

Each Fare-set shall contain a fare pre-set amount in \$0.05 increments that may be set at the FARE SYSTEM Backend to any value between \$0.05 and \$99.95 or disabled. When a pre-set fare has been established, unless over-ridden by key input, the Farebox shall count upwardly as money is inserted and validated; and display the deposited amount, until the pre-set fare value has been reached. When the pre-set value has been reached, the Driver's numeric display shall be reset to "\$0.00", the Farebox shall sound a distinctive tone, and a unit count and transaction shall be added to a transaction record that documents that a pre-set fare has been recorded.

For adult stored-value media, the pre-set fare will normally be deducted from the t-purse in the user's account.

For each token deposited and validated, the Driver's numeric display shall not be affected but a tone shall sound indicating a token has been counted. The token shall be processed in accordance with its established value and the transaction recorded by the Farebox.

19.1.6.4.4 Key Entry Registers

The Farebox Driver Display shall be provided with a group of softkeys that shall be used for the purpose of entering data, controlling system operation, and classifying revenue. The display shall have at least eleven (11) buttons around the edge of the Graphics Display whose function will be determined by the screen flow which will be developed through the Design Review process, and 12 other buttons (0 – 9, * and #).

Any key not otherwise specifically designated for exclusive system functional use shall be configurable from the FARE SYSTEM Backend for functional use in the following manner:

- Revenue value of \$00.05 to \$99.95: When configured in this manner, pushing the key will reset the pre-set value to the FARE SYSTEM Backend value configured for that key for a single transaction. When the revenue reaches, and amount is equal to or greater than the reset value, or if an adult stored-value smartcard is presented, the FARE SYSTEM will register the fare and reset the Revenue Display by deducting the amount registered from the Revenue Display. The Information Display shall display the key identification and value by reference to the FARE SYSTEM Backend entered Fare Table. The amount deducted from an adult stored-value smartcard shall be the amount designated by the key.



- Tally: When configured in this manner, pushing the key will register the transaction as a tally count to the designated key count. This input has no impact and shall not change the Revenue Display. The Information Display shall display the key identification and "TALLY" by reference to the FARE SYSTEM Backend entered Fare Table.
- Tally, dump and clear: When configured in this manner, pushing the key will register the transaction as a tally count to the designated key count and will, in addition, "dump" and deduct the FARE SYSTEM Backend key revenue value from the Revenue Display. The Information Display shall display the key identification and the value to be deducted from the Revenue Display by reference to the FARE SYSTEM Backend entered Fare Table.
- Read Card: When pressed before presentation of a CSC, the Farebox displays (Driver and passenger) shall show the card type and remaining value, time or rides, according to the type of card.
- Add Value: When pressed before presentation of a CSC, it shall be possible to present the card to the CID, deposit money into the Farebox, and, upon second presentation of the card, the amount of money will be loaded onto the CSC t-purse.
- Disabled: When configured in this manner, pushing the key will have no effect on Farebox register count or Revenue Display. The Information Display shall display "INVALID".

Any or all of the buttons may be used to access a second screen that shall provide additional functionality.

19.1.6.4.5 Route/Run Segment Record

The Farebox logic shall be configured with a "Route/Run" segment record. This capability shall permit the Driver, by means of key entry to make the Farebox create a transaction record that reflects the revenue amounts and event activity that has occurred since the last Route/Run record was created.

Route/Run segment records shall be generated without Driver input because of any of the following conditions or events:

The Driver makes key entry in the prescribed sequence to create a Route Run record.	Signal from the J-1708 VAN indicating a new Route-Run record is to be created.
The Farebox is placed in bypass.	The Farebox is removed from bypass
The cashbox is removed	A cashbox is inserted
The electronic key is used	The revenue access door is opened except by smartcard
The revenue access door is closed except after interrogation	The Farebox is interrogated.
The Farebox internal clock fails.	A Fare-set change is recorded.

The Farebox data capacity shall be sufficient to accommodate, at minimum, one-hundred and fifty (150) such records. The information stored in the segment record shall not be accessed through the Driver's information display but shall be available only for data transmission. Data shall not be available to the Driver for editing in any fashion.

19.1.6.4.6 Log-On Entry Process

The Farebox shall not accept revenue and shall not process electronic Fare Cards until successful completion of a system log-on process. The Farebox log-on shall consist of entry of a Driver ID, an operating Fare-set, and Palm Tran specified information; e.g., route number, run number, trip number, and direction. Data generated will be stored in the Farebox logic and shall be appended to fare collection transactions.

The primary method of operator log-on will be through the Farebox. The secondary method of operator log-on will be through Palm Tran's Computer Aided Dispatch/ Automatic Vehicle Location (CAD/AVL)



System. Either method shall issue a log-on message to all devices requiring log-on information via the J-1708 data connection.

Log-on at the Farebox, shall be done using the CID or through manual entry. The manual entry sequence may be configured by user definition. It shall be possible to make entry and complete the log-on process by button (key) entry. The Driver may make key entries to “step” through the Route, Run and Driver numbers. These will appear in the information display and the Driver may change them by reentering them from the keypad. In the event the Driver does not enter a new number the number shown on the display shall be used on the new Route Run record. Line 1 of the DCU Driver Information Display (DCU-ID) shall display the key entry and shall confirm that a new log-on record has been created.

Alternatively, the Farebox shall be capable of supporting log-on by use of data transmitted by CSCs through the CID or by external communication data interface.

In case log-on information comes from more than one source, whether it is from the CAD/AVL, manual log-on or CSC, the Farebox shall use the information from the last log-on message received.

The Farebox shall automatically log-off at the expiration of a FARE SYSTEM Backend configurable period of time during which no Farebox activity has occurred. The FARE SYSTEM shall record and report to the FARE SYSTEM Backend a transaction record to indicate an automatic log-off. The automatic log-off period shall be user defined by Palm Tran via the FARE SYSTEM Backend and downloaded to the Farebox logic. Prior to initiating an automatic log-of, the Farebox shall emit a distinctive tone for a FARE SYSTEM Backend configurable period.

19.1.6.4.7 Transaction Record

The Farebox shall record, store, maintain, and download to the FARE SYSTEM Backend an individual transaction representing a record of fare collection operational activity. All transactions shall be date/time stamped and assigned an incrementing record sequence number unique to the Farebox. Transactions shall be generated for all significant activity, including but not limited to the following:

Cash and token fare payments	Non-cash and electronic fare payments
Key fare payment entry (e.g. classification or tally)	Key entry operations (e.g. bill override, card issue)
Driver log-on, log-off, and log changes; e.g., Driver ID, Route, Run, Trip, Direction, Fare-set	Farebox power on/off
Coin bypass activation or clear	Cashbox threshold level event
Data storage threshold event	Data interrogation event
Electronic key event	Cashbox door open and close events
Cashbox removal and insertion events	Security events
Maintenance status events, including, maintenance access, and Maintenance/jam clear access	All data required for retention and reporting of individual transactions.

In addition to transaction records, the Farebox and/or the FARE SYSTEM Backend shall maintain aggregate data records and counts of other system activity, including but not limited to, the following:

Coins validated	Coins rejected
Bills validated	Bills rejected
CID read	CID misreads
CID encode	CID verify fail

All transactions, events and alarms shall be reported to the FARE SYSTEM Backend each time the Farebox is properly interrogated and shall be accessible to authorized users through the FARE SYSTEM Backend workstations. The Farebox shall store and maintain all such data until directed by communication from the FARE SYSTEM Backend to delete records.

The Farebox shall ensure all data is maintained and is available for transmission upon proper authorization. The design, architecture, and application processing shall ensure the data is maintained to the highest level of integrity and that proper audit provisions are provided to routinely recognize and identify corrupt or incomplete data. Critical data, particularly data representing or having cash value, shall be maintained in such a manner to support full recovery in the event of data corruption. Redundant data storage shall be required to support this requirement.

19.2 Passenger Display

An electronic display shall be provided within the Farebox passenger interface bezel and positioned in a manner to be easily observed and read by a boarding passenger. The passenger display shall be capable of displaying a minimum of two lines of at least 20 characters each. The Passenger Revenue display shall be of sufficient brightness and clarity to be visible in all forms of ambient lighting conditions within the vehicle. The data displayed on the Passenger Revenue display shall be as agreed during the CDR (CDR - 10). Typically, it will show the fare or transaction type and value data appropriate to the transaction. The Passenger Information Display shall be on when the Farebox is powered on and off when the Farebox is powered off.

19.3 Driver Control Unit (DCU)

Driver control and operation of the Farebox shall be accomplished with an independently mounted DCU. This unit shall provide all Driver operational display and input control functionality necessary to operate the Farebox. The design, layout and functionality of the DCU are to be provided as part of the CDR (CDR - 8, CDR - 10) and finalized during PDR (PDR - 18). All aspects of enhanced UX shall be applied to the design of the DCU UI.

19.3.1 Driver Control Unit Function

The DCU shall function to provide all necessary Farebox input and display to support fully the operation of the Farebox. The unit shall be designed to function without degradation in the vehicle operating environment, considering lighting, temperature, dust, moisture, vibration, and other such conditions.

The DCU shall be interfaced with the Farebox in such a manner to render key input and display output indistinguishable from directly interfacing with the Farebox. No provided Farebox function shall be inhibited or degraded as the result of DCU operation or control.

Communication utilized in the exchange of data between the Farebox and DCU to affect control and operation of the Farebox shall be fully documented and licensed to Palm Tran. Palm Tran shall have full rights to convey this license to equipment suppliers for effecting interface to the Farebox. The use of proprietary technology to facilitate DCU interface is not acceptable. CONTRACTORS shall submit full and complete interface message set documentation as part of the CDR (CDR - 10).

19.3.2 Driver Control Unit Mechanical Design

The DCU enclosure and components shall be made of material suitable to the service under the full range of the specified environmental and operating conditions.

Mounting hardware, fixtures, and appliances shall be designed to support the DCU and its operation in the approved installation location. If a flexible arm is required to meet the DCU installation requirements, it shall be designed to prevent autonomous movement or vibration throughout the life of

the equipment. Hardware, fixtures, and appliances shall be designed and manufactured of materials suitable for the service. It shall not be necessary to replace, adjust, or otherwise service the DCU mounting hardware, fixtures, or appliances during the period of operating life expectancy.

The DCU shall be secured from removal from the mounting fixture by a key-lock or other interlock system. It shall not be possible to open or otherwise gain access to the DCU unit interior without tools while the unit is installed.

DCU input keys shall be minimally rated at 100,000 contacts, each. Full functionality of displays shall be rated at 50,000 continuous hours.

19.3.3 Driver Control Unit Electrical Design

All electronics incorporated in the DCU shall comply with Section 6.16 and other applicable requirements defined herein. Displays shall be designed such that the unit shall not generate electrical interference with on-board devices, nor shall onboard devices affect the display or controls.

All requirements for electric interface to the Farebox shall be incorporated into a single cable with protected mounting terminated internally protected within the Farebox. The design of any interface cable shall be adequate to prevent interference and generation of false signals because of EMI, vibration or other conditions common to the bus environment. It shall be of construction so as not to be degraded by dirt, moisture, road salt, solvents or other environmental factors common in the areas where the cable is to be installed.

Termination of the cable at each end shall be by means of a polarized or keyed snap or twist connect plug with positive retention devices. It shall be possible to install or remove the DCU or DCU mounting fixture without unsoldering or otherwise disassembling the cable connection.

19.3.4 Driver Control Unit Physical Design

The DCU shall be designed to support Driver key entry and information display while functioning in the operating vehicle environment. Consideration for ergonomic and functional utility shall be inherent in the design, given the requirement to support the Driver population, operating conditions, and Driver seating positions. It shall be incumbent upon CONTRACTORS to familiarize themselves with the DCU design requirements.

Glare free illumination of the Driver pushbutton panel of the DCU shall be provided. Bulbs or other illumination sources shall be used for such illumination and shall be resistant to shock and vibrations as encountered in Palm Tran's operating environment. The illumination source shall be easily accessible for replacement in a repair shop.

The DCU unit shall be illuminated when the Farebox is on.

19.3.5 Driver Control Unit Input

The DCU shall be provided with a group of keys, which shall be used for making Driver entries into the Farebox. The DCU shall provide adequate key designation to support fully all operating functionality of the Farebox.

It is desired the primary numeric, pound (#), and asterisk (*) keys be configured consistent with the standard telephone keypad format.

Dedicated DUMP and ENTER keys shall be prominently grouped giving consideration for frequency and convenience of use.

All function keys shall be logically grouped in an arrangement that facilitates easy identification and use.

All pushbuttons and displays shall be of sealed constructions and mounted with gaskets or seals to prevent entry of foreign material that might degrade performance. Key color and design (shape) may be used to differentiate special function or dedicated use keys.

19.3.6 Driver Control Unit Display

A digital display to provide display information to the Driver shall be provided by the DCU. This display shall function to display Farebox processing and status information to the Driver.

Information displayed for Driver use shall consist of a DCU – Revenue Display (DCU-RD) for the purpose of deposited money, value display, and a DCU-ID for communicating fare collection and system operational information.

The display shall be readily readable by a Driver in lighting conditions ranging from bright sunlight to darkness and by Drivers wearing polarized sunglasses. Readability of the display under adverse operating conditions is a critical requirement. As specific adverse operating conditions are not definable, it is incumbent upon CONTRACTORS to familiarize themselves with the adverse operation conditions that may be present and shall overcome those conditions. Display back lighting may be provided if necessary to enhance functionality. Display controls for brightness and contrast shall be included, but they shall not be capable of being adjusted to make the display not visible.

19.3.6.1 Driver Control Unit Revenue Display

A minimum of six (6) character display shall be provided for use by the Driver to indicate the value of money inserted into the Farebox in the form of coins and bills; \$00.00 to \$99.99. Each display character will be a minimum of 0.25-inch-high, and of sufficient brightness to be visible in all forms of ambient lighting within the bus cockpit area. At idle, the DCU-RD shall display the amount of the fare to be paid. As the coins and bills are inserted, the DCU-RD shall reflect the amount of money validated and accepted and the amount remaining to be paid will be decremented.

Nominally, thirty seconds after the last coin or bill has been inserted, a timer shall cause the accumulated fare to be registered as the fare paid. By doing so, any numeric information on the Driver's display shall be reset to the default amount of the fare to be paid. It shall be possible for Palm Tran to configure this timer via the FARE SYSTEM Backend to any period between zero (0) seconds and sixty (60) seconds or to disable the timer so that deposited revenue is retained on the display until otherwise reset by a processing action.

One system key shall be designated as a "HOLD" key. The designated "HOLD" key shall be configurable from the FARE SYSTEM Backend. When the Driver depresses the "HOLD" key, it shall reset the timer and retain the revenue value. A Hold Key event will be created.

One system key shall be designated as a "SHORT FARE" key. The designated "SHORT FARE" key shall be configurable from the FARE SYSTEM Backend. When the Driver depresses the designated "SHORT FARE" key, the value DCU-RD shall be reset to the amount of the fare to be paid and the revenue registered as Short Fare Revenue. A Short Fare Event will be created.

19.3.6.2 Driver Control Unit Information Display

A DCU-ID shall be provided for use by the Driver to indicate various fare system statuses, fare collection processing messages, and other display output. The DCU-ID shall be of sufficient brightness and clarity to be clearly visible in all forms of ambient lighting within the bus cockpit area. The display shall be appropriately designed to prevent undesirable glare or reflections on vehicle windows. The display shall be capable of displaying the full ASCII character set.

The top of the DCU-ID shall display the current time as maintained within the Farebox – to be confirmed during the CDR (CDR - 10).

Upon processing of a token or electronic non-cash fare instrument, the DCU-ID shall display the identity of the fare instrument as determined by processing and reference to the associated electronic non-cash register. The identity shall be configurable from the FARE SYSTEM Backend and may consist of at least any eight (8) character alphanumeric combination within the allowable range of FARE SYSTEM Backend input.

DCU-ID shall also display the Farebox processing status for the instrument as determined by reference to the associated electronic non-cash register. The register may indicate for display any of three processing conditions:

- The instrument is valid and therefore its use has been counted.
- The instrument is valid but additional fare payment is required.
- The instrument is not valid.

The text shown for these conditions, and the length of time it is displayed, is configurable by Palm Tran from the FARE SYSTEM Backend. The initial values will be defined during the CDR (CDR - 10).

19.3.7 Driver Control Unit Installation

The DCU shall be mounted in the vehicle cockpit area in such a manner to allow operators in all seated operating positions to observe comfortably the displays and to operate the DCU controls from a seated position.

The CONTRACTOR shall designate the preferred DCU mounting location for each class of vehicle as part of the CDR (CDR - 9) by drawing or notation submittal. The DCU mounting and installation shall be accommodated without relocation of existing installed vehicle equipment. If relocation is suggested or recommended, such shall be submitted at part of the CDR (CDR - 9) and will be subject to Palm Tran acceptance. The CONTRACTOR shall be responsible for installation of the DCU in the location and manner as approved by Palm Tran.

As part of the PDR (PDR - 10) review, a functioning Farebox with DCU shall be provided and installed on each type of Palm Tran vehicle to validate mounting configuration and to verify the unit does not block visibility or otherwise create a safety hazard. Installation shall be required to validate Driver operation, visibility of displays, illumination under night conditions, and display reflection in the windshield.

19.3.8 Driver Control Unit Operation

The DCU shall be operational any time the Farebox is operational. It shall not be necessary or possible to independently turn on or turn off the DCU. When operational, all displays, key functions, and operating features of the DCU shall be operational and fully functional.

19.3.9 Driver Control Unit Maintenance

The DCU shall have incorporated a self-test operating sequence that may be initiated by key entry or other designated means that does not require unit removal or disassembly. The self-test operating sequence shall adequately indicate failure of DCU key entry input, display functionality, or operating condition without removal of the unit from the vehicle mounting.

Removal and replacement of a DCU on a vehicle shall require no more than one minute and, except for a security key and a screwdriver shall require no tools.

19.4 Revenue Access and Collection Process

When the Farebox is connected to the backend system for the purpose of revenue collection, the FARE SYSTEM shall verify that the electronic media used to initiate the communication is also authorized to conduct revenue vaulting. If so, the internal mechanisms and locking pins on the Farebox revenue access door are to be released and the door shall open to permit removal of the cashbox.

The Farebox logic shall be designed such that the Farebox probe or data exchange can be configured either to authorize or not the release of the revenue access door. Either configuration will enable full exchange of data.

The action of closing the revenue access door and holding it in the closed position for approximately one-half (½) second shall cause the Farebox mechanism to engage the revenue access door locking pins and lock the access door. It shall not be necessary to latch or secure the revenue access door by any other means.

19.5 External Communication Capability

To facilitate the secure and reliable collection of revenue, the Farebox shall be provisioned with the capability to communicate with Palm Tran's authorized external devices for exchanging FARE SYSTEM data and information with the FARE SYSTEM Backend.

The Farebox and associated microprocessor devices shall be provided with hardware interfaces and software that shall permit the integration of the Farebox with other Intelligent Transportation System (ITS) device employing the SAE J-1708, SAE J-1587, ITE, TCIP and related standards.

In addition, the design, architecture, and processing capability of the FARE SYSTEM shall be sufficient to support interactive communication with external devices and other ITS devices in a manner consistent with fare collection and the onboard transit environment operational requirements. It is incumbent upon CONTRACTORS to be familiar with these requirements.

It is the intent of the integration with the Ethernet, TCP/IP and J-1708/1587 standards to permit the Farebox to interchange data interactively over a Vehicle Area Network (VAN) and with CAD/AVL System to automate operator login and trip change, provide the Farebox with current location and time for synchronization.

In addition to enabling an interface with Palm Tran's CAD/AVL System, the Farebox shall be able to be interfaced via Ethernet to an on-board Router (CradlePoint IBR1100). Attached to the onboard router is the vehicle Wireless LAN subsystem, which communicates (AT&T 4G connectivity for public WIFI) with Palm Tran's fixed Wireless LAN systems at the bus garage and Palm Tran Central Station.

If the current on-board router isn't sufficient to support communications by your proposed FARE SYSTEM, Proposers may propose an optional upgrade router – refer to the Price Proposal Options Tab.

19.6 Information Exchange over Vehicle Area Network

The Farebox shall be able to exchange securely the information listed in Table 3 4 over a VAN for use in identifying CSC transactions:

Information Type	Provided by FARE SYSTEM to VAN	Provided by VAN to FARE SYSTEM
All operational alarms indicating failure, malfunction or other problems with the Farebox device	X	
Driver log on/log off information (ID and Run)	X	X
Current location information (geographic) for use in calculating distance-based fares		X
Current Route, Run, trip, etc.	X	X

19.6.1 External Communication Architecture

The external communication architecture shall support the following recognized standards for data communication and connectivity:

- SAE J-1708
- SAE J-1587
- Ethernet
- USB

19.6.2 External Systems Hardware Interface

The connecting cable from the Farebox to the SAE J-1708 connector shall conform to all SAE J-1708 requirements and be shielded. Power shall not be drawn over this cable. Two power supply ground connections shall be provided in the cable from the power supply in the Farebox. The data path circuit shall be as identified by SAE J-1708.

Appropriately designed terminal interface capability shall also be provided for the interconnection of other supported data communication interfaces. The design shall provide for standard locking plug connections in a location or locations accessible without disassembly of the Farebox. Subsequent to initial installation of the Farebox, it shall be possible for CONTRACTOR personnel to complete connection of RS-232, RS-485, or other data interfaces within ten (10) minutes per system or less.

19.6.3 Software and Data Interface

SAE J-1708 and SAE J-1587 describes the communication protocol in the form of Message Identifier (MID), Parameter Identification Definitions (PID) and Subsystem Identification Numbers (SID). The Farebox shall support and provide information for all SAE J-1587 message formats for the interface with Palm Tran's CAD/AVL system.

The Farebox shall have the ability to accept and respond to the following information provided over the J-1708 serial interface by Palm Tran's CAD/AVL system, as well as any other messages described herein:

- Latitude and longitude data
- Stop location data

19.6.4 Intelligent Transportation System Interfaces

The Farebox shall be capable of interfacing with Palm Tran's CAD/AVL System.

The Farebox and its associated FARE SYSTEM Backend systems shall have sufficient design, communication, processing, and data storage capability and have an appropriate architecture to support a Palm Tran's CAD/AVL interface.

The following shall be defined by the CONTRACTOR and included in the Farebox. As a part of its CDR package (CDR - 11), the CONTRACTOR shall provide full documentation on the communication and processing functionality so that successor contractors may integrate this functionality into their own systems.

19.6.4.1 CAD/AVL Defined Fares by Stop

The Farebox shall receive and generate a transaction record in response to a CAD/AVL System data message transmitted to the Farebox. Such messages will represent the CAD/AVL system processing representing the positioning of the vehicle at a specific stop location. If the CAD/AVL equipment is not on the vehicle, not functioning, or not logged on, stop codes will not be provided to the Farebox; the location field will be tagged with a default null value. The CAD/AVL system may be expected to generate such a message each time the FARE SYSTEM processing determines the vehicle is positioned at a new stop Location, and periodically if the stop location has not changed. The Stop Location shall be represented by a stop code generated by the Farebox. The Farebox shall append the Stop Location and/or the Latitude/Longitude associated with the Stop Location data to each fare collection transaction record formed and shall append the same data until a new Location message is received.

The Farebox shall integrate message data received from a CAD/AVL Stop Location system into those transactions representing fare collection activity. Such integration shall be in the form and appropriately supported by the FARE SYSTEM Backend to provide fully integrated reporting of such data by the same selection criteria as fare collection revenue and ridership data.

The specific elements of the CAD/AVL Stop Location system shall be defined by Palm Tran in conjunction with the CONTRACTOR and Avail Technologies, Inc., Palm Tran's CAD/AVL provider.

19.6.4.2 Status and Alarm CAD/AVL

The Farebox shall have the capability to form, direct, and transmit the messages in response to specific Farebox status and alarm conditions. These messages will be directed to the CAD/AVL system via the J-1708 interface to support processing and transmitting of a radio message relating to the Farebox status or alarm.

The Farebox shall form and log a transaction to indicate such and the Farebox shall anticipate the CAD/AVL system will provide a message response to indicate receipt and acceptance of the message and shall also form and log a transaction to indicate such. In addition, means shall be provided for the Farebox to recognize the failure of the CAD/AVL system to respond to a status or alarm message after a specified FARE SYSTEM Backend configurable period and, accordingly, consider the message as undelivered and respond by automatically retransmitting the message.

The Farebox shall form and transmit the specified message each time any of the specific conditions or alarms is registered.

19.6.4.3 Use of the on-board Wireless LAN

The onboard equipment includes a four-port router and wireless LAN that is already integrated with Palm Tran's wireless LAN. The CONTRACTOR shall integrate with this device to upload and download information needed by the FARE SYSTEM devices on the bus. Palm Tran's wireless LAN is installed at Palm Tran's maintenance facility and Palm Tran's Central Station.

19.6.4.4 Farebox Communication

The Farebox shall to communicate with the FARE SYSTEM Backend, to exchange data and information for the purpose of accurately and securely controlling and reporting the collection of all revenue from the Farebox.

Regardless of the communication method, provisions must be made to ensure all Farebox data is transmitted securely and with 100% accuracy. Failed or interrupted transmissions shall not compromise the integrity of the data or security of the FARE SYSTEM. The FARE SYSTEM shall provide a means that assures the cashbox can only be removed from a Farebox at the appropriate location through an authorized procedure that is auditable – the CONTRACTOR shall provide its proposed procedure as part of its Proposal and as part of the CDR (CDR - 11); it will be subject to Palm Tran audit confirmation.

Communication with the FARE SYSTEM Backend shall download fully and completely all Farebox configuration and application logic programs, including, the current fares for all the pre-set Fare Tables, the valid presets for current Routes, associated push button values, the function of each Driver push button registration assignments, transfer rules, Bad Card lists, autoload lists, and other such information as required by the Farebox. It shall not be necessary to replace physical components or electronic chips to accomplish this functional process.

19.6.4.4.1 Wireless Data Polling and Transmission

The CONTRACTOR shall use Palm Tran's existing Wireless Local Area Network (WLAN) for interrogating/polling/probing buses and transmitting data between the Fareboxes and FARE SYSTEM Backend system. The following is a description of Palm Tran's WLAN. If Palm Tran's WLAN isn't sufficient to support CONTRACTOR's FARE SYSTEM, the CONTRACTOR will be responsible for specifying its WLAN requirements within its Proposal. Any proposed WLAN configuration will be based on the 802.11 family of standards.

The Farebox WLAN components shall communicate reliably between the Farebox and a garage access point within a range of at least one-hundred feet (100'). Designated FARE SYSTEM components shall become part of Palm Tran's WLAN during log-on, log-off and Farebox vaulting as long as the bus is within at least one-hundred feet (100') of a garage access point. No equipment external to the body of the Farebox shall be used for this system.

Any RF equipment on Fareboxes must not interfere with other data communications (for example, telecommunications, RF, optoelectrical, infrared or other) in use within or near Palm Tran facilities, including other WLANs operating in the garage or nearby areas.

Farebox design shall allow for exchange of Palm Tran's WLAN component to update as new standards become appropriate for these systems. Farebox Data Exchange.

The following section describes Palm Tran's functional requirements for controlling, managing, and facilitating the bi-directional exchange of FARE SYSTEM data between the Farebox and the FARE SYSTEM Backend. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

The data transfer is controlled and managed by the FARE SYSTEM Backend. It is designed to operate in a real-time environment to interrogate and facilitate the secure bi-directional exchange of fare collection data via a wireless communication process between the Farebox and the FARE SYSTEM Backend.

Palm Tran's WLAN shall be used to securely transmit all Farebox related information, data, parameters, lists, etc., to/from the FARE SYSTEM Backend. When the Farebox establishes an authorized and secure connection with Palm Tran's WLAN the exchange of information shall occur automatically. Upon each successful connection, at minimum, the following functions shall occur:

- The Farebox shall send to the FARE SYSTEM Backend its identification data, Farebox ID and cashbox serial number.
- Synchronization of the Farebox's Date and Time with the FARE SYSTEM Backend.
- All data stored by the Farebox since the last connection shall be uploaded to the FARE SYSTEM Backend. All data will be associated with a Farebox Data Tag, which is the combination of the Farebox ID and Cashbox ID. The Farebox Data Tag will be used to match transmitted data with data collected during the Revenue Collection Process (RCP).
- The FARE SYSTEM Backend shall verify that only one set of data has been received from each Farebox; if duplicate data is received, the FARE SYSTEM Backend shall reconcile the duplicate data.
- The FARE SYSTEM Backend shall transmit all updated information associated with the Farebox, including but not limited to Fare Tables, bad number list updates, autoload lists, authorized Route/Run/trip and Driver parameters, and other specific parameters and data.
- The total time required to complete a complete and full data exchange between the Farebox and FARE SYSTEM Backend shall not exceed five (5) seconds.

19.7 The Revenue Collection Process (RCP)

The RCP shall be initiated when an authorized Revenue Agent (RA) taps their ID badge to the Farebox CID and accomplish, at minimum, the following functions:

- The Farebox will verify the presented card is authorized to conduct revenue collection and verify that the bus is connected to the authorized WLAN Access Point.
- The Farebox will verify that the status of the RCV's Cashbox Receiver door is in the state "Open".
- If all checks pass, the Farebox shall transmit the appropriate command to unlock the Farebox cashbox access door. A Cashbox Access Door Open event shall generate a transaction event record, including, at a minimum, the Date, Time, RA ID, Farebox ID, and Cashbox ID – the initiation of the RCP, including all checks and the opening of the Cashbox Access Door, shall be no more than one (1) second.
- A tone (warble) shall be sounded to alert the RA to remove and empty or replace the cashbox.
- The Farebox cashbox removed event shall generate a transaction event record that includes, at a minimum, the Date, Time, RA ID, Farebox ID, and cashbox ID number of the event. The Farebox ID and Cashbox ID, combined, shall create a Farebox Data Tag for use in matching interrogated data with data collected during the RCP.
- The Cashbox insertion and locking of the access door shall generate a transaction event record that includes, at a minimum, the Date, Time, Mobile Vault ID, Farebox ID and Cashbox ID number of inserted Cashbox. The Farebox ID and Cashbox ID, combined, shall create a Farebox Data Tag for use in matching interrogated data with data collected during the RCP.

- An emptied Cashbox, not necessarily the same one removed, shall be inserted into the Farebox and the RA shall hold the Farebox Cashbox Access Door closed until the RA hears the audible tone confirming the door has been locked.
- The Farebox will lock the Cashbox Access Door after confirming that presence of a valid empty Cashbox. If confirmed, the Farebox will lock the Access Door, issue an audible tone, and generate a transaction event record that includes, at a minimum, the Date, Time, RA ID, Farebox ID, and Cashbox ID of the inserted Cashbox – the completion of the RCP, including all checks and the locking of the Cashbox Access Door, shall be no more than one (1) second.

In addition, the FARE SYSTEM shall allow for exchange of data and subsequent removal of a cashbox from a bus that is parked elsewhere in the garage and is not able to connect with Palm Tran's WLAN (for example, due to mechanical failure in the bus itself, rather than the Farebox). This exchange shall be only allowed by an authorized RA through use of user ID and password entry via the DCU. This process will generate a transaction event record that includes, at a minimum, the Date, Time, RA ID, Farebox ID, and Cashbox ID.

In all circumstances, the CONTRACTOR is responsible to ensure the delivered FARE SYSTEM clearly traces/matches the revenue in each cashbox to the specific Farebox from which it came.

19.8 Farebox Diagnostic and Operational Reporting

The Farebox and its electronic logic shall provide operational self-testing, diagnostic operations, reporting and indication. These elements are required for effective maintenance of the equipment, to provide audit trails to determine adequate levels of Farebox operations.

19.9 Operational Testing and Measurements

Provision shall be made to initiate onboard self-test processes for the purpose of identification and isolation of malfunctioning components. CONTRACTORS shall identify in their response the method, action, and test criteria for any self-test processes. Self-test process and the exercise of such shall not compromise revenue security or data maintained in the Farebox.

19.9.1 Indicators

A method to continuously monitor and indicate the proper operation of major modules shall be provided. Major module fault alarms; e.g., coin validator failure, bill validator failure, or CID failure, shall be displayed on the DCU-ID, unless otherwise precluded by the FARE SYSTEM failure, and a maintenance transaction record written.

Methods to continuously monitor and indicate the proper operation of sub-modules shall be provided to support maintenance diagnosis and corrective action. This information shall be provided on the DCU-ID in response to the entry of the proper command(s). Such indicators may be used to indicate such conditions as proper voltages from the main power supply. If electrical or electronic relays are employed to start and stop any motors or solenoids, then an indicator may be provided for each motor and solenoid to indicate the state of the operation. If an indicator lamp is lit or other indicator is given, it shall denote that all logic to that point is functional. All indicators provided shall be visible by technicians without the need to remove any components.

19.9.2 Automatic Sequence Testing

The Farebox logic shall be designed to provide an automatic sequence testing of each of the major operational assemblies: coin processor, bill processor, DCU-RD, DCU-ID, and CID. The sequence test shall be adequate in scope to determine the operating condition of the Farebox to ensure operational readiness. It is not intended the test sequence shall be used to diagnose failure beyond the level of FARE SYSTEM Components. Initiation and completion of the sequence test shall each generate a data transaction reportable to the FARE SYSTEM Backend indicating completion and result.

The automatic status check sequencing shall be initiated by a DCU entered designated key sequence. The Farebox shall automatically return to the normal operating state at the completion of the status check, regardless of the reported status. In the event of a DCU failure, it shall be possible to place the Farebox in a "test mode", to provide access to additional sequence tests, by a designated means requiring maintenance access. From this status it shall be possible to initiate the automatic status check and directly exercise a specific component sequence test(s) without the need to initiate fully automatic sequence testing.

19.9.3 Power Supply Monitoring

The Farebox shall monitor and report the number of times it is turned on-and-off.

19.9.4 Security Door Alarm

The Farebox shall be provided with a sensing device capable of monitoring real time and the length of time that the cashbox security door is open. If the door is open for longer than a FARE SYSTEM Backend configurable parameter, an alarm signal shall be transmitted in real-time to the FARE SYSTEM Backend and an alarm record shall be generated. The Date and Time of the alarm and the length of time that the security door was open shall be included in the Alarm record. The next probe or data download shall cause the Farebox to generate a "security door alarm" message that will display. The security door alarm message shall indicate the time of the original reported alarm and the length of time the door was open.

19.9.5 Cashbox Security Alarm

The Farebox shall be provided with a sensing device capable of monitoring the presence of a cashbox in the Farebox. If a cashbox is removed for a time that varies by more than a FARE SYSTEM Backend configurable parameter, an alarm signal shall be transmitted in real-time to the FARE SYSTEM Backend and an alarm record shall be generated. The Date and Time of the alarm and the length of time the cashbox was not in place shall be included in the Alarm record. The next probe or data download shall cause the Farebox to generate a "security cashbox alarm" message that will display. The cashbox security alarm message shall indicate the time of the original reported alarm and the length of time the cashbox had been removed.

19.9.6 Cashbox Threshold Indicator

The Farebox shall continually calculate the individual volume or percent of capacity of the cashbox coin and bill storage compartments. When the Farebox determines the volume/capacity has reached a FARE SYSTEM Backend configurable threshold level for bills and/or coins, a "Cash Box Almost Full" message shall be generated and displayed on the DCU as well as transmitted in real time to the FARE SYSTEM Backend.

19.9.7 Cashbox Full Alarm

The Farebox shall continually calculate the individual volume or percent of capacity of the cashbox coin and bill storage compartments. When the Farebox determines the volume/capacity has reached a FARE SYSTEM Backend configurable threshold level for bills and/or coins, a "Cash Box Full" message shall be generated and displayed on the DCU as well as transmitted in real time to the FARE SYSTEM Backend. The message shall remain visible until the cashbox has been processed.

20 Palm Tran Agency Point of Sale (APOS)

Palm Tran Agency Point of Sale (APOS) Terminal will provide Palm Tran with the capability to perform a range of customer service activities upon demand and when a customer is present. These terminals will have several different configurations depending on their intended location and will be used to sell Media and perform customer service at Palm Tran Outlets and other Palm Tran locations as required. ~~Palm Tran will provide the appropriate hardware work stations as agreed to with the CONTRACTOR, in design review.~~ The CONTRACTOR will develop, test, and provision the software as specified in the following requirements.

20.1 General Requirements

The APOS Terminal will be a modular device and will support multiple configurations, depending on the peripheral modules included. The APOS Terminal hardware will be optimized for its intended use and configuration.

The APOS Terminals will be designed to permit rapid exchange of the device and peripheral modules to restore service in minimal time. Repairs and adjustments will be performed in shop facilities and no special tools or instruments will be required for exchange of modules. Minor repairs and adjustments will be capable of being performed in the field.

~~The Front Office APOS Terminal will provide all functions available and will be installed for walk-up customer transactions.~~ The device as supplied by the CONTRACTOR will include:

- Integrated touch-screen and computer enclosure
- Separate keyboard and mouse that are tethered
- Contactless Smart Card Reader
- Cash drawer
- Bank card processing module
- Multi lingual Patron Display
- Receipt printer
- Separate digital camera and tripod
- Separate document scanner
- Limited-Use Media printer/encoder
- Extended-Use Smart Card printer/encoder
- Uninterruptible power supply
- Communications Interfaces as necessary

The Front Office APOS Terminal functionality will provide all functions available and will be installed configured for walk-up customer transactions. The FARE SYSTEM Back Office APOS Terminal

functionality will be configured to support Palm Tran's internal needs and transactions where the customer is not present, including single and multiple card order fulfillments, Palm Tran employee card issuance, bulk card personalization, and other transactions. ~~The device will include the following modules, which will be identical to those used in the Front Office APOS Terminal:~~

~~Integrated touch-screen and computer enclosure~~

~~Separate keyboard and mouse~~

~~Contactless smart card reader~~

~~Separate digital camera and tripod~~

~~Separate document scanner~~

~~Limited-use media printer/encoder~~

~~Extended-use smart card printer/encoder~~

~~Uninterruptible power supply~~

~~Communications Interfaces as necessary~~

The Portable APOS Terminal will be based on a laptop computer or tablet with an integrated touch screen interface, keyboard and pointing device. The portable configuration will support remote sales and card personalization programs. In addition to the laptop computer, the device will include the following modules, which will be identical to those used for the Front Office APOS Terminal (except where noted herein):

- ~~• Contactless smart card reader~~
- ~~• Bank card processing module~~
- ~~• Receipt printer~~
- ~~• Separate digital camera and tripod~~
- ~~• Separate document scanner~~
- ~~• Extended-use smart card printer/encoder~~
- ~~• Cellular broadband data modem (specific to Portable APOS Terminal) and other communications Interfaces as necessary~~

All APOS Terminal software configurations will be subject to Palm Tran's review and approval.

The APOS Terminal will conduct a variety of smart media transactions required to support Palm Tran's fare policies, and those defined herein. At minimum, these transactions will include:

- Issue new EU cards (with and without fare product, and with and without deposit)
- Add stored value and fare products to an existing transit account
- Activate and sell pre-encoded LU media
- Encode, print, and issue custom LU media (when configured to do so)
- Encode, print, and issue personalized EU media (when configured to do so)
- Conduct a read-only transaction and display the FARE SYSTEM account or card balance and transaction history
- Initiate and register an anonymous transit account
- Modify the information of an existing customer account
- Accept payments and provide change

20.2 Software

All APOS Equipment software will be subject to Palm Tran's review and approval.

20.2.1 Operating System and Application Software

The APOS Terminal will utilize a standard, current Microsoft Windows® Operating System in use at Palm Tran.

The APOS Terminal will use application software that is developed with a high-level language and that supports all functions described herein.

If risk mitigation lists (i.e., positive/negative lists) are employed in the FARE SYSTEM, the APOS Terminal will receive from the FARE SYSTEM Backend and store updated lists. If a card presented for replenishment is on a risk mitigation list, the APOS Terminal will notify the Customer Service Agent.

Once installed, the APOS Terminal will not enter service until it has communicated with the FARE SYSTEM Backend to receive current fare table, application software, administrative and maintenance login IDs, positive / negative lists, and other configurable data.

Authorized users of the FARE SYSTEM Backend will be able to remotely manage and administer APOS Terminals. Remote management functions will include:

- Changing configurable parameters
- Enabling and disabling payment methods
- Downloading data
- Extracting transaction and event records
- Synchronizing date and time

On each APOS Terminal, the CONTRACTOR shall supply, install, and configure client versions of anti-virus and anti-malware software consistent with Palm Tran security policies, and approved by Palm Tran.

The APOS Terminal shall fully comply with all PCI regulations.

The CONTRACTOR shall submit descriptions of the APOS Terminal software design for Palm Tran's review and approval. APOS Terminal software design submittals will include:

- APOS Terminal data registers
- APOS Terminal transaction, event, login, etc. records
- APOS Terminal operator interface
- APOS Terminal configurable parameters and their value range
- APOS Terminal risk mitigation list storage, update and processing (if applicable)
- APOS Terminal transaction limitation procedures
- APOS Terminal setup and administration procedures
- APOS Terminal login types and permitted functions
- APOS Terminal anti-virus and anti-malware software and procedures

20.2.2 Data Records

The APOS Terminal will generate transactions and events, including operator login and logout and diagnostics. Each data record will incorporate a unique identification number for that APOS Terminal and day and will be date/time stamped.

Each APOS Terminal customer transaction record will, at minimum, consist of the following:

- Sequential transaction number (unique per APOS Terminal)
- APOS Terminal number
- Location (where available)
- User ID
- Serial number of cards
- Time and date
- Transaction result (e.g., success, failure)
- Transaction result reason (e.g., approved by FARE SYSTEM Backend, denied by local risk list)
- Fare category (e.g., full fare, reduced fare)
- Transaction type (e.g., new card, account value, pass type)
- Transaction value
- Payment amount per payment method

When a user signs on to the APOS Terminal, the following Data will be stored in a data record:

- APOS Terminal number
- Location (where available)
- User ID
- Time and date
- Login attempts

When the user logs off the APOS Terminal, the device will store a similar record.

The APOS Terminal will be capable of detecting basic internal malfunctions and will annunciate failures directly on the operator display and to the Device Monitoring System (see Section 19.2, Device Monitoring System). The malfunction detection will cover at least Failure of power or control circuitry, and any Failure of the Contactless Smart Card Reader that could result in a false, incomplete, or corrupted encoding of a Smart Card.

The APOS Terminal will be capable of recording locally data representing no less than 3,000 events, including changes in status, communication problems, and problems detected during the automatic diagnostic testing. At a minimum, each event record will include:

- APOS Terminal number
- Time and date
- Event code
- Any associated event data
- Identifier of the failed test
- Iteration number of tests
- Reason for test failure (unique code)
- Additional information to define the nature of the failure

Each APOS Terminal will contain registers that track the following information:

- The total number and value of all transactions completed by the APOS Terminal since Data was last uploaded to the FARE SYSTEM Backend.
- The date and time of the last successful Data upload to the FARE SYSTEM Backend.

These registers will be modified only by the APOS Terminal itself and will not be manually alterable.

The register totals for the cash value of transactions of each APOS Terminal uploaded to the back end will be available to the RF Cash Settlement System (as defined in these Specifications) for revenue servicing and processing requirements.

20.2.3 Offline Processing

For those transactions that may be completed while the APOS Terminal is offline, each APOS Terminal will have Palm Tran-configurable limits that control the number and value of offline transactions that the device may conduct before transaction data will be uploaded to the FARE SYSTEM Backend. As each transaction is completed, the APOS Terminal will increment internal data registers that track the number and value of completed transactions. Any customer data gathered during offline transactions will be encrypted.

When either data register is within 75 percent of the defined limits for the device, the APOS Terminal will initiate data communications with the FARE SYSTEM Backend.

Upon successful completion of data uploading, the data registers reflecting number and value of transactions since last data upload will be zeroed.

If the APOS Terminal cannot communicate with the FARE SYSTEM Backend, the APOS Terminal will make repeated attempts at communicating at a Palm Tran-configurable interval.

If an APOS Terminal reaches the permitted limit of the number or value of offline transactions without data uploading, the APOS Terminal will discontinue all sales and replenishment transactions until all transaction data is successfully transmitted to the FARE SYSTEM Backend.

20.2.4 Fare Table Updates

The APOS Terminal will maintain a table of fares which will include the list of all fare products to be sold or replenished, their prices, characteristic parameters (such as the validity periods for unlimited ride passes) and other dynamic information such as the text to display on the operating and patron displays and receipts.

Each time the APOS Terminal communicates with the FARE SYSTEM Backend, the FARE SYSTEM Backend will transmit any updates to the fare table; the APOS Terminal will store any such updates as necessary. With each update of the fare table, the APOS Terminal will confirm that the list has been properly updated.

The APOS Terminal will retain in non-volatile memory the current and at least two future fare tables. Each future fare table will include all entries to reflect the intended fare structure and the date and time at which the new fare structure is to take effect.

Any new fare table will be activated automatically in the APOS Terminal at the specified date/time as programmed by Palm Tran.

20.2.5 Software Updates

When required, modification of the APOS Terminal's software will be performed by downloading new software from the FARE SYSTEM Backend. The FARE SYSTEM Backend will record and track the version number of all such software in each APOS Terminal, and the date that the software versions were downloaded and installed.

APOS Terminals will accept and apply software updates from the FARE SYSTEM Backend for the APOS Terminal's software.

Each time the APOS Terminal communicates with the FARE SYSTEM Backend, the FARE SYSTEM Backend will transmit any software updates to the APOS Terminal's software. The APOS Terminal will not commence installing software updates until it has received and verified the complete software update.

The FARE SYSTEM Backend will centrally manage the deployment of software updates to the APOS Terminal's operating system software.

Upon receipt and verification of the software update, the FARE SYSTEM Backend will apply the software update (rebooting if necessary) at a time configurable by Palm Tran for each APOS Terminal.

20.2.6 Configuration Control

Operating parameters, including EMV configuration parameters, will be downloadable to the APOS Terminal from the FARE SYSTEM Backend via the Palm Tran network and cellular data networks, as appropriate for each installation or APOS Terminal configuration.

The APOS Terminal will support configurability through numerous adjustable parameters. The APOS Terminal's application software will at minimum support configurability for:

- Fare Products available for sale and upgrade
- Pricing
- Payment method selection
- Receipt content
- All text and touchscreen region labels
- Value of deposit to be collected for new or replaced Media
- Authorized users and passwords (if stored locally at the APOS Terminal)
- All other relevant fare table entries

20.2.7 Smart Media Inventory Control

Upon issuance and/or initialization of a smart card, the APOS Terminal will record an issue record, including the date, time, fare category, card identification number and other pertinent information of the smart card and any associated FARE SYSTEM Account. The APOS Terminal will transmit this record to the FARE SYSTEM Backend.

The CONTRACTOR's Inventory Management System will track the smart cards distributed to each Palm Tran sales location. Using the list of cards issued to each sales location and the issuance and/or initialization records previously transmitted to the FARE SYSTEM Backend, it will be possible for authorized APOS Terminal users to query the FARE SYSTEM Backend for the identification numbers and total quantity of Smart Media that remain in the sale location's inventory.

20.3 Communications

The APOS Terminal will communicate with the FARE SYSTEM Backend via secure Internet connection to send and receive Transaction Data, send event and status information, and receive clock synchronization information, positive/negative lists, and configuration parameters. This will be possible both automatically at a scheduled time and manually, upon selection by authorized users.

All communications between the FARE SYSTEM Backend and the APOS Terminals will be via a direct Ethernet cable connection or cellular broadband data modem.

For transactions requiring FARE SYSTEM Backend access to a transit account, or to establish a customer account, the APOS Terminal will communicate with the FARE SYSTEM Backend in real-time.

Transactions requiring FARE SYSTEM Backend access to a Transit Account will be disabled if the APOS Terminal is unable to communicate with the FARE SYSTEM Backend.

For transactions that may occur offline, communications may be deferred, but will normally be accomplished automatically, at Palm Tran-specified times or time intervals.

APOS Terminal communication with the FARE SYSTEM Backend will be able to be initiated manually at the device at any time without affecting the automated procedures.

If the APOS Terminal has missed a scheduled communication with the FARE SYSTEM Backend, upon restoration of communications, the APOS Terminal will automatically initiate communications.

20.4 Operations

20.4.1 Login and Logout

The APOS Terminal will remain inactive and unable to perform any functions unless a proper login has been completed.

The APOS Terminal will enable login to be performed by manual entry or by tapping an employee ID on the contactless smart card reader and entering a PIN number.

The APOS Terminal will support at least three levels of logins with assigned functionality configurable by Palm Tran.

The APOS Terminal will require the operator to identify the initial funds bank (i.e., starting cash drawer balance) at the start of each shift.

The APOS Terminal will support relief shifts, with the replacement of the cash drawer. The APOS Terminal will also maintain statistics for the relief shift separately and will not affect the main shift information.

If the APOS Terminal has not been used in a number of minutes configurable by Palm Tran, the user will be automatically logged out. The APOS Terminal will close all files and display the login prompt screen.

Upon logging out or otherwise indicating an end-of-shift condition, the APOS Terminal will produce a report and receipt depicting the ending balance of the cash drawer.

The APOS Terminal will store a data record for each successful login, each unsuccessful login, and each logout.

The APOS Terminal will provide field audit reports and support reconciliation processes as defined by Palm Tran.

20.4.2 Sales

The APOS Terminal will function as an “intelligent cash register,” allowing patrons and clerks to interact in a manner that is as similar as possible to normal retail sales transactions. Sales transactions will include:

- Purchase of new media
- Adding of value and passes to existing media and transit accounts

When issuing a new EU Smart Card, the APOS Terminal will permit the clerk to select whether a Palm Tran-configurable card fee (i.e., deposit) is to be collected.

The APOS Terminal will support of selling LU media using one of two methods:

- Activation of pre-printed, pre-encoded individual media presented to the contactless smart card reader.
- Encoding individual LU media using the contactless reader.

At no time will the APOS Terminal add a fare product to a customer account if doing so would result in the customer account having more than one pending fare product valid on the same service.

All unlimited ride rolling fare product will be added to the customer account in the pending state (without an expiration date set for the fare product).

The purchase of multiple fare products for a single customer account will be able to be performed in a single transaction, and with payment collected once.

When configured to conduct sales, the APOS Terminal will support a variety of payment methods. These will include:

- Cash
- Bank cards (credit and debit)
- Mobile wallets (Apple Pay or Google Pay)
- Personal and / or Company checks
- ~~Palm Tran Vouchers~~
- Purchase Orders
- Any combination of the above

The APOS Terminal will provide means by which patrons may exchange unused legacy Palm Tran fare products as a means of payment for account-based fare products. The APOS Terminal will track the value of exchanged legacy media used as payment.

The APOS Terminal will support payments using including multiple bank cards, to be used for payment in a single transaction.

For each sales transaction, the APOS Terminal will enable the clerk to select the payment method. If the clerk selects more than one payment method, the APOS Terminal will prompt the clerk to enter the amount to be paid using each payment method.

Cash transactions will provide the total amount due, allow the clerk to enter amount tendered, and display the change due.

The APOS Terminal will control and monitor the cash drawer and open the cash drawer upon calculation and display of the amount of change due.

All credit and debit card transactions will be authorized via the APOS Terminal and its connection to the FARE SYSTEM payment gateway.

The APOS Terminal will provide the option to print a patron receipt for every completed sales transaction. Receipts will include the content specified during design review and the resulting status and value of the transit account, where applicable.

For each completed transaction, a data record will be stored and transmitted to the FARE SYSTEM Backend.

The APOS Terminal will enable a clerk to display (and print via the receipt printer) totals of all completed transactions by that clerk for the current day.

The APOS Terminal will enable an administrative user to display (and print via the receipt printer) totals of all conducted transactions for the current and each of the prior 7 days. These totals will be displayed on the operator's display and will indicate daily totals by clerk and payment type. As necessary, the APOS Terminal may retrieve Data from the FARE SYSTEM Backend. Alternatively, prior days' sales reports may be provided by network access to the FARE SYSTEM Backend or from the APOS Terminal's browser interface.

20.4.3 Issuance of Personalized Media

When configured to do so, the APOS Terminal will include the necessary software and peripherals to enable Palm Tran to issue personalized cards to customers eligible for reduced fares, Palm Tran Connections customers, Palm Tran employees, and in support of other Special Programs.

Personalized cards will include the cardholder's name and photograph printed on one side of the card, accompanied by other Palm Tran-defined graphics and information.

The CONTRACTOR shall supply printing templates (also known as "masks") using Palm Tran-supplied graphic designs for all personalized card types. The APOS Terminal will support no less than 70 pre-loaded templates from which the user will select prior to printing. Where possible, template selection will be automatic based on card type.

When printing a personalized card, the APOS Terminal will scale the photo image to fit within the area defined by the printing template without distorting the image or changing its native aspect ratio.

Palm Tran will supply the graphics for printing templates within 90 days following NTP. The CONTRACTOR shall supply printing masks no later than 30 days before the commencement of APOS Terminal Factory Acceptance Testing.

The APOS Terminal will support issuance of personalized cards in individual and bulk production modes.

For individual card personalization, a digital camera controlled by the APOS Terminal will capture the customer images as necessary.

Upon successful production of the personalized smart card, the APOS Terminal will store a transaction record, including all personalization Data, the identification number of the issued card, the digital photograph image and all other Transaction Data. The APOS Terminal will transfer the entire transaction record, and all accompanying data, to the FARE SYSTEM Backend.

The FARE SYSTEM Back Office APOS Terminal will exclusively support production runs (using data imported from an external source) for bulk card personalization in quantities of 1 to at least 100 cards per batch.

For bulk card personalization production runs, the APOS Terminal will use data files imported from an external source in a Palm Tran-specified format. The data files will include the customer name, digital photograph, and other data as required.

The FARE SYSTEM Back Office APOS Terminal will support selection of custom printing templates for bulk personalization production, which may be used to support corporate partner, university, and other Palm Tran Sponsor programs.

Upon successful production of each card, the FARE SYSTEM Back Office APOS Terminal will store a transaction record similar to those created for individually personalized cards and transmit all records to the FARE SYSTEM Backend.

Palm Tran may issue to customers who have qualified to receive TD smart cards with personalized information printed on one side of the card, including a digital photograph and the name of the cardholder. Using the appropriate customized printing template for reduced fare Media, the APOS Terminal will print and issue personalized cards.

The APOS Terminal will support the capture of all data needed to validate, register and issue personalized media for reduced fare and paratransit customers.

The APOS Terminal will support manual entry of reduced fare and paratransit customer account registration data using a simple graphical UI. The interface will be reviewed and approved by Palm Tran during design review.

The APOS Terminal will capture physical reduced fare and paratransit customer applications and submitted supporting documentation using the CONTRACTOR -provided document scanner.

The APOS Terminal will capture reduced fare and paratransit customer photographs using the CONTRACTOR -provided camera.

All customer data captured and used by the APOS Terminal will be securely stored within the CONTRACTOR -provided CAM System and will not be stored locally on the APOS Terminal.

Using a printing template customized for Palm Tran employee ID cards, the APOS Terminal will print and issue personalized Palm Tran employee cards on relevant media.

20.4.4Media Inquiry

Whenever a FARE SYSTEM Smart Card (LU or EU) is presented to the APOS Terminal contactless smart card reader, the APOS Terminal will read the card and display the current status and value of the LU card or the transit account linked to the EU smart card on the operator display and customer display.

If the customer's smart card is not functioning, the APOS Terminal will permit the clerk to manually enter the card identification number.

Upon request, the APOS Terminal will query the FARE SYSTEM Backend for details of the most recent transactions posted to the media or transit account. Upon receipt of the transaction history, the APOS Terminal will display the results of the transit account history query on the operator display, along with the current status and value of the media or transit account.

The APOS Terminal will be able to display at minimum 25 recent transactions, with the maximum number displayed configurable by Palm Tran.

For each prior transaction displayed, history details will include, at minimum:

- Date and time of transaction
- Transaction type (e.g., pass activation, pass usage, value usage, transfer, replenishment/purchase)
- Transaction value
- Usage location (e.g., station name, bus route)
- Replenishment location (e.g., retailer location, autoload)

Upon request using the operator touchscreen, the APOS Terminal will print a receipt of the current status and value of the ticket or associated Transit Account.

20.4.5 Customer Account Management

The APOS Terminal will enable operators to setup and modify customer accounts.

The APOS Terminal will enable the operator to create a new customer account by registering an anonymous transit account.

The APOS Terminal will enable the operator to modify any fields in the existing customer accounts that are deemed user-alterable.

The APOS Terminal will enable operators to establish, modify, and cancel patron subscriptions for autoload.

To prevent manual data entry error where possible, the identification number of the customer's smart card will be captured by the contactless smart card reader, and the bank card processor module will read any bank card data required for autoload subscription.

Reduced fare privileges are subject to expiration. The APOS Terminal will include a function to re-authorize reduced fare privileges and update the FARE SYSTEM Account information with a new reduced fare privilege expiration date.

20.4.6 Media Replacement

The APOS Terminal will support replacing registered EU Smart Cards by disassociating the lost or stolen smart card from the FARE SYSTEM Account and linking a new smart card in its place.

Prior to replacing a registered EU smart card, the APOS Terminal will require verification of the customer's identity through the entry of the customer account identifier, password and/or answers to secret questions, as recorded by the FARE SYSTEM Backend.

If the replacement smart card requires no personalization, the APOS Terminal will prompt the operator to present the new smart card to the contactless smart card reader.

When replacing a previously issued personalized smart card, the APOS Terminal will support use of the digital photograph, printing template, and other Data from the original issue record to facilitate replacement without requiring the cardholder's presence, or the use of the digital camera to create and store a new digital image.

Upon reading or issuing the replacement smart card, the APOS Terminal will transmit to the FARE SYSTEM Backend an issue record containing the card's identification number, and a corresponding record to block use of the replaced smart card.

Replacing a malfunctioning smart card will be possible if the patron presents the malfunctioning smart card. Procedures to replace a defective smart card will be similar to those used to replace a lost registered smart card, but replacement of a defective smart card will not require the smart card to be registered.

The replacement process will support entry of the defective smart card's identification number as the means to initiate replacement.

20.4.7 Refunds and Reversals

For refund or error correction purposes, the APOS Terminal will provide operators the ability to reverse the last replenishment transaction performed to a transit account if:

- The same APOS Terminal conducted the replenishment transaction
- The transaction occurred within a Palm Tran-configurable period (initially set to 5 minutes)
- The transit account has no usage transactions since the replenishment

Reversal transactions will require the deletion of the relevant Fare Product or deduction of the value added from the transit account during the replenishment transaction.

Refunds should be made to the same method of the original payment.

The APOS Terminal will fully record and transmit to the FARE SYSTEM Backend all reversal transactions.

21 Farebox Revenue Collection System (FRCS)

The following section describes Palm Tran's functional requirements for a FRCS and its processing capabilities. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

The principal components to be furnished with the proposed system include:

- Revenue Collection Vaults (RCV) – Through-wall configuration
- Mobile Safes
- Cashbox Receivers
- Audit Unit
- Associated hardware, cables, and appliances

It is incumbent upon the CONTRACTOR to familiarize themselves with the requirements, objectives, and environment of Palm Tran's Revenue Collection. It is also the responsibility of the CONTRACTOR to identify all equipment, hardware, cables, and appliances required in the performance of Palm Tran's Revenue Collection.

NOTE: The CONTRACTOR shall be required to fit their proposed RCV in Palm Tran's current garage facility, without requiring modifications to the garage's structure. Proposers shall include the dimensions of their proposed RCV within their proposal.

21.1 General Function

The general function of the FRCS is to provide the equipment, processes, and procedures to ensure the secure, efficient, cost-effective transfer of revenue from the vehicle Farebox to bank deposit.

Security of revenue is a primary consideration. The design, manufacture, and operation of the FRCS shall minimize the risk and exposure to revenue loss. While physical protection against loss is required, it is also recognized that a secure and accurate revenue audit process is an equally effective deterrent and protection. A FRCS that employs effective techniques to monitor, track, and audit the movement of revenue will be favorably received.

21.2 Operating Environment

Revenue Collection equipment may be installed in areas, which provide minimal or no protection from outdoor conditions of temperature, humidity, moisture, wind, dust, and sunlight. Under no circumstance shall the presence of any of these or other weather condition compromise the security of the revenue collection process.

The FRCS equipment shall function as specified without degradation of performance under the environmental conditions specified in Section 2.7 Environmental Factors.

21.3 Keys and Locks

Within the Cashbox Receiver, receiver vault and Mobile Safe, locks shall be provided to secure and restrict access to revenue areas.

Appropriate maintenance access apertures shall also be provided to aid in the maintenance of the FRCS. Each aperture provided shall be keyed alike. All locks and keys for the FRCS shall be secured with a high security locking system as outlined in Section 21.3.

Each separate key and lock employed in the FRCS shall be different, except for the maintenance apertures. The keys and locks employed in the FRCS shall be different from those employed elsewhere in the FARE SYSTEM.

21.4 Mechanical Design Requirement

This section describes the mechanical design requirements for the FRCS. Revenue collection FARE SYSTEM Components are detailed individually. All components shall be designed and manufactured to the highest standards necessary to ensure security and operating reliability of the FARE SYSTEM.

21.4.1 Revenue Collection Receiver

Construction of the Revenue Collection Receiver (RCR) shall be robust and shall be capable of withstanding a force of 500 pounds for 1 minute without permanent distortion, breakage or creation of openings. Application of force may be on any point of the receiver except Keys, lamps and cable connections.

The RCR structure shall be free standing. Hardware shall also be supplied as part of the receiver that will allow application of a hasp lock. Alternatively, a separate key operated lock shall be provided on the receiver door to permit the door to be locked closed. Under a door-locked condition and with no cashbox in the receiver the receiver will be inoperative.

All elements of the receiver shall be self-contained and integral to the receiver. The use of loose keys shall not be permitted. All engagements and/or alignments shall be positive and automatic. The design and construction of the RCR shall be such that any wear and tolerance buildup due to rough use that may cause a misalignment of the interfaces between the cashbox and receiver can be accommodated by compensating adjustments to the RCR.

The thickness of the metal used in the receiver, its enclosure, and the vault structure shall be such as to serve for the intended usage and security of collected revenues. The equipment shall be constructed of non-corroding materials, plated materials or shall be cleaned, prepared, and painted with weather

resistant enamel. The front surface, door and entire cavity of the receiver shall be made of stainless steel for corrosion protection and wear.

The RCR shall have fixed components configured with two separate interior compartments, one for coins and one for bills. During the Revenue Vaulting Process (RVP), the coins from the cashbox shall go into the vault coin compartment while the bills will remain separated and go into the bill compartment.

The RCR shall function so that when the access door is open, the receiver mechanism shall be inoperative. When the access door is closed, the receiver motor will activate. This action will lock the receiver access door and open the cashbox. Continued rotation shall permit the cashbox to be completely opened. A FARE SYSTEM Backend configurable time delay shall be instituted to afford sufficient time for a complete gravity discharge of the cashbox contents. When the cashbox is completely closed, interlocks shall unlock the access door, permitting the cashbox to be removed.

The complete cashbox RVP shall take no longer than ten (10) seconds in addition to the above time delay period of the discharge timer as configured by Palm Tran. The period shall start when the access door is locked and shall complete when the access door is released.

Appropriate indicators shall be provided, at a location adjacent to the receiver door, to signify a "ready" condition and a "process" condition. In the "ready" condition the door may be opened, and a cashbox may be inserted or withdrawn. In the "process" condition, the door is locked, and the revenue transfer operations are taking place.

A FARE SYSTEM Backend Reportable electronic counter shall be provided. This counter cannot be reset, except through an authorized command issued from the FARE SYSTEM Backend. If this command is issued, an event record is created at the FARE SYSTEM Backend.

21.4.2 Revenue Collection Vault

Palm Tran has three locations where it collects the revenue from the Fareboxes. These locations will require the CONTRACTOR to replace the current receive vault with their proposed revenue collection vault (RCV). The RCV shall be constructed of heavy steel plate, one-eighth inch (1/8") minimum, welded and ground to allow no entry to the vault other than through authorized apertures. The lowest point of the receiver cashbox aperture shall be no less than thirty-eight inches (38") from the lowest point of the collection vault for ease of cashbox entry.

The overall envelope of the RCV shall not exceed thirty-nine inches (39") wide by forty-five inches (45") deep by sixty-eight inches (68") high.

The RCV shall be fitted with mechanical interlocks and/or electronic sensors to sense the presence of a properly seated and open Mobile Safe. These interlocks shall be connected to the receiver above so that if the interlocks are not correctly aligned, the receiver shall not be able to accept and process a cashbox. The interior cavity for the RCV shall have durable guide rails or plates to guide and position the Mobile Safe for insertion or removal.

The RCV shall have provisions internal to the structure for permanently mounting the vault to a concrete pad or floor by a minimum of four anchor bolts for each vault.

Construction of the RCV shall be such to resist physical attempt to compromise security for at least ten (10) minutes by items such as but not limited to the following:

- A hammer of less than 3 pounds in head weight
- A chisel

- An adjustable wrench
- Pry bars
- Punches
- Screwdrivers

The RCV shall be reinforced in the lower section so that it may be lifted by means of a forklift truck without deforming the structure.

The RCV structure shall contain the receiver and space for one Mobile Safe. The RCV shall be installed in the "through-wall" configuration, permitting access to the RCR through the wall and access to the Mobile Safe from the opposite side in the revenue vaulting room. The RCV shall be permanently installed at the specified locations and serve as a secure weather resistant housing for the RCR and Mobile Safe.

The following operational interlocks and security requirements shall be met so that revenue transfer can begin only when all of the following requirements are present:

- The Mobile Safe is in position
- The Mobile Safe properly locked within the vault enclosure
- The Mobile Safe cash inlet doors are fully open
- The Cashbox has been properly inserted into the receiver
- The Receiver security door is closed and locked

Once the revenue transfer has started, a full transfer cycle must be completed before the cashbox can be removed. The Cashbox Receiver security door interlock will not lock the door closed nor will the transfer crank operate without a properly inserted cashbox.

When a Mobile Safe is placed in the RCV, the Mobile Safe enclosure doors will not close and lock until the Mobile Safe is properly positioned in the RCV and interlocks being properly aligned. All openings to the contents of the Mobile Safe shall be sealed when the cashbox security door is unlocked. The Mobile Safe shall be removable from its enclosure only after all vault openings are securely closed. The RCV enclosure doors may be closed without the presence of a Mobile Safe; however, the interlock system shall prevent revenue transfer from the receiver.

The FRCS shall retain its security should a jam occur until accessed by authorized personnel. The security procedures and features for overriding the interlock(s) under such conditions shall be detailed as part of the PDR (PDR - 2) and shall be subject to Palm Tran's acceptance.

21.4.3 Mobile Safe

The Mobile Safe shall be constructed of heavy-duty steel so assembled as not to allow access to the contents of the Mobile Safe other than through authorized protected apertures. Appropriate maintenance apertures shall be provided. Each of these shall be secured with a high security locking system.

The Mobile Safe shall have two large revenue discharge doors, each secured by a high security lock. The bill compartment shall be separate from the coin compartment. Coins shall be discharged from the Mobile Safe by means of gravity utilizing sloped stainless-steel bottom surfaces to aid in the process. Revenue discharge doors and openings shall be securely designed to prevent exposure of revenue except when opened in an authorized manner.

The Mobile Safe shall have a reinforced lower section so that it may be lifted by means of a forklift without deformation of the structure. A channel guide structure for the forklift shall be designed to

support full load conditions with appropriate safety provisions. The Mobile Safe shall have provision for a tie-down adequate to secure a fully loaded Mobile Safe for transport in revenue service trucks.

The overall envelope of the Mobile Safe shall not exceed thirty-two inches (32") wide by forty-two inches (42") deep by thirty-nine inches (39") high.

All of the Mobile Safes provided under this contract shall be identical in manufacture and dimensions and shall be interchangeable between any of the RCV structures.

The Mobile Safe shall be equipped with four wheels, two fixed and two with 360-degree swivel capability to facilitate maneuvering. Handles shall be provided so as not to protrude beyond the envelope of the Mobile Safe. Four-inch (4") heavy duty casters shall be supplied such that the Mobile Safe shall be able to overcome a one-inch (1") floor transition and a two and one-half inch (2.5") floor gap. The material used in the casters shall be appropriate to support the weight of a fully loaded Mobile Safe.

The Mobile Safe shall have a heavy-duty "dead-man" braking system to engage brakes on the two fixed wheels so that a fully loaded Mobile Safe shall be held in a stationary position on a maximum six-degree (6°) incline.

The Mobile Safe shall be provided with a high security mechanism and locking system to assure that when removed from the RCV that all doors providing access to revenue are closed and locked. When a Mobile Safe is inserted into the vault, provision shall be made to secure it in place so that it can be removed only in an authorized manner. The key(s) used for this purpose shall be different from any other keys used in the revenue collection process and shall be of the "high security" design.

The Mobile Safe shall have two large revenue discharge doors, each secured by a high security lock. The bill compartment shall be separate from the coin compartment. Coins shall be discharged from the bin by means of gravity utilizing sloped stainless-steel bottom surfaces to aid in the process. A removable aluminum internal bin shall permit easy processing of bills in the counting room while the bin is on a counting table.

The Mobile Safe shall accept the separated coins and bills from the receiver and store them in the dual bin compartments. The Mobile Safe shall be removable from the vault structure only in a closed and locked condition. It shall be transported to the counting room or bank where its contents shall be removed by means of security access doors.

The capacity of the bill compartment shall be adequate to hold a total of approximately 10,000 banknotes in "street" condition. The coin compartment capacity shall be not less than \$10,000 using a coin distribution of 100 gold or Susan B. Anthony dollar coins, 31,000 quarters, 17,000 dimes, 8,000 nickels, and 5,000 pennies.

21.4.4 Audit Unit

The Audit Unit shall be used for the removal of a single cashbox's contents in a secure Location, such as a money room.

The Audit Unit shall be made of steel, with an upper and lower cavity and equipped with handles to permit mobility by a single person. It shall be finished with weather resistant enamel over suitably cleaned and primed surfaces. The surfaces on which the cashbox shall rub, or glide shall be made of stainless steel for long life and corrosion resistance.

Since this unit is designed for operation in a secure Location, locks shall not be required to secure the removed revenue. The design of the Audit Unit shall allow the unit to be secured to a fixed location with a hasp lock.

21.5 Electrical Design Requirement

The revenue collection and transfer process shall be electromechanical in operation. The CONTRACTOR shall provide electronic sensors or other electrical devices for the purpose of data transmission and status sensing. A contact closure, indicator, and key operated bypass shall be provided to detect an open access door.

The RCR shall be fitted with appropriate devices to read automatically and electronically the serial identification number of a cashbox that has been inserted in the receiver. Similarly, the RCV shall electronically read the serial identification number of an inserted Mobile Safe. Cashbox and Safe identification numbers shall be transmitted to the FARE SYSTEM Backend for the purpose of recording and tracking movement and position.

Alarm notifications shall be sent to the FARE SYSTEM and reported to the FARE SYSTEM Backend upon failure to read identification on an inserted cashbox or Mobile Safe.

21.6 Installation

The FRCS shall be installed and made fully operational by the CONTRACTOR.

21.6.1 Modification of Existing Facilities

This is a replacement of an existing similar FRCS, and it is Palm Tran's belief that sufficient facilities exist for the installation of new equipment. It is the responsibility of the CONTRACTOR to inspect and document any required changes for installation of the new equipment. These changes shall be provided as part of the CDR (CDR - 6).

The CONTRACTOR is responsible for installation of the RCVs and associated utilities. All apparatus and associated wiring for the supply of electrical power shall be provided by the CONTRACTOR.

At the garage, Palm Tran shall supply a 120 VAC, 60 Hz power source at the junction box/existing vault system power supply. Palm Tran supplied power shall be sufficient for the operation of the CONTRACTOR's vaulting system, which requires 120 VAC, 60 Hz power. A Palm Tran supplied power source of 120 VAC, 60 Hz will be available within 10 feet of the FARE SYSTEM Backend locations. A Palm Tran supplied network connection will be available within 10 feet of the FARE SYSTEM Backend locations.

The CONTRACTOR will be required to install no more than 200 feet of power cable conduit at the garage to bring power from Palm Tran power supply to the location of the vaulting system(s). The CONTRACTOR shall place the FARE SYSTEM Backend in the same location as the computer currently supporting the existing vaulting system. The CONTRACTOR will be required to install no more than 200 feet of communication cable conduit to connect the garage server to the vaulting system(s).

All work shall meet city, county and other applicable building codes in effect at NTP. The CONTRACTOR shall be responsible to file any necessary permits or other paperwork to allow the work to proceed on schedule.

Except as specifically provided herein, the CONTRACTOR shall be responsible for all demolition, construction, equipment, and costs required installing a functionally reliable and secure system. The CONTRACTOR shall be responsible to provide at no cost to Palm Tran all equipment and make all additional modifications required to meet the performance levels indicated by the Contract.

Installation shall employ ground fault detection and a means of emergency disconnect.

No work shall take place without the written approval/acceptance of Palm Tran.

All modifications to facilities required for installation of the FRCS shall be documented and submitted for acceptance as part of the CDR (CDR - 6). No modifications shall take place without Palm Tran's written approval/acceptance.

21.6.2 Removal and Storage of Old equipment

It will be the responsibility of the CONTRACTOR to remove and store Palm Tran's existing fare collection system and equipment now in use on all Palm Tran buses and facilities at no additional cost to Palm Tran. All costs with this task are to be included in the Proposal submitted. The final handling of the legacy system will be determined by Palm Tran at a future date. The facility used by the CONTRACTOR shall be the same as that used to store the new FARE SYSTEM components. The facility shall be situated near one of Palm Tran's garage facilities, environmentally controlled, protected against the outside elements, secure, allow only authorized access, and setup under a renewable annual lease.

21.7 Performance and Maintainability

In addition to the performance requirements defined in Section 9, the following additional performance, reliability and the maintainability requirement of the FRCS, including the Cashbox Receivers, the receiver vaults, Mobile Safes and ancillary equipment shall apply:

21.7.1 Performance

The performance of the FRCS shall be such that a full cashbox in the Cashbox Receiver shall require no more than ten (10) seconds to empty completely all revenue and fare media contents into the Mobile Safe. This performance requirement excludes any vibration or other methods that may be employed to aid in the dumping process, which shall be added to the period. The period shall be measured from the time the cashbox is positioned in the Cashbox Receiver to the time when it is removed from the Cashbox Receiver.

21.7.2 Maintainability

Maintainability of the FRCS shall be measured as the MTTR. The MTTR for all revenue collection equipment, including the Cashbox Receiver, receiver vault and Mobile Safe, shall not exceed one (1) hour. This time is measured from the time maintenance repairs begin to the time the failed unit is returned to full revenue service. Preventive maintenance activity is excluded.

21.8 FARE SYSTEM Monitoring

The FARE SYSTEM Backend shall support the monitoring of the entire AFCS operations. This shall include but not be limited to the recording of security alarms, the monitoring of cashbox ID data to track and record the movement of cashboxes, and the monitoring of Mobile Safe ID data to track and record the movement of Mobile Safes should such equipment be provided. In addition, the FARE SYSTEM Backend

shall support the operation of money counting systems and the collection of revenue audit data from such systems.

21.9 Operating Security

For the security of the RCP, access and initiation of the RCP shall be contingent upon entering the proper password and user ID combination from an authorized FARE SYSTEM Backend workstation. Invalid entries shall result in appropriate tone indication and an appropriate prompt.

At minimum, four levels of application access shall be provided. Access shall range from low-level routine operations such as viewing and printing certain basic reports to high-level access such as changing system parameters or fares. Access levels shall be provided as follows with the following general limitations:

Level 1:

- Access to view data, status examine alarm log. This is the lowest and most limited access.

Level 2:

- All of Level 1 plus reset vaulting hours, close alarms, initiate maintenance calls, place report requests, and view Fare Tables.

Level 3:

- All of Levels 1 and 2 plus ability to download data, locally update Fare Tables, download data to the backup memory stick, extract memory stick data for transmission to the FARE SYSTEM Backend, modify system parameters, and copy files for independent analysis.

Level 4:

- All of Levels 1 through 3 plus functions of a System Administrator with the ability to add and delete users, reset or override passwords, and define access levels.

The FARE SYSTEM Backend and memory stick shall only respond to authorized password/user ID combinations. The authorized code numbers and times for transmission shall be input through the keyboard through special security access based on System Administrator's assignment.

The security method and number of characters employed to ensure that transmission of data occurs only upon a bona fide request shall be submitted as a part of the CDR (CDR - 11).

21.10 Operating Functions

After initiating the RCP, the FARE SYSTEM Backend workstation shall offer a menu of functions, which shall vary depending on the user category. The choices available to each user category shall be configurable by Palm Tran via the FARE SYSTEM Backend. For the FRCS operator, at Palm Tran's option, the menu shall include at least the following choices:

- Log-on
- Log-off
- Vaulting
- Vaulting Location Status

Depending on the user category, the FARE SYSTEM Backend workstation also provides access to all the functions of the FARE SYSTEM Backend described in the Contract, including:

- System configuration
- Alarm management

- User management
- Device management
- Reporting
- Tariff Management

21.11 Wireless Local Area Network System

The CONTRACTOR will use Palm Tran's WLAN for communication and exchange of data and information between the Fareboxes and the FARE SYSTEM Backend. Palm Tran's WLAN may be used for the transmission of other Palm Tran data. Palm Tran's WLAN will support the functions of the Farebox system at the speeds and reliability required by the Contract. Palm Tran's WLAN shall support data exchange of transactional ride/revenue data, Fare Table, smartcard updates, etc., initiated by the following events:

- Farebox log-on
- Farebox log-off
- Authorized connection to Palm Tran's WLAN Access Points
- During RVP

Data exchanges and communication over Palm Tran's WLAN shall be done in a secure manner employing encryption to protect sensitive data, as well as, following security protocols ensuring that only authorized personnel can initiate events that interact with the Farebox and other FARE SYSTEM Backend devices.

The FARE SYSTEM Backend shall be designed to exchange transactional Farebox data with the FARE SYSTEM Backend. Smartcard updates and changes (such as Bad Card list, autoload list, configuration, Fare Tables, etc.) will be received from the FARE SYSTEM Backend and forwarded to the FARE SYSTEM Backend on a real-time basis. Updated data shall be published to the FARE SYSTEM Backend so that Fareboxes are provided with the most recent information through Palm Tran's WLAN at the first opportunity.

The FARE SYSTEM Backend must provide a means of reporting that all buses are polled and updated to achieve updates when operators log-on and log-off from the Farebox, as well as during the RVP, while minimizing WLAN overhead. Means shall be provided to manage WLAN overhead, which shall include, but not be limited to the following:

- Management of IP addresses, including means of assuring that all IP addresses in all Farebox WLAN cards are unique.
- Assignment of IP addresses to specific equipment, assignment of specific buses to specific garages, etc.
- Ability to "reset" Palm Tran's WLAN card in the Farebox based on certain events to assure the card has not locked up or powered down when it should be transmitting data. Events may include data communications at the service lane, bus being started, Farebox being brought out of power-down mode, etc.
- Configurable from the FARE SYSTEM Backend, ability to limit Farebox WLAN card operation to specific time windows, to periods only when the bus has been vaulted, etc.
- Means to prevent buses from being polled repeatedly as they move around the garage, for example have Palm Tran's WLAN card initiate sessions no more often than a FARE SYSTEM Backend configurable time variable such as one hour,
- Means to manage buses starting a session as they pass on the street.

FARE SYSTEM Backend must not be subject to interruption, Malfunction, failure or data corruption due to use of other electrical or electronic devices including, but not limited to microwave ovens, computers, radios, RF LANs in close proximity, etc.

At Farebox log-on and log-off, the Farebox shall be interrogated by Palm Tran's WLAN. Upon successful interrogation, the FARE SYSTEM Backend will execute action to exchange Farebox data. This exchange of data shall not authorize opening of the cashbox access door.

Vehicles leaving the garage shall have, at minimum, updated Autoload and Bad Card lists downloaded to them following operator log-on. The FARE SYSTEM Backend shall assure that updated lists are pushed to Fareboxes any time connected to the Palm Tran's WLAN, including at Palm Tran Central Station. The Farebox will display messages on the DCU alerting the Driver that the necessary information has been received.

21.12 Software

All software programs, including CONTRACTOR developed and commercially available products, required to enable the data transfer functions to be performed shall be furnished and installed by the CONTRACTOR. The Operating System shall be the latest version of Microsoft Windows. Similarly, communications software for data transmit and receive functions shall be accomplished by a standard commercial software package modified by appropriate CONTRACTOR-furnished Utility Program(s) and macros to customize it for the operating requirements.

All data collected, processed, and transmitted by the FARE SYSTEM, including the FARE SYSTEM Backend, is owned by Palm Tran. If any encryption device or algorithmic masking formula is applied to achieve data security at the collection source, then a utility program must be provided which can be applied to the encrypted data to de-encrypt the data into a readable and portable (e.g., ASCII, or a database file/table) format. This will satisfy an audit requirement that data shall not be dependent upon a singular software retrieval system nor proprietary database structure. Any FARE SYSTEM Database Application Solution, residing with Palm Tran, must be Microsoft SQL; other solutions would need to be hosted. Data shall be held in a standard Microsoft SQL database satisfactory to Palm Tran and shall be accessible by standard commercial SQL query tools for which the vendor supplies Palm Tran with the schema. Any sensitive data that is encrypted at the Farebox level, shall be encrypted according to the standards established for those media and shall not be de-encrypted at any point.

The Operating System, Communication Program, Application Programs, commercial software packages and CONTRACTOR developed programs shall be fully installed on the delivered FARE SYSTEM devices, including the FARE SYSTEM Backend. All program disks, Compact Disks (CDs), or other memory devices shall be provided separately packaged, labeled and cataloged for physical safekeeping by Palm Tran with version number and other details appropriately documented. The software shall be provided with means to execute related tasks to be performed either on a command structure basis or on a menu driven basis. All programs shall be designed so that Palm Tran is able to make operating parameter changes, and fare changes without CONTRACTOR involvement.

21.13 Portable Data Unit

Portable Data Units (PDU) shall provide an alternative means to download and upload data to and from the Farebox in case of Palm Tran's WLAN failure. The PDU shall perform the function of gathering the data from each Farebox. The PDU shall be a commercially available USB memory stick. Sufficient disk storage shall be provided to store data from at least 100 Fareboxes with full data records.

22 Ticket Vending Machines (TVM)

The following section describes Palm Tran's functional requirements for a TVM with integrated Fare Media processing capabilities. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

All TVM parameters shall be fully configurable by Palm Tran from the FARE SYSTEM Backend. In general, the TVM shall perform the following functions:

- Comply with Palm Tran's Fare Policy and Palm Tran's Business Rules and Fare Policies.
- Display the ticket, fare type, and amount due based on patron selection via a touchscreen UI.
- Cardholders may load value or products at TVM, using cash, credit or debit cards.
- Passengers may use a TVM to determine current balance and status of products on electronic media.
- Provide audio and text instructions in American English, Creole, and Spanish.
- Account for sales, distribution and reload of all types of electronic media to patrons.
- Vend and encode electronic media.
- Load purse and all types of Products onto electronic media, both when issued and reloaded at the CID on front of TVM.
- Process cash and credit and debit cards for payment.
- Perform on-line credit and debit card payments.
- Accept cash (coins and bills) and make change, as defined herein.
- Print transaction receipts.
- Register, store, and transmit accounting and operational data to the FARE SYSTEM Backend.
- Print accountancy CSC media/reports.
- Contain a security and alarm system.

The TVM shall be able to process customer transactions, monitor the subsystems, maintain the transaction and event data, and communicate with the FARE SYSTEM Backend.

The process for loading electronic media shall follow an agreed procedure. The following describes a possible scenario:

- Patron touches the card to the CID.
- Using the touchscreen, the patron shall select the Product or amount of stored value the patron wants to load onto the CSC.
- The display shall then indicate the amount due.
- The patron can then pay using cash, credit or debit card.
- Once the TVM has received the amount due, the patron will be prompted to touch the same CSC to the CID to load the value and update the CSC.
- After the CSC has been successfully updated, the TVM shall provide audible confirmation and display a message informing the patron to remove the CSC.
- In event a transaction is performed but the patron does not touch the card to the CID the second time, or the second touch is "torn", the transaction will be added to the Autoload list, so the card is updated via Autoload the next time the patron's CSC is presented to a FARE SYSTEM Device.

The TVM shall collect, store, and transmit all data to the FARE SYSTEM Backend. All information and data, including, at a minimum, event and transaction data, shall be transferred to the FARE SYSTEM

Backend via the fare collection local area network and Data Transmission System. The TVM shall include a back-up storage function, having a non-volatile storage medium (i.e., Encrypted USB Drive or hard drive). Function shall allow extraction of data when TVM is in off-line operation via swapping of Encrypted USB Drive or connection of laptop computer to a communications port. Media shall have sufficient capacity to store, at a minimum:

- All TVM transaction and event data for a minimum of most recent 40 days, assuming a minimum of 2,500 transactions per day per TVM;
- Two sets of resident Fare Tables (one set used for current operations and three sets that shall be used for future activation or on as needed basis);
- Application files;
- Personnel identification and access files; and,
- Credit/debit support files.

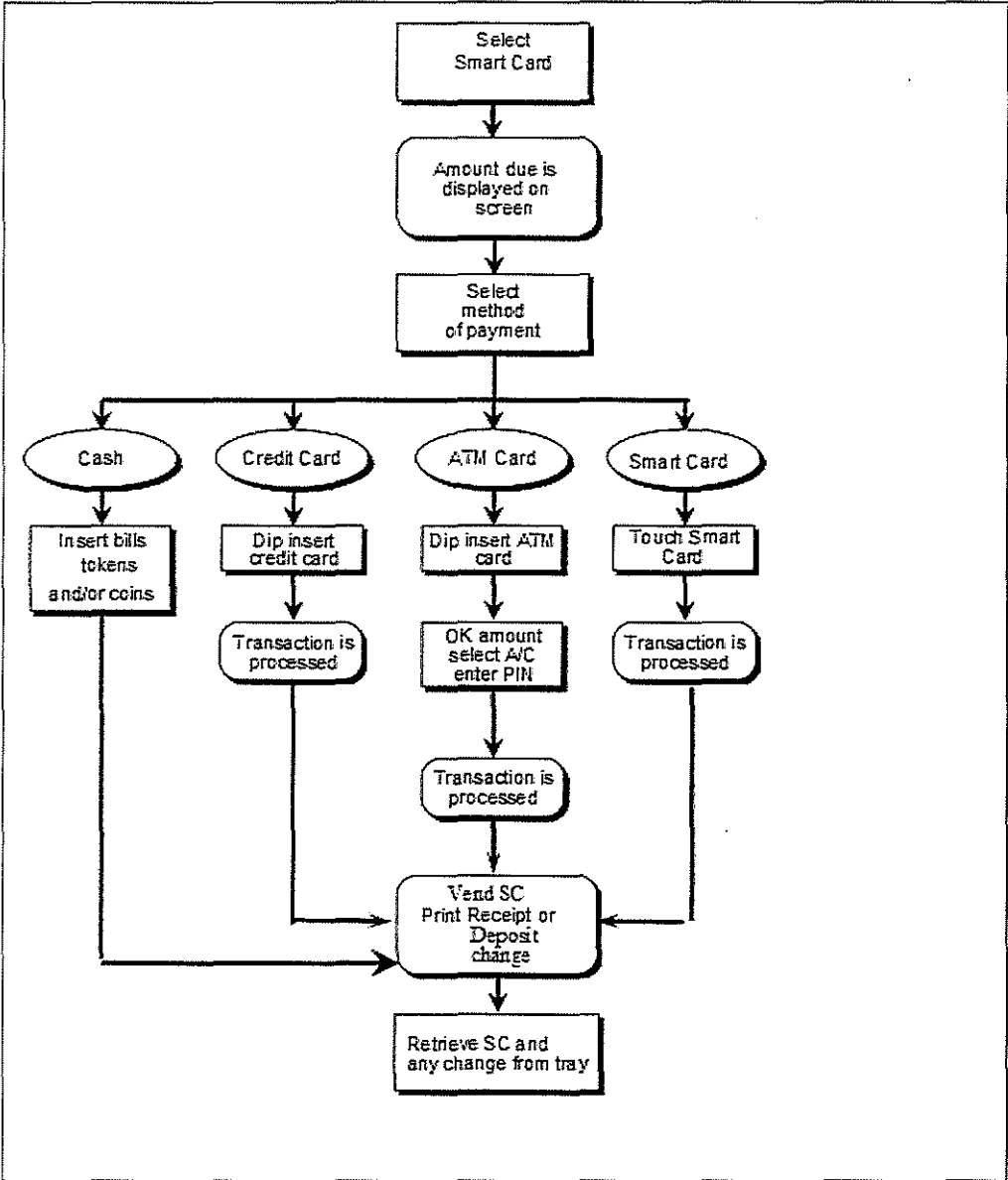
All CSC transactions interacting with the CID shall require less than five-hundred milliseconds (500ms) to fully complete. CONTRACTORS are required to demonstrate compliance during PDR (PDR - 10).

22.1 Vending CSCs

TVMs shall support the vending (dispensing) and encoding of CSCs in the form of Limited Use CSCs (LU) and Extended Use CSCs (EU). LUs will be dispensed from roll or fan-fold stock and EUs will be dispensed from stackers. CSCs are to be dispensed with Transit Purse (t-purse) value or Products loaded as selected by and vended to the customer. The TVMs shall have the capability to initialize and load purse value or product onto a CSC in conjunction with vending of the CSC.

The CONTRACTOR shall provide specifications for CSCs to be used as part of the CDR (CDR - 12).

The customer shall select the desired purchase on the touchscreen display. The TVM display shall indicate the amount due. The customer can pay using cash, credit card, debit card, or CSC stored value t-purse. Upon inserting the indicated amount, processing a bank card, or touching a CSC to deduct the required amount from the t-purse, the TVM shall dispense a LU or EU that has been initialized, fully functional and loaded with the appropriate product and/or t-purse value. If appropriate, change shall be returned and/or receipt printed.



22.2 Check Value, Add Value, or Add Product to CSC

Upon touching a CSC to a CID, the patron will be presented with the current value of the CSC and with the following menu (specific screen “flow” and messages are to be presented as part of the CDR (CDR - 13) and finalized during the PDR (PDR - 19)):

- Add Value
- Add Pass or Ticket Product

22.2.1 Add Value

Selecting “Add Value” will prompt the patron to enter in the amount they want to add via the touchscreen displayed key pad. The maximum amount allowed is a FARE SYSTEM Backend configurable parameter, adjustable by Palm Tran; the default value should be set at \$100.00.

When done, the patron should make their payment – select payment option if paying by credit/debit or just deposit cash.

Upon receipt of payment for the amount due, the TVM shall prompt the customer to touch the same CSC used to initiate the process to the CID. Upon doing so, the amount selected will be added to the t-purse. A confirming screen shall be presented to the customer that includes the original t-purse value, the value added, the new t-purse value, and the form of payment. A receipt will be printed.

The transaction may be cancelled at any time by selecting Cancel. Doing so will terminate all add value processing and cancel or return all funds. The transaction will also be cancelled after an inactivity period of 30-seconds. If a different CSC is presented to the CID, a message indicating this shall be displayed giving the patron the option to try again using the CSC that initiated the process or cancel the transaction. This is required to prevent inadvertent adding of value to a CSC that is not the card of the customer purchasing additional value.

In the event all add value actions have been successful except the second touch of the correct CSC, after the 30-second period of timeout, the transaction shall be terminated, and the funds banked. The TVM shall transmit a banked or “Walk-Away” transaction to the FARE SYSTEM Backend and the appropriate instruction will be added to the Autoload list to load the Value the next time the CSC is “seen” by the FARE SYSTEM.

In summary:

- Patron touches the card to the target.
- Using the touchscreen UI, the patron selects “Add Value” and enters the amount of stored value the patron wants to load onto the CSC.
- The patron pays using cash, credit or debit card.
- Once the TVM has received the amount due, the patron will be prompted to touch the same CSC to the target to load the value and update the CSC.
- After the CSC has been successfully updated, the TVM shall provide audible confirmation and display a message informing the patron to remove the CSC.
- In event a transaction is performed but the patron does not touch the card to the target the second time, or the second touch is “torn”, the transaction will be added to the Autoload list, so the card is updated via an Autoload the next time the patron’s CSC is presented to a FARE SYSTEM Device.

22.2.2 Add Product

Selecting “Add Product” will prompt the patron to select from a product menu, which product to add to the CSC at that specific TVM (as configured from the FARE SYSTEM Backend). The capability for Palm Tran to configure the TVM, via the FARE SYSTEM Backend, to add or modify available products shall be provided at no additional cost to Palm Tran. Upon selection, the amount due will be displayed to the patron.

The patron should make their payment – select payment option if paying by credit/debit, just deposit cash, or just tap their CSC (the CSC must be the same CSC used to initiate the process and have a t-purse with sufficient funds).

If the customer uses the CSC as the form of payment, the cost of the selected product will be deducted from the t-purse and the product will be loaded to the CSC – the CSC used MUST be the same CSC that initiated the process. If insufficient funds are available in the t-purse, the patron will receive a prompt indicating this and presented with the option to use another form of payment or cancel the transaction.

Upon receipt of payment for the amount due, the TVM shall prompt the customer to touch the same CSC used to initiate the process to the CID. Upon doing so, the selected product will be added to the card. A confirming screen shall be presented to the customer that includes the product added, value purchase price of the product added, the form(s) of payment, and the amount paid by each form of payment. A receipt will be printed.

The transaction may be cancelled at any time by selecting Cancel. Doing so will terminate all add product processing and cancel or return all funds deposited. The transaction will also be cancelled after an inactivity period of 30-seconds. If a different CSC is presented to the CID, a message indicating this shall be displayed giving the patron the option to try again using the CSC that initiated the process or cancel the transaction. This is required to prevent inadvertent adding of product to a CSC that is not the card of the customer purchasing the product.

In the event all add product actions have been successful except the second touch of the correct CSC, after the 30-second period of timeout, the transaction shall be terminated, and the funds banked. The TVM shall transmit a banked or “Walk-Away” transaction to the FARE SYSTEM Backend and the appropriate instruction will be added to the Autoload list to load the Product the next time the CSC is “seen” by the FARE SYSTEM.

In summary:

- Patron touches the card to the target.
- Using the touchscreen UI, the patron selects the Product the patron wants to load onto the CSC.
- The screen shall then indicate the amount due.
- The patron pays using cash, CSC, credit or debit card.
- Once the TVM has received the amount due, the patron will be prompted to touch the same CSC to the target to load the value and update the CSC.
- After the CSC has been successfully updated, the TVM shall provide audible confirmation and display a message informing the patron to remove the CSC.
- In event a transaction is performed but the patron does not touch the card to the target the second time, or the second touch is “torn”, the transaction will be added to the Autoload list, so the card is updated via an Autoload the next time the patron’s CSC is presented to a FARE SYSTEM Device.

22.3 Ticket Vending Machine Displays and Customer Interaction

TVM displays and customer interaction processes, including error responses, shall be configurable by Palm Tran from the FARE SYSTEM Backend. The CONTRACTOR shall deliver full, clear and complete descriptions of all TVM customer interactions associated with TVM processing functions. Where

displays, notations, processes, sequences, or functions are not configurable, the CONTRACTOR shall clearly call out to Palm Tran such limitations as part of the CDR (CDR - 14).

~~23 Smart Card Unit (SCU)~~

The following section describes Palm Tran's functional requirements for an SCU with integrated Fare Media processing capabilities. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

CONTRACTOR shall deliver a SCU to be installed as a "standalone" device with the ability to be connected with a DCU. The SCU shall allow passengers to validate their CSCs in a similar fashion as described for the Farebox. The SCU shall be installed for any of the following applications:

- On board vehicles like shuttles or Paratransit vans
- Mounted on a stanchion next to a Farebox
- Mounted on a stanchion to the left of the bus front door

The SCU shall provide the capability as a separate external unit, to read and encode contactless smartcards as appropriate to the processing requirements. The SCU is to be fully functionally integrated with the FARE SYSTEM, being capable of receiving and transmitting data to the FARE SYSTEM for the collection of ridership and revenue data, and other purposes as described below.

~~30.0 SCU Functionality~~

~~31.0.0 Operation~~

All SCUs will support Palm Tran's Business Rules and Fare Policies, including the following:

- Deduct fares from the t-purse or process other Products on the card, according to the Fare Table, cardholder profile, and Palm Tran's Business Rules and Fare Policies.
- Validate CSCs by reading the data, performing whatever logic is required to determine the amount to be deducted from t-purse or processing of Products, deducting the designated fare amount and re-encoding the new value and associated data to the card.
- Autoload t-purse amounts and Products on CSCs.
- Have the ability of accepting and revalidating electronic transfers on CSCs to "add time" to the transfer, in accord with Palm Tran's Business Rules and Fare Policies.
- Validation shall take no more than two-tenths (0.2) seconds for normal transactions (pass, transfer, stored value, etc.) and no more than three-tenths (0.3) seconds for other transactions where specifically allowed by Palm Tran.
- Validation shall be accompanied by a distinct audible tone suitably loud for the bus environment to indicate to the patron that the CSC has been validated as well as display a message to the patron.
- Comply with ADA requirements.
- Record all validations in transaction records, which include, at a minimum, the Date, Time, Media ID, SCU ID, Bus ID, Route/Run ID, Lat/Long Geo Information.
- Transmit all data transactions and event data to the FARE SYSTEM Backend in real time and/or batch, via WLAN.
- Detect basic internal Malfunctions.

- ~~Provide diagnostic and operational reporting data/information.~~

The SCU shall contain a real time clock that shall store the Date and Time at which each transaction or record was created and stored. This clock shall record Date, Hour and Minute. The SCU's clock will be synchronized by the FARE SYSTEM Backend' real time clock via Palm Tran's WLAN.

SCUs shall tag all transactions, at minimum, with the current Route, Run, Driver ID, Bus ID, Geographic ID, Date, and Time, derived from either Driver entry or J1708/1586 Vehicle Area Network.

A new record shall be created in the SCU whenever any of the following events takes place:

- ~~The Driver, Route or Run Number is altered, whether by the Driver, CSC input, information from the VAN or other Palm Tran-Accepted means;~~
- ~~Signal from the VAN indicating a new Route-Run record is to be created;~~
- ~~Midnight;~~
- ~~The SCU communicates with the FARE SYSTEM Backend via WLAN;~~
- ~~The SCU internal clock fails;~~
- ~~A record is about to overflow; or,~~
- ~~Changing from one fare preset to another;~~

The record shall be stamped with a special code indicating the type of event that took place and this shall be reported by the FARE SYSTEM Backend when the appropriate reports are accessed.

SCU shall be able to operate in a standalone configuration, with or without a connection to a DCU and without availability of Route, Run trip or zone information. In this case, the SCU will use follow Palm Tran's Business Rules and Fare Policies, that do not require DCU inputs.

The SCU shall collect and store data and transmit the data to the FARE SYSTEM Backend. All event and transaction data shall be transferred to the FARE SYSTEM Backend via Palm Tran's WLAN. The SCU shall have sufficient non-volatile memory to store, at a minimum:

- ~~At minimum, all transaction and event data for the most recent ten (10) days, assuming a minimum of 1,000 transactions per day per SCU.~~
- ~~Four (4) sets of resident Fare Tables (one (1) set used for current operations and three (3) sets that shall be used for future activation or on-as-needed basis).~~
- ~~Application files.~~
- ~~Personnel identification and access files.~~

61.0.0 Diagnostic and Operational Reporting

The SCU shall provide a means to troubleshoot individual circuit board level and other failures and malfunctions. Similar to the other FARE SYSTEM Equipment, the SCU electronic logic shall be designed to provide operational self-testing, diagnostic operations, reporting and indication. These elements are required for effective maintenance of the FARE SYSTEM Components, to provide audit trails to determine adequate levels of SCU operations.

Power and logic circuit boards shall be configured in such a manner as to be able to take electrical measurements while the circuit boards are in place and operational within the SCU or using extender boards or other means. The circuit boards shall have test points indicated to permit voltage measurements to be taken.

When any of the following conditions, at a minimum, occur, the SCU shall switch to an Out-of-Service state:

- Power failure
- Control circuitry failure
- Clock failure

~~68.0 SCU – Driver Control Unit~~

In order to allow the SCU to be monitored and controlled by the driver, it may be connected to the DCU. The SCU may be installed as a standalone unit or connected with a DCU, regardless if a Farebox is installed on the vehicle. For those installations, where the SCU is connected with the DCU, it is to provide the interface between the SCU and the vehicle operator. The DCU shall be provided with its own mounting system that shall allow mounting independent of the SCU.

The SCU may be controlled directly from the DCU or via a J1708/1587 connection.

~~71.0 Mechanical Details~~

The SCU shall be contained in a housing which dimensions do not exceed 7" h x 6" w x 6" d. The housing shall include all power supplies, CID, bright colored TFT touchscreen display, audio, logic and other electronics.

All interior components shall be readily accessible for repair and exchange by authorized means. Maintenance openings shall incorporate a gasket and be sealed properly to prevent entry of dust, moisture or other contaminants common to the bus environment. Access for maintenance purposes shall not be prevented when the SCU is mounted in the bus.

The SCU shall have a mounting system that allows for mounting on vehicle stanchions or other pole mounting scenarios. Installations on vehicles shall be near the doors of the vehicle in a location that is convenient for passengers to use as they board. Means of mounting shall be provided and suitable for mounting on any of the following:

- A vertical handrail/stanchion
- A horizontal handrail/stanchion
- The front dash

All mounting provisions shall provide the necessary stability, without secondary anchorages. Mounting provisions shall be suitably designed and reinforced to prevent deformation in service, oxidation, deterioration or accumulation of tolerance, which might allow the SCU to be subjected to increased vibration, wear, metal fatigue or other degradation.

The SCU shall have affixed to it, by means of high yield adhesive, a multi-color decal that indicates to patrons the function of the unit and instructive information as to its use.

Maintenance access door(s) shall be secured by means of a continuous hinge and High Security lock.

~~81.0 Electrical Details~~

A master "disconnect" switch shall be provided, internal to the SCU to disconnect from the incoming power supply. This switch shall be identified and marked and be of the two position type.



~~83.0~~ Installation

~~The CONTRACTOR shall be responsible for installation and testing of SCUs. Design of the installation on each class of vehicle shall be provided as part of the CDR (CDR 6). Installation must be performed in a manner satisfactory to Palm Tran.~~

~~A test plan specific for the SCUs shall be submitted by the CONTRACTOR for each location where SCUs are installed. Testing will comply with the Accepted test procedures.~~

~~8623~~ Fare Media

~~86.123.1~~ General Media Requirements

These requirements define the materials, manufacturing, handling, packaging, quality assurance, testing and delivery of EU and LU Media to be used throughout the FARE SYSTEM. All EU and LU media will include an ISO/IEC 14443 contactless interface. The CONTRACTOR shall produce and supply the Media to Palm Tran in accordance with these requirements. Final graphics artwork and printed text will be specified during design review.

For estimating purposes, the CONTRACTOR shall provide media pricing based on the quantities listed below.

Table 6 - Media Quantity

EU Media	50,000
LU Media	150,000

~~86.223.2~~ Production Requirements

The CONTRACTOR shall provide and ensure manufacture and delivery of all EU and LU media specified and as required for successful deployment and operational maintenance of the FARE SYSTEM.

During design review, the CONTRACTOR shall work with Palm Tran to determine the necessary quantities and varieties of all media to ensure successful deployment of all standard and Special Programs of the FARE SYSTEM. The CONTRACTOR shall supply the BIN numbers for these retail smart cards for tracking within the FARE SYSTEM.

The CONTRACTOR shall deliver all graphics and related materials in electronic and other relevant forms, used in the manufacture of the smart cards, for Palm Tran's review and approval.

The CONTRACTOR shall provide media produced in a manufacturing facility which provides information security management compliant with ISO 27001. The media will support the general security, software and performance requirements.

The CONTRACTOR shall accommodate on-site inspections of the media production facility by Palm Tran staff.

The CONTRACTOR shall provide the capability for media in form factors other than the standard forms required herein (such as mini-cards, key fobs, or stickers). Alternative forms of media are subject to the same performance, data, serialization, storage, usage, and delivery requirements described within this Section.

The CONTRACTOR shall provide Palm Tran with detailed specifications for all types of EU and LU Media and receipt stock including coefficients of friction and roll core requirements to allow purchase of equivalent media by Palm Tran from a third party.

~~86.3~~23.3 Encoding

The CONTRACTOR shall support and provide pre-encoded LU and EU media.

The CONTRACTOR shall deliver all pre-encoded media with sensitive data specific to the FARE SYSTEM, including the encryption keys.

Data encoded to the media will include a unique sequential serial number for the purposes of traceability.

If MIFARE smart card format is chosen, a minimum 7-byte UID will be used for each smart card produced.

~~86.4~~23.4 Encryption Keys

All provided media will support the most currently available robust cryptography, such as 3DES, Advanced Encryption Standard (AES) and RSA, and support offline cryptography as necessary.

Key management services will be provided by the CONTRACTOR. Key management in this context includes, but is not limited to:

- Key generation – Palm Tran may require derived key generation for each manufactured Smart Card. This may consist of a Smart Card manager key set, as well as multiple application related key sets. Key sets may consist of encryption and authentication keys.
- Key management – Palm Tran may require key management services for the storage and retention of Smart Card and application key sets.
- Key updates – The CONTRACTOR shall provide the ability to update, or roll, all cryptographic keys used within the FARE SYSTEM.

The CONTRACTOR shall use the highest available security in defining, generating, deploying, transmitting, storing, and retiring encryption keys employed in the FARE SYSTEM. The CONTRACTOR shall develop and submit procedures that follow all applicable standards, such as those outlined in ISO 27002, and NIST 800 55/57.

If the FARE SYSTEM design requires the smart card manufacturer to write the encryption keys onto the smart card media, the security plan will be approved by Palm Tran. Under that plan, the CONTRACTOR shall use only trusted smart card manufacturers with appropriate security mechanisms in place to ensure that Palm Tran's keys remain safe and secure. The CONTRACTOR shall develop a Palm Tran-approved certification plan for the smart card manufacturer.

Any and all encryption keys will become property of Palm Tran at the time of Revenue Service Acceptance, and all algorithms that generate encryption keys will be licensed to Palm Tran.



~~86.5~~23.5 Protection of Palm Tran Security Sensitive Information

The CONTRACTOR shall treat all security sensitive information with the utmost care and security. The CONTRACTOR shall not release, share or expose security sensitive information without the express written consent of Palm Tran.

Security sensitive information includes, but is not limited to:

- Card data encoding format and definitions
- Card encoded data and field values
- Palm Tran specific encryption keys

The CONTRACTOR shall be liable for all Palm Tran costs to replace all Palm Tran smart media in circulation and inventory if the CONTRACTOR, through negligence or deliberate action, causes unauthorized release of some or all of security sensitive information, and affected media may include third party-supplied media.

~~86.6~~23.6 Quality Control and Defects Allowed

The CONTRACTOR shall verify proper functioning of all media after manufacture prior to delivery to Palm Tran or the retail merchants.

Defective media identified at time of manufacture will be replaced prior to delivery, and all serial numbers will be retained as sequential so that, at the time of delivery, there will be no gaps in the sequential serial numbers.

Delivered media will function properly when first presented to Frontend FARE SYSTEM Equipment. Failure rates will not exceed the following values:

Media Type	Maximum First Tap Failure Rate	Maximum Premature Failure Rate
EU Media	0.05% 1.0%	LU Media 0.1% 2.0%

The CONTRACTOR shall replace all media that fail to function as defined above at no additional cost to Palm Tran. If the Failure rate exceeds the required rates, Palm Tran may reject the batch and the CONTRACTOR shall replace the entire batch at no additional cost to Palm Tran.

Failures of customer circulated media that occur upon first use (the “First Tap Failure Rate”), due to reasons other than abuse, will not exceed those specified in this Section.

Failures of customer circulated Media that occur prior to the expected useful life (the “Premature Failure Rate”), due to reasons other than abuse, will not exceed those specified in this Section.

~~86.7~~23.7 Serialization

The FARE SYSTEM will read and utilize the unique 7-byte UID that is pre-encoded on the embedded chip.

The FARE SYSTEM will also read and utilize a separate unique, sequential control number for the purposes of inventory control. This number will be assigned at the time of manufacture.

All media will have the 7-byte UID and the sequential inventory control indelibly and legibly printed on one side.

Any printed UID or serial numbers will be printed on the lower portion of the smart card and will not interfere with or otherwise obscure graphics or other branding placed on the smart card.

The CONTRACTOR shall propose a number sequence for inventory control during design review with proposal subject to Palm Tran's approval.

86.823.8 Packaging and Deliveries

Media will be packaged in a manner to prevent package pilferage, facilitate storage, and prevent damage to the media.

The delivery of Media will be made under controlled conditions, with bundles in boxes or packages made to Palm Tran standards. The packaging for each bundle will be sequentially numbered.

The package labeling will include the following, at a minimum:

- Date and location of manufacture
- Media type and product description
- Manufacturer part number
- Palm Tran part number
- Palm Tran batch number
- Palm Tran box number
- Palm Tran order number
- Quantity
- Sequence number (first and last)
- Range of media sequential numbers in the package

Other packaging information may be defined by Palm Tran prior to delivery. Printing on the package label will include all items above in a standard barcode format.

Palm Tran may, at its discretion, request delivery of the contracted quantity of media in discrete batches. For EU media, each batch will contain the requested number of smart cards or the entire contracted quantity of a given media type, whichever is less. For die cut LU media, each batch will contain the requested number of smart cards or the entire quantity of a given media type, whichever is less.

For roll stock media, each roll will contain at least 2,000 and up to 3,000 LU Media. As delivered to Palm Tran, each roll will be individually fitted with bands to prevent unwinding of the roll.

For each batch, the CONTRACTOR shall provide two (2) electronic files, in .csv and .xml formats, containing the UID and associated sequential serial number of all media for processing into FARE SYSTEM databases.

86.923.9 Production, Storage and Storage Security

The CONTRACTOR and its suppliers will maintain security during the manufacture, production and storage of the media, and maintain full compliance with ISO 27001 security measures.

The CONTRACTOR shall be responsible for all tracking of materials used in the production of the Media. the media will be manufactured in a secure area, accessible only to personnel involved in the manufacturing and handling of the media.

The CONTRACTOR shall maintain, and produce upon request by Palm Tran, a certified record of the media fashioned on a form registered by the production equipment at the end of each production run.

The CONTRACTOR shall ensure disposal of all scrap and rejected media so that they are rendered unusable.

The CONTRACTOR shall ensure the following storage environment environmental conditions:

- Temperature 32 °F to 140 °F (0 °C to 60 °C)
- Relative Humidity (RH) 30% to 65% (non-condensing)

The media will be suitable for storage for up to 3 years under the conditions listed above. Cartons will be of sufficient strength to permit stacking 5 packages high, without damage to the Media or the packages, for a storage period of 3 years.

The production, storage, or packaging of roll stock media shall not damage or adversely affect media towards the center of the roll. Issues regarding bend radius will be tested and resolved prior to delivery.

Palm Tran, at its discretion, may perform unannounced inspections at all facilities involved with the production and storage of the media.

~~86.10~~ 23.10 Palm Tran Acceptance Testing

All delivered media will be subject to Acceptance Testing by Palm Tran staff as designated by Palm Tran.

The FARE SYSTEM staff will sample delivered media and verify that the media meets the requirements defined herein and works within the FARE SYSTEM. If media are found defective during this testing or not in compliance with any part of these requirements, then Palm Tran may reject the entire batch and return it to the CONTRACTOR for replacement at no additional cost.

The CONTRACTOR shall provide a list of any required associated test equipment.

If the batch is rejected, the CONTRACTOR shall deliver replacement media in no more than 4 weeks from time of notification by Palm Tran.

The CONTRACTOR shall provide a media acceptance test plan during preliminary design review for Palm Tran's review and approval.

Replacement Media

The CONTRACTOR shall replace any first-tap defective media found in a batch as described in req. # at no additional cost to Palm Tran.

The replacement media will be included in the subsequent batch order and replacement media will not use the sequential serial number of the defective media, and sequential serial numbers of delivered media shall always be unique.

~~87~~ 24 Extended Use Contactless Media

~~87.1~~ 24.1 Physical Characteristics

EU media will support Palm Tran-issued media general requirements and EU smart card requirements.

The EU media will comply with ISO/IEC 14443 1 for physical characteristics and ISO/IEC 7810 ID1 size for dimensions.

The smart card body will comprise a composite PVC/PET material.

The media will have a read/write performance of not less than 200,000 read/write cycles.

The media will be constructed of appropriate durable materials for a minimum useful life of 10 years.

The media will comply with the most recent versions of ISO/IEC 10373 and ANSI INCITS 322 for durability.

~~87.224.2~~ Pre-printed Graphics

The EU media will be printed with colors and designs as specified during design review with a minimum of 8 colors, and support edge to edge printing.

All pre-printed graphics will be protected by a clear coat that covers the entire surface of the smart card.

Prior to commencing full production, and within 30 days of approved graphic designs, the CONTRACTOR shall supply at least 20 proof samples of each media type for Palm Tran's review and approval. Palm Tran will approve or reject the samples within 14 days of receipt of the samples. For each rejected sample, the CONTRACTOR shall provide 10 corrected proofs within 14 days of notification of rejection.

The CONTRACTOR shall supply designs for all pre-printed graphics in electronic format for review and approval by Palm Tran.

~~88.25~~ Limited Use Contactless Media

~~88.125.1~~ Physical Characteristics

LU media will support Palm Tran-issued media general requirements and LU smart card requirements.

The LU smart card body will comprise polyester paper laminate, plastic PVC, PET, or composite PVC/PET.

Except for thickness, the media dimensions will be compliant with ISO 7810 ID-1.

The media will comply with ISO/IEC 14443.

The physical media body will be coated with an appropriate durable material for a minimum useful life (in use, not storage) of 1 year.

The media will have a read/write performance of not less than 20,000 read/write cycles and have a minimum life expectancy of at least 180 days of normal daily use.

~~88.225.2~~ Pre-printed Graphics

The LU media shall include colors and designs as specified during design review with a minimum of 4 colors.

Within 30 days of approved graphic designs, the CONTRACTOR shall supply at least 40 proof samples of each media type for Palm Tran's review and approval prior to commencing full production. Palm Tran will approve or reject the samples within 14 days of receipt. For each rejected sample, the CONTRACTOR shall provide 20 corrected proofs within 14 days of notification of rejection.

The CONTRACTOR shall supply designs for all pre-printed graphics in electronic format for review and approval by Palm Tran staff. All proofs will become the property of Palm Tran.

~~89~~26 Closed-Loop Virtual Cards

CONTRACTOR shall offer a closed-loop virtual card that will integrate with the FARE SYSTEM backend.

Palm Tran will offer a payment credential which will be virtualized on the Near Field Communication (NFC) secure element of mobile devices.

The FARE SYSTEM will allow a customer to procure a mobile closed-loop credential without the need for a physical card. The FARE SYSTEM will also enable conversion of a physical credential if a card has already been procured by the customer.

The virtual credential will communicate with the validators via ISO/IEC 14443 and the backend to recognize, log, and report on usage. Additional data will be generated and transmitted to enable and support comprehensive reporting and analytics including mobile platform information and geocoding.

~~90~~27 Receipt Stock

Receipt stock for use in the APOS Terminal will be thermally sensitive plain paper roll stock that is a minimum of 2 inches wide. Each roll will have the capacity to provide no less than 2,000 receipts that are approximately 3 inches long.

Receipt stock shall not contain Bisphenol A (BPA), shall be weather resistant, and shall comply with all relevant regulations.

~~91~~28 Desktop Bulk Smartcard Encoder (BSE)

Palm Tran is interested in acquiring Desktop BSE equipment, to enable them to encode batches of cards for special programs, typically in quantities of 100 or more.

The BSE shall fit on a typical 60 in X 30 in desktop.

The BSE shall operate in a typical office environment.

The BSE shall include an automated feeder with a minimum capacity of 1,000 cards in the thickness range of 0.45 mm to 0.8 mm.

The BSE shall enable a user to automatically encode cards and add value and passes, without manual handling of cards by the user.

The BSE shall vend and encode ISO 14443 13.56 MHz Type A Contactless IC Cards.

The BSE encoding shall comply with the encoding format for Palm Tran Issued Card.

The BSE shall have the capability to add value or products.

The BSE shall interface with the FARE SYSTEM back office and backend to obtain information on rider classes and fare product as needed for encoding.

The BSE shall lock-out cards and maintain configuration during power interruptions.

The BSE shall have a UI to set encoding parameters at a minimum:

- User logon and password
- Quantity of cards to encode
- Rider class of cards to encode
- Value or product to encode
- Expiration date

The BSE shall provide a digital and paper audit of cards encoded specifying:

- Operator ID
- Date/time card was encoded
- Card serial number (UID)
- Card concession class
- Value or products encoded on card
- Expiration date
- Total number of cards encoded

The BSE shall generate transaction data for each batch and card encoded, as required for the relevant Palm Tran Issued Card transaction type.

The transaction data shall be automatically uploaded to the FARE SYSTEM back office and/or back end.

The transaction data shall reside in a local folder at the BSE until uploaded to the FARE SYSTEM back office and/or back end.

There shall be a process for identifying transaction file errors and corrective action.

The transaction data shall be stored locally at the BSE in a folder for a minimum of 60 days.

92.29 Smart Cards

In addition to the requirements for EU and LU media, the following section describes Palm Tran's functional requirements for the Smart Card Media to be deployed with this system. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

92.129.1 Smart Card Characteristics

ISO/IEC 14443 compliant CSCs shall be provided as part of the system. The CSCs shall store-be used as a credential to a riders account, which contains cardholder profile, stored trip data and other data as defined ~~herein~~ to meet the requirements of the FARE SYSTEM as described herein. Some or all CSCs shall have a photograph and signature of the rider. These images shall be imprinted to the card surface(s).

The CSC Card format is to be fully documented and it will be owned by Palm Tran to obtain compatible cards from alternative sources.

92.229.2 Physical Standards

CSCs shall conform to the following, as applicable:

- Basic physical standards as defined by ISO/IEC 7810, ID-1 form factor and ISO/IEC 7813.
- Specific physical standards for contactless integrated circuit proximity remote coupling cards specified in ISO/IEC 14443.

All CSCs for low value shall conform to ISO/IEC 14443 LU and may utilize paper or plasticized laminate stock. CSCs proposed for high value or EU, frequent use or multipurpose usage, shall be made of polyester. Both card types shall include an ISO/IEC 14443 contactless-only interface.

All issued LU-CSCs shall last at least thirty (30) days when used on a regular basis under normal circumstances for fare payment. All issued EU-CSCs shall last at least three (3) years when used on a regular basis under normal circumstances for fare payment. In the event the card graphics are developed to be a critical security feature, the graphics shall not deteriorate for at least three (3) years when used on a regular basis under normal circumstances for fare payment.

~~Currently, Palm Tran accepts the IDs of its participating Pass Program Employers and Schools for access to Palm Tran services. A majority of the participants' IDs use current contactless technology. The Proposed FARE SYSTEM shall recognize and accept these IDs. Proposers are encouraged to investigate the existing contactless technologies in use by the Palm Beach County Area Schools and Major Employers participating in Palm Tran's Employer/School Pass Program.~~

The CSCs for the Proposed FARE SYSTEM shall be compatible with the existing contactless technologies in use by program participants and the CSC shall meet the following minimal characteristics:

- EU-CSCs shall meet ISO/IEC 14443 standard, parts 1 through 4 – MIFARE DESFire EV1, 4K
 - EU-CSCs shall meet Common Criteria EAL4+
- LU-CSCs meet ISO/IEC 14443 standard, parts 1 through 3 – MIFARE Ultralight C
- CSC processors shall be able to process ISO/IEC 14443 Type A or Type B cards
- EU-CSCs shall possess sufficient memory to process all regional fare media types as explained herein with 50% growth capability
- CSC transactions shall be able to operate within the complete extent of the physical range as stated within ISO/IEC 14443
- CSCs supplied under this contract shall be available to Palm Tran from at least three independent sources within the United States.
- EU-CSC media supplied under this contract shall be subjected to testing described in ISO/IEC 10373, Identification Cards – Test Methods part 6.
- EU-CSC shall accommodate standard card initialization, embossing, and personalization equipment.

~~The Proposer shall list supported smart card protocols; e.g., ISO 14443 A/B, and describe in its Proposal how its Proposed FARE SYSTEM shall could recognize and accept existing third party Pass participants' IDs as well as the Proposers proposed CSC technology, including memory size. The CONTRACTOR shall be responsible for ensuring that the existing IDs shall be recognized and accepted as well as ensuring the proposed CSCs do not create any conflicts with participants' infrastructure. The Proposer shall highlight in its Proposal any compatibility issues between its Proposed FARE SYSTEM and any of the pass technologies in use by Palm Tran Participants. The Proposer shall describe in its Proposal how it proposes to address these issues, if present.~~

~~92.3~~ 92.3.3 Card Interface Device

ISO/IEC 14443 compliant CSC processing capability shall be incorporated into all delivered FARE SYSTEM Component for processing CSCs in compliance with Palm Tran's Business Rules and Fare Policies.

Initialization and Anti-collision Protocol: The CSC and CID shall accommodate an anti-collision protocol preventing erroneous processing when more than one CSC is simultaneously brought within the processing range of the CID. The initialization and anti-collision protocols shall conform to the specifications of ISO 14443-3.

Transaction Protocol: The protocol of those transactions that shall be performed through the contactless interface shall conform to the specifications of ISO 14443-4.

Operating Range: The CSC and CID shall interface within the distances and relative orientations defined in ISO 14443. The FARE SYSTEM equipment read-write distance shall be adjustable from zero to the maximum defined in ISO 14443. The distance shall be optimized once Palm Tran's FARE SYSTEM is in operation.

Documents processed by any CID shall be accurately read 99.0% of the time for the first tag. Validity on second tag shall be no less than 99.9% of a second tag.

~~92.4~~ 92.4.4 Card Data

Card Data: Cards shall carry all data necessary to uniquely identify it within the system and associate it with an establish account at the backend system ~~support Palm Tran's Business Rules and Fare Policies, outlined herein.~~ At minimum, CSCs will carry the following:

- Card source
 - Supplier number
 - Batch number
 - Run number
 - Encoding equipment number
- Application/software version identifying information
- Card serial number
 - Series number
 - Sequential number within series
- ~~Products or fare types:~~
 - ~~All cards will support a regional t-purse.~~
 - ~~EU cards shall support at least four concurrent Products being loaded onto the card. Products may be for a single Agency, different Agencies, or inter-Agency regional products. These may include pass, stored ride, stored value, rolling period, or special type such as "off-peak only", "peak only" and "anytime", senior citizen passes, passes with zone differentials, etc., minimum 128 types available}~~
 - ~~LU cards will support one Product in addition to the t-purse.~~
- ~~Issuing agency~~
- ~~Date of expiration (calendar)~~
- ~~Expiration time offset (minutes, up to 365 days)~~
- ~~Date of issue~~
- ~~Embedded transfer expiration time~~

- Last 6 transactions (EU cards) or last 3 transactions (LU cards):
 - Agency
 - Initial amount deducted
 - Route/Location ID/store number
 - Device number and type
 - Direction
 - Date/time
 - Zone or location
 - Direction (if available) (inbound, outbound, north, south, east, west)
 - Time of expiration
 - Transfer type
 - Fare charged against transit account
 - Parking (if appropriate)
 - Credit amount offset
 - Parking credit time offset
 - Parking lot number
 - Parking lot processor designator (entry or exit)
 - Recharge history
 - Transaction type code
 - Sales agency
 - Terminal or FARE SYSTEM Device ID
 - Date/time
 - Amount
- Threshold Autoload data (EU cards only)
- Remaining
 - Rides in the transit rides account(s)
 - Value in t purse
- Cardholder Profile
 - Rider type (e.g. regular fare, discount type or demographic profile, gender, deposit paid, birth date, etc.)
 - Sponsoring agency
 - Registered or not
 - Access card data for employees
- Valid period (calendar).
- Validity time offset
- Driver or employee identification data
 - Driver serial number
- Frequent rider information
 - Agency number/counter
 - Agency number/counter
 - Agency number/counter
 - Agency number/counter
 - Agency number/counter

~~14430~~ FARE SYSTEM Backend and FARE SYSTEM Back Office

The following section describes Palm Tran's functional requirements for a FARE SYSTEM Backend with integrated Fare Media processing capabilities. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

The FARE SYSTEM Backend shall consist of the Application Programs, FARE SYSTEM Functionality, and Operating Capability to generate Responses, Print Reports, Compile and Generate Files, and make Data available in response to user input and programmatic requests against data maintained within the FARE SYSTEM Backend.

The FARE SYSTEM Backend shall include the functional capability to access available data and data elements, summarize and calculate the data, and format output as appropriate and necessary to generate the specified user responses.

Data shall be held in a Microsoft SQL Relational database and shall be accessible through standard commercial SQL query tools; CONTRACTOR shall provide Palm Tran with a full data dictionary and schema for the provided FARE SYSTEM as part of the PDR (PDR - 22).

The CONTRACTOR shall provide to Palm Tran all necessary Relational Database licenses for the FARE SYSTEM.

The FARE SYSTEM Backend shall provide the FARE SYSTEM Components with: FARE SYSTEM Device Polling; a Data Repository for all Event, Alarm, and Transaction Data; FARE SYSTEM Reporting – Standard and Ad-Hoc; and Control and Management of FARE SYSTEM Operating and Configuration Parameters (e.g., Fare Tables, Date and Time, Software Update, etc.). Figure 2 provides a pictorial representation of a sample system architecture.

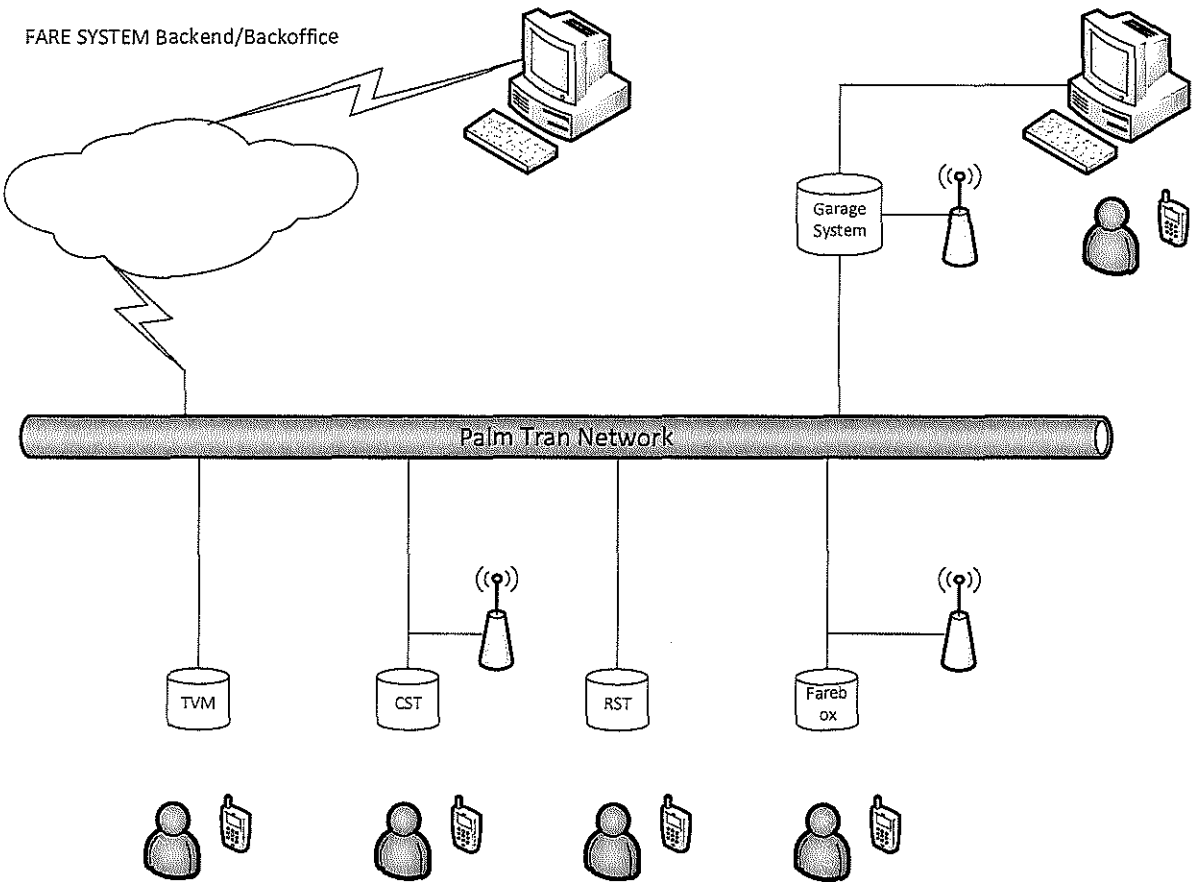


Figure 2 - Suggested FARE SYSTEM Architecture

Palm Tran’s existing Network is illustrated in Figure 3.

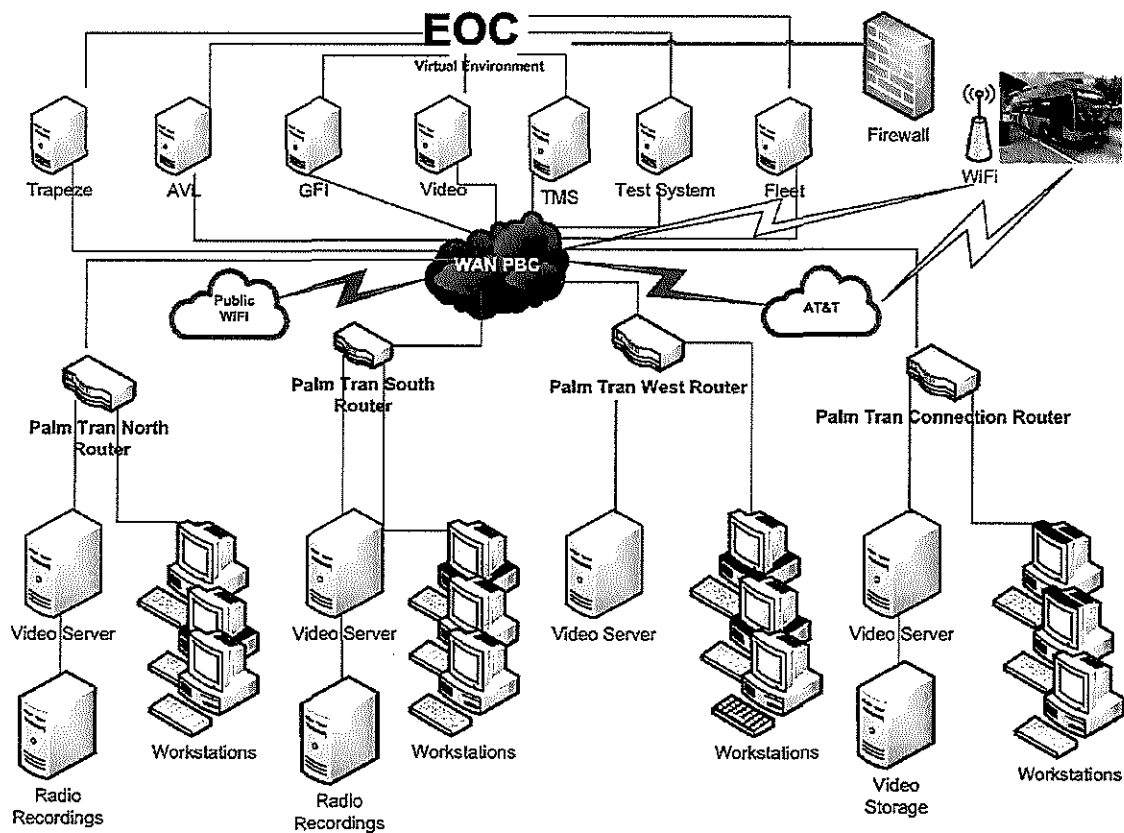


Figure 3 - Palm Tran Network

Figure 3 Palm Tran Network

144.130.1 Subsystems and interfaces

The FARE SYSTEM Backend shall provide a means to transfer data between each FARE SYSTEM Component via Palm Tran’s network. The FARE SYSTEM Backend shall transfer the related data from each FARE SYSTEM Component to a centralized location. Communication protocols shall be standard, common protocols and not custom designed for this application.

Requirements enumerated herein are the minimum required by Palm Tran for the various elements of the FARE SYSTEM Backend. The CONTRACTOR shall provide sufficient capability and capacity to meet the operating and performance requirements described herein; considering transaction load, data load, and multiple concurrent requests for communication at various points in the FARE SYSTEM; and all other requirements of the CONTRACTOR’s FARE SYSTEM as designed.

Specific components to be provided for all computers and workstations, as well as the anticipated network configuration, shall be a part of the Proposer’s Proposal.

~~144.2~~30.2 FARE SYSTEM Backend Functionality

The FARE SYSTEM Backend shall store all data and information related to the configuration, operation, performance, and health of the provide FARE SYSTEM and provide the primary means for Palm Tran and other authorized staff to audit, configure, control, and monitor the FARE SYSTEM Components as well as execute various reports about the system.

The FARE SYSTEM Backend shall be capable of processing all data downloaded from the FARE SYSTEM Components and producing related reports.

Transactional and Event data other than alarms (such as sales information, revenue amounts, CSC media information, and non-emergency diagnostics) may be transmitted in batch at FARE SYSTEM Backend configurable intervals. Alarms shall be transmitted in real-time or near real-time, depending on connectivity, from the FARE SYSTEM Devices to the FARE SYSTEM Backend. Palm Tran shall have the option to have operational data transmitted at more frequent intervals, settable from the FARE SYSTEM Backend for the system as a whole, or for individual FARE SYSTEM Components or groups of FARE SYSTEM Components.

The FARE SYSTEM Backend shall be capable of transmitting software upgrades, modifications or enhancements to FARE SYSTEM Components. Such software changes shall be automatically activated by the appropriate FARE SYSTEM Components based on signals from the FARE SYSTEM Backend or previously stored instructions within the respective FARE SYSTEM Component.

The FARE SYSTEM Backend shall allow Palm Tran personnel to access reporting functions, alarm events, and monitor and control functions of the FARE SYSTEM Components via a web interface. Access to the FARE SYSTEM Backend functions and FARE SYSTEM data shall be restricted in accordance to the security level assigned to the respective user and computer.

The FARE SYSTEM Backend shall have hardware and software to operate as a link to the credit/debit card verification agencies, fully PCI-DSS compliant.

The CONTRACTOR shall develop all required interfaces to and among the FARE SYSTEM Components, including the use of intermediate communication links to provide a complete and functional FARE SYSTEM in meeting the requirements of the Contract. All such developed interfaces shall become the property of Palm Tran for its use in interfacing other 3rd party components as Palm Tran's needs dictate.

The CONTRACTOR provided FARE SYSTEM network and Palm Tran's LAN/WLAN shall provide the primary means to transfer data and information between the FARE SYSTEM Components and FARE SYSTEM Backend. The RSTs will connect through the respective retailer's network into Palm Tran's LAN/WLAN via a secure VPN, or Alternative approach as authorized by Palm Tran's IT.

~~144.3~~30.3 Payment Processing

The FARE SYSTEM Backend shall serve as the central processor for purchases or fare payments that use credit, ATM, or debit cards.

The FARE SYSTEM Software resident on the FARE SYSTEM Backend to accommodate credit, ATM, or debit card transactions shall conform to ISO, federal and banking standards for these transactions, including PA-DSS and PCI-DSS. The CONTRACTOR is responsible for ensuring that the delivered system complies with and adheres to all governing standards for the security and protection of personal data and information.

To support the use of credit, ATM, or debit cards for fare payment, the FARE SYSTEM Backend shall perform the functions described below:

- Upon receiving a request for authorization from a FARE SYSTEM Device, the FARE SYSTEM Backend shall Route transactions to the appropriate financial institution and/or clearing house, for authorization
- The FARE SYSTEM Backend shall transmit the results of the authorization request to the initiating device for completion of the transaction, and record all required information within the FARE SYSTEM Backend for Audit and tracking purposes
- At the end of each day, the FARE SYSTEM Backend shall automatically provide the payment processor house with necessary Settlement data

Upon request from a FARE SYSTEM Device for on-line authorization of a transaction, the FARE SYSTEM Backend shall initially verify that the bank card records do not show that the card has been used more than a pre-programmed number of times within a specific period. If Palm Tran's programmable number is exceeded, the request for authorization shall be declined.

If communication with the financial institution/clearing house is not established or a response is not received within a preset time limit, programmable from the FARE SYSTEM Backend, the request shall be canceled, and notification of the condition shall be sent to the initiating FARE SYSTEM Device.

The CONTRACTOR shall provide the specific electronic payment processing functionality, processing procedures, flow charts, connections to clearinghouse and reports as part of the CDR (CDR - 26).
 Farebox

144.430.4 Transactional Databases

All FARE SYSTEM Components shall provide fully transactional information as defined herein. Each shall have the ability to identify and store in memory, and subsequently transmit to the FARE SYSTEM Backend, information provided on all transactions, events and alarms.

The Data shall be maintained in the FARE SYSTEM Backend in a transactional, fully relational database allowing for searches, queries, reporting, and other standard Database Administrator (DBA) activity using standard Structured Query Language (SQL) techniques as commonly used by professional DBAs. Each Transaction, Event and Alarm shall be maintained and reportable separately. Alarms are reported in real-time or near real-time, depending on connectivity.

Each Transaction, shall generate a transaction record that shall be individually recorded with, at minimum, the Location ID, Date, Time, Lat/Long, Sequence Number, Fare Paid, Items/Products Purchased, Itemized Value, Total Cost and Payment Type, FARE SYSTEM Components Identifier (Type and Number), Media ID, Agent ID/Driver ID/Login ID, Cash Box ID, Line, Block, Run, Trip, Location ID/Route Number and other information as appropriate for the type of FARE SYSTEM Component and transaction.

The FARE SYSTEM shall record all Events and Alarms with, at minimum, the FARE SYSTEM Component Number, Location ID, Date, Time, Lat/Long, Sequential Number, Event Code, Event Description Media ID, Agent ID/Driver ID/Login ID, Cash Box ID, and other information as appropriate for the type of FARE SYSTEM Component and event.

The database engine shall be the most current version of Microsoft SQL or approved equal accepted by Palm Tran.

Normalization for purposes of improving database efficiency will be acceptable.

The CONTRACTOR shall provide Palm Tran with the full Data Schema for the FARE SYSTEM Backend databases at PDR (PDR - 22).

The CONTRACTOR shall provide means for Palm Tran to extract data directly from the FARE SYSTEM Backend databases into third-party systems. Direct data export tools shall be automated.

~~144.4.1~~ 30.4.1 Farebox Transactions

Palm Tran's buses have Automatic Vehicle Location (AVL) systems that will provide geographic identifiers to the Farebox devices via the J-1708 Vehicle Area Network. Each Transaction and Event shall be tagged with a geographic identifier from AVL.

It is likely that the geographic information to be provided shall be the current location of the bus in terms of latitude and longitude. However, the AVL may provide the most recent bus stop number or the most recent bus stop location (latitude and longitude). Whichever identifier is provided shall be recorded as a part of the transaction/event record.

~~144.4.2~~ 30.4.2 Data Retention

The FARE SYSTEM computers shall provide detailed information online for analysis for no less than one (1) year after the date of a given transaction. Summary data is to be available on-line for five (5) years.

Removable data storage devices shall be provided allowing the archiving of all data and generating of reports for a minimum of a two (2) year period without the need to restore data to a fixed drive.

The FARE SYSTEM Backend shall maintain a log of all transactions and events processed by the FARE SYSTEM. Means shall be provided to make this log available for a minimum of seven (7) years.

Credit and debit Card Numbers will not be stored, except for those required for Autoload.

~~144.5~~ 30.5 User Interface Requirements

The CONTRACTOR shall provide Palm Tran users with a web-based interface to the FARE SYSTEM Backend that allows for the generation of standard and ad-hoc reports, as well as the monitoring and control of FARE SYSTEM Components.

The web interface shall allow Palm Tran authorized users access to FARE SYSTEM data through approved security protocols described in herein.

The CONTRACTOR shall provide sufficient licenses to support 5 concurrent users.

When the Log-on procedure is complete, the user-interface shall display a menu providing function selections authorized for that individual user. Only those functions to which the user has access shall be displayed.

~~144.6~~ 30.6 Systems Files Modifications

The FARE SYSTEM Backend user-interface shall provide menu options to access, store, edit, display, download to the FARE SYSTEM Components, and print various systems files that support the FARE SYSTEM operation, including Fare Tables and access authorization lists.

The ability to access these files shall be tightly controlled through the FARE SYSTEM Backend security function. Access to specific files and to functions such as "create" and "edit" shall be limited to authorized personnel regardless of location.

It shall be possible to select specific FARE SYSTEM Components by identification number for downloading such files, or to download files to all FARE SYSTEM Components in the FARE SYSTEM.

For Audit and security purposes, records shall be kept of all changes made to components of various FARE SYSTEM Component control files by Agent ID/Driver ID/Login ID, User Authorization Codes, Date, Time, Effective Date, FARE SYSTEM ID Number, etc.

~~144.6.1~~ 130.6.1 Fare Table Design

Fare Tables shall support fare changes based on cash deposit (Fareboxes only) and ticket types.

The FARE SYSTEM Fare Tables shall be identified by the Date and Time that they become effective. At a minimum, the FARE SYSTEM Backend shall be able to retain the currently active Fare Table, allow editing of any component of that table, and provide for three (3) more Fare Tables with future Effective Dates and Times. Most recently used Fare Tables shall be retained for future use

Current and future Fare Tables shall be available for downloading to any or all FARE SYSTEM Components.

The Pending Fare Table shall be a future (Effective Date not yet due) Table and shall not be processed by the FARE SYSTEM Backend for download to the FARE SYSTEM Components until the status is modified to "Active".

When Fare Tables are activated, the FARE SYSTEM Backend shall transmit the changes to FARE SYSTEM Components to conform the Active tables in all FARE SYSTEM Components to the most recently "accepted" version of the Pending table.

~~144.6.2~~ 130.6.2 Card Design Management

The Fare Table used to manage the issuance of CSC (EU and LU) and the Fare Card Design function shall include, but not be limited to, the capability to define, set, control, and manage the media parameters:

The FARE SYSTEM Backend shall have the capability to independently store and maintain Fare Card Designs with the capability to designate a design as "Active", "Test", or "Pending" card.

Graphics/fonts used in FARE SYSTEM ticket processor units may be limited to selection of predefined graphics/fonts. The specific graphics/fonts to be stored in the FARE SYSTEM Device shall be provided as a part of the CONTRACTOR's Proposal.

Ticket layout shall allow specification of font faces and font sizes, with either vertical or horizontal printing, in normal or reverse printing, and in either portrait or landscape format.

CONTRACTOR-provided software shall also allow the inclusion, editing and movement of Palm Tran-specified graphics, such as logos, images, barcodes, and patterns. Software providing this function shall be a non-proprietary, commercially available graphics software package.

Ticket layouts shall be created for each type of ticket sold by the FARE SYSTEM Devices. Ticket layouts shall be identified as a set by the date that they become effective. At a minimum, the software shall be capable of retaining the currently active ticket layout set, allowing editing of that layout at an authorized work Location, and provide for multiple layouts with a future effective date for each of the defined ticket types.

CSC loads and other transactions through FARE SYSTEM Components shall be defined and programmable via the FARE SYSTEM Backend. The parameters associated with each Product type (i.e., Validity Period, Transfer Rights, etc.) shall be adjustable/configurable via the FARE SYSTEM Backend. Additionally, the FARE SYSTEM Backend shall allow Palm Tran to activate the t-purse function and create new types of CSC passes/CSC media. Access to the functions associated with creating or modifying CSC Product parameters shall be restricted to authorized personnel.

Current and future layouts shall be available for downloading to the FARE SYSTEM Devices or when necessary to a file on a non-volatile memory device for manual transfer to the FARE SYSTEM Devices. Expired ticket layouts shall be archived at the FARE SYSTEM Backend for future reference.

~~144.6.330.6.3~~ 144.6.430.6.3 Bad Card Maintenance

The electronic Fare Card Bad Card maintenance function shall include but not be limited to the capability to find, sort, add, delete, and change Bad Card listing parameters for CSCs:

- Fare Card type and category listing
- Specific card serial number or range of serial numbers
- Effective listing date
- Discontinue listing date
- Display messages or indicators

The FARE SYSTEM Backend system shall have the capability to independently store and maintain two (2) Bad Card listing tables with the capability to designate a table as "Active" or "Pending".

- The "Active" table shall be the table currently in use by the FARE SYSTEM and processed as required by the FARE SYSTEM Backend for download to the FARE SYSTEM.
- The "Pending" table shall be the table currently being worked on by system administrators.

It shall be possible to execute automated searches for bad listed Fare Cards to insert or remove Fare Cards to/from the bad list.

~~144.6.430.6.4~~ 144.6.430.6.4 Log-On Table Maintenance

The FARE SYSTEM Backend shall have the capability to manage a Log-on Table consisting of Palm Tran Employee Numbers and Route Numbers downloaded to the FARE SYSTEM Devices for use to validate Driver or Maintainer log-on entry.

The functionality shall include addition, deletion, and change of Employee Numbers and Route Numbers used to validate the FARE SYSTEM log-on process.

Functionality shall be provided to locate automatically a desired (input) Employee Number or Route Number within the table.

The FARE SYSTEM Backend shall have the capability to independently store and maintain two (2) Log-on Tables designated "Active" and "Pending".

- The "Active" table shall be considered as the active table and shall be processed as required by the FARE SYSTEM Backend for download to the FARE SYSTEM.
- The "Pending" table shall represent either an expired (past effective date) table or as a future (effective date not yet due) table.

~~144.7~~30.7 Monitoring Functions

~~144.7.1~~30.7.1 General Requirements

The CONTRACTOR shall deploy a monitoring management tool (preferably web-based) that provides real-time monitoring of all devices and back office systems down to the component and process level. The monitoring management tool shall provide access to all monitoring functions, and will provide all information in a clear, organized dashboard using color graphics and text. Generally, green/yellow/red colors may be used for optimal/attention/error conditions. Colors and corresponding conditions will be finalized during design review.

The monitoring management dashboard shall include a graphical system map and/or list that can be drilled-down into by location to view the status of system components. The system map/list will be dynamically updated when devices or systems are added and removed, and configurable to allow editing of device groups, locations, and location names as the system expands. The user interface will be defined during the CDR design review.

If the monitoring management tool is web-based it will be accessible remotely using any modern desktop or mobile web browser. See the Website Design section for details for browsers and platform compatibility requirements.

~~144.7.2~~30.7.2 FARE SYSTEM Device and System Monitoring

The monitoring management tool will provide real-time performance and status monitoring for all devices, back office systems, and network nodes using the CONTRACTOR developed and provided device management API. Device commands will also be possible in conjunction with the device configuration management tool. The monitoring management tool will monitor the operational status and performance of the devices and their components, including but not limited to:

- Fareboxes
- Ticket Vending Machines
- Agency POS
- ~~Mobile Sales Device~~
- Back Office Hardware
- Mobile Ticketing Back Office
- Test Environment Devices

The monitoring management tool will display device attributes, including but not limited to device type, device ID, location, status, events, and alarms. Device status reported by the monitoring management tool will include operational status (e.g., in service, degraded mode, out of service, or no communications), maintenance alarms associated with individual device modules, and revenue alerts (e.g., vault near-full/full and low stock/out of stock).

The monitoring management tool will monitor and display in real-time the status of all back-office systems, subsystems, applications, databases, and processes. Details of which processes will be monitored will be provided during the CDR design review.

Devices or systems that are not reporting status for any reason will be easily identifiable, and the last known status and history will be available. A “heartbeat” or equivalent method to determine device status may be employed and will be configurable. The monitoring management tool will automatically generate alerts and/or notifications via email and text message. The configurable alert information will

include all device attributes, including but not limited to device type, device ID, location, status, and event type. The trigger and frequency of these alerts will be configurable by device type, user, location, event type, or trigger condition. Device status will be sent via an appropriate monitoring protocol based on industry standards, such as SNMP3, or a modern functional equivalent. The protocol chosen will be supported by all devices and systems, expected network traffic, and potential for intermittent communications.

~~144.830.8~~ FARE SYSTEM Back Office

The FARE SYSTEM Back Office comprises central system applications that support the operations and maintenance of both FARE SYSTEM Backend Accounts and Frontend Equipment. These FARE SYSTEM Back Office applications include tools for customer service and maintaining the FARE SYSTEM. Some FARE SYSTEM Back Office applications will interface or exchange Data with existing Palm Tran Assets. The FARE SYSTEM Backend and FARE SYSTEM Back Offices are closely tied, and work together to support these general functions:

- Account and Cash Management processing
- Risk and Fraud Management processing
- Settlement processing
- Post Settlement processing
- Reconciliation processing
- Data retention processing
- Report and data analytics processing

~~144.8.130.8.1~~ FARE SYSTEM Back Office General Requirements

The FARE SYSTEM Back Office requires the flexibility to integrate with existing systems and adapt to new ones. The legacy Palm Tran Back Office applications and systems may continue to operate over the life of the FARE SYSTEM or be replaced by newer applications. In both cases, open architecture design of the FARE SYSTEM Back Office will be required. The following general requirements will be applied to all FARE SYSTEM Back Office applications.

The CONTRACTOR shall develop and submit for Palm Tran's approval FARE SYSTEM Back Office hardware Design Documentation that provides a detailed description of all of the hardware components that will compose the FARE SYSTEM Back Office and the purpose, functions, interdependencies, power, A/C cooling configurations, and communication requirements for each component.

The CONTRACTOR shall develop and submit for Palm Tran's approval a FARE SYSTEM Back Office Software Architecture Design Documentation that provides both graphical and narrative descriptions of each software component of the FARE SYSTEM Back Office. The FARE SYSTEM Back Office Software Architecture Design Documentation will include at a minimum the following:

- Each software component including functional description, purpose, OEM and version
- FARE SYSTEM Interfaces and communication flows between components
- Installation, configuration and upgrade Documentation

UI access to all elements of the FARE SYSTEM Backend will be controlled through Palm Tran's centrally-managed user authentication and access control platform. The CONTRACTOR shall be responsible for integration with this system to support single sign-on. Individual users or user groups may also have access controlled by Palm Tran IT (or equivalent responsible party) within specific systems where

appropriate to allow for standard business operations. All FARE SYSTEM access control and user authentication will comply with Palm Tran IT security standards and be subject to Palm Tran's review and approval.

Where applicable, FARE SYSTEM Interfaces (including Open Architecture APIs) shall be provided to enable the FARE SYSTEM Back Office to interface with Palm Tran Assets that provide similar or related functionality.

The FARE SYSTEM Back Office will adhere to the general design requirements, especially those pertaining to:

- Aesthetic Requirements and UIs
- System Security
- Open Technology
- Software Requirements
- Performance Requirements
- Codes, Regulations & Reference Standards

Software updates to FARE SYSTEM Back Office software, databases, and associated modules will be centrally managed. Software versions will be accessible by authorized system administrators and version control will be put in place.

The FARE SYSTEM Back Office will use a network time sync protocol to sync system time to NIST time.

All FARE SYSTEM Back Office software will comply with the articulated Palm Tran preference for COTS components, upgrade testing, and other general software requirements.

~~144.8.230.8.2~~ Device Monitoring System

The FARE SYSTEM Back Office shall include a Device Monitoring System (DMS) that will provide real-time monitoring of all FARE SYSTEM hardware down to the component level, as well as remote control of certain devices through the issuance of appropriate commands. For purposes of the DMS, components are defined as Line-Replaceable Units, such as bill modules, removable memory modules and other components that can be replaced for maintenance purposes. The DMS will interface with Palm Tran's SAP Maintenance Management System (MMS) in a Palm Tran-defined format, using a CONTRACTOR developed API. The CONTRACTOR shall support this developed API, and the CONTRACTOR shall also provide the device management API.

The Device Monitoring System (DMS) will support real-time operational and performance status of Frontend FARE SYSTEM Equipment devices and their components (which are LRUs as defined above), including new as well as legacy equipment. Any device connected to the FARE SYSTEM, which adheres to the FARE SYSTEM APIs, shall be monitored by the DMS.

DMS will support some status monitoring of FARE SYSTEM equipment, including TVMs, Fareboxes, and POS devices.

The DMS will provide sufficient Data to support a graphical interface that presents device status and alarms in a clear, organized format, using color graphics and text.

The DMS will display several device attributes, including: device type, location, status, alerts and device ID. These attributes shall have the capability to be defined and modified by authorized Palm Tran administrators.

Status types reported by the DMS shall include performance status (operational, degraded, out of service, no communications, actual bill, coin, ticket stock counts, etc. where applicable) and revenue alerts (fully stocked, low stock, out of stock, etc. where applicable). Status types and resettable numerical alert parameters will be determined during design review.

The DMS shall utilize a communications protocol designed to provide persistent status over an unreliable communications network using minimal bandwidth. Network management protocols shall comply with industry standards such as SNMP3, or modern functional equivalents. Devices that are not reporting status for any reason shall be easily identifiable, and the last known status and device history shall be available via the DMS.

The DMS will be able to output relevant Data to the Palm Tran SAP MMS based on device events in a Palm Tran-defined format during design review. The generation of Data will be in real-time and will not adversely impact the operation or functionality of the MMS.

The DMS will automatically generate alerts via emails, text messages and/or other output files defined by Palm Tran. The initiation, frequency and cancellation of these alerts shall be configurable by Palm Tran.

The DMS graphical view will display a system map that can be drilled-down by location or system component. The FARE SYSTEM map will be dynamically updated when devices are added/removed, and configurable to allow editing of locations and location names as system expansion occurs.

The DMS will support remote equipment configuration and viewing of system status, including, to the greatest extent possible, drill-down capability to the LLRC/LLRU. The remote monitoring can occur in text and graphical format and will support web access in both desktop and mobile forms.

The DMS will support, to the greatest extent possible, the real-time issuance of device commands to the LLRC/LLRU using the CONTRACTOR-provided device management APIs.

The DMS will issue commands to relevant devices for operational purposes. Command sets will vary by device, but will include configuration, maintenance, revenue and customer service functions. Commands will be defined during design review.

DMS commands will utilize an appropriate command protocol based on industry standards (such as SNMP3, or a modern functional equivalent). The protocol chosen will be supported by all devices and systems within the FARE SYSTEM and take into account the expected network traffic and inconsistent wireless communications associated with an Account-Based fare collection system.

The DMS will support any existing monitoring tools and processes as applicable, and not adversely impact the monitoring capabilities that are currently utilized at Palm Tran.

The DMS will provide clock synchronization services to all field devices. The DMS will synchronize its clock to NIST time.

~~144.8.3~~ 330.8.3 Inventory Management System (IMS)

The CONTRACTOR shall deploy an Inventory Management System (IMS) that will maintain a full inventory of all FARE SYSTEM media issued by Palm Tran through all channels.

The IMS will maintain an inventory of all Palm Tran-issued media as it is held by Palm Tran, regional partners or third-party distributors, and issued to customers. The media inventory data will include information such as: media type, expiration date, batch ID, ship date, and account status. Final fields for inventory management purposes will be determined during design review.

The IMS shall track the current and historical status of all card-based smart cards in inventory. Whenever a transaction causes a card to change status, upon receipt of the transaction record, the IMS shall update all records of the card's status accordingly. All updates will maintain history of changes including audit trails.

144.8.430.8.4 Customer Account Management (CAM)

The FARE SYSTEM Back Office shall include a CAM System that provides web-based access to transit and customer account information for payments only, and the ability to track all payment- and account-related customer service incidents from creation through resolution.

The CONTRACTOR shall deploy a COTS software CAM System that allows for the central management of all customer payment data, order management and fulfillment, and the cradle-to-grave tracking of FARE SYSTEM customer service incidents.

The CAM System will be supported by an isolated customer database that, in addition to complying with the requirements set out in the Contract Documents, will be fully compliant with the latest PCI requirements, and compliant with agency, local and state policies for the handling of customer PII.

The customer database will store all customer data for registered transit accounts and accounts set up for the automatic reloading of value (i.e., subscription/autoload). In addition to the other information security requirements, customer data will be stored in a secure manner and payment information will be stored in an encrypted and tokenized form, respectively.

The customer database will serve as the repository for data on all customers applying for a reduced fare classification and paratransit access, including applications and supporting documentation, eligibility parameters, and card personalization information, such as a customer photograph captured via the APOS Terminal.

The customer database will serve as the repository for data on all employees including card personalization information, such as a photograph. Employee Data will be entered manually or electronically from forms provided by Palm Tran's HR department. Only Palm Tran designated users will have access to this data.

The core function of the CAM System will be to support customer service operations by providing a customer service tool that allows the creation, viewing and modification of payment transactions and incidents stored within the CAM System, based on customer inquiries received and the actions taken to resolve those inquiries. The CAM System will support the classification of customer service incident type and severity using pre-defined selections, and incident descriptions in custom text fields.

Customer service staff will be able to manually create incidents when responding to customer service inquiries over the web or phone.

CAM incidents will be created automatically based on customer-initiated actions performed through the FARE SYSTEM Websites.

CAM incidents will be linked to a specific customer account when the customer generating the inquiry is registered.

The CAM System will support customer service operations by providing a complete view of customer accounts and related transit account activity, including activity associated with anonymous transit accounts.

The CAM System will connect to the customer database using the CONTRACTOR-provided APIs and shall otherwise provide a fully integrated interface for customer service staff to create, view and modify customer accounts within the FARE SYSTEM.

The CAM System will allow customer service staff to perform customer account actions, including:

- Creation of a new customer account (i.e., registration of a transit account)
- Association of an anonymous transit account to an existing customer account
- Modification of customer account registration data
- Addition and modification of payment data associated with a customer account

The CAM System will connect to the ATP through using the CONTRACTOR-provided APIs and shall otherwise provide a fully integrated interface for customer service staff to view and update transit accounts within the FARE SYSTEM.

The CAM System will enable customer service staff to perform transit account actions, including:

- Creation of a new transit account (i.e., issuance of media)
- Sale and loading of fare value
- Viewing of transaction history and fare calculation for open- and closed-loop payments
- Modification of transit account balances through generation of transit account adjustments or refunds
- Setup, modification and cancellation of subscription or autoload services
- Replacement of lost/stolen closed-loop media and linking of the new media to an existing closed-loop account
- Linking of new Open payment media to an existing closed-loop account

All actions resulting in a change to a customer account or transit account will be recorded in the CAM System.

The CAM System will support the association of multiple transit accounts with a single customer account for account management and the loading of value and Fare Products.

The CAM System will support the management of Palm Tran Partner programs, which will allow customers and the associated transit accounts to be linked to a Palm Tran Partner (such as an employer, or school) for account management and the loading of value.

The CAM System will provide central order management for the distribution of media and value through all distribution channels, including Palm Tran Partner programs.

The CAM System will interface with the IMS to maintain proper media inventory controls.

Access to the CAM System will be password-controlled with the displayed information and allowed functions restricted based on centrally defined user-access privileges. Access to all elements of the CAM System will be controlled through Palm Tran's centrally-managed user authentication and access control platform, Active Directory.

144.8.530.8.5 Financial Clearing & Settlement System

The FARE SYSTEM Back Office shall include a Financial Clearing and Settlement System (FCSS) that maintains a general ledger of all financial activity within the FARE SYSTEM, generates invoices and tracks Accounts Receivable (AR), and supports the settlement and reconciliation of funds.

144.8.5.130.8.5.1 Financial System General Requirements

The FCSS will include COTS financial management software to the greatest extent possible and, as necessary, Palm Tran-configured software modules.

The FCSS will support the full auditing of all FARE SYSTEM activity, including reconciliation of all FARE SYSTEM Accounts and end-to-end tracking of FARE SYSTEM revenue as it is generated and recognized by Palm Tran.

UI access to all elements of the FCSS will be controlled through Palm Tran's centrally-managed user authentication and access control platform, Active Directory. Individual users or user groups will have access configured by Palm Tran to allow for standard business operations.

144.8.5.230.8.5.2 General Ledger Interface

Palm Beach County has an existing General Ledger system, Advantage. The FCCS will include an API to facilitate exchange of information between the FARE SYSTEM and Advantage, including accounts to track fare revenue, deferred revenue, AR, expenses, and other revenue offsets generated by the FARE SYSTEM.

As part of design review, the CONTRACTOR shall be responsible for mapping each transaction type generated by the FARE SYSTEM to the appropriate general ledger entries to support automated categorization and summarization by the FARE SYSTEM.

Summary entries will be posted automatically to the general ledger no less than daily.

144.8.5.330.8.5.3 Accounts Receivable

The FCSS will include a COTS AR software module that supports the creation and management of purchase order (PO)s (i.e., accounts receivable) within the general ledger.

The AR module will support the establishment of accounts based upon billing source, event and time period, and transaction type, and the ability to record billing items (e.g., fare products) by line item in order to identify unique accounting classification codes.

The AR module will track receivables for pre-bill and post-bill Media and value sales, such as those generated as part of the Palm Tran Partner program. The AR module will support the issuance of refunds for Media sales as needed.

Receivables against individual customers will be supported in instances of funding source failures or negative Transit Account balances.

The AR module will support the application of payments (full and partial), credit memos and adjustments against Palm Tran Partner and customer accounts. The process will support batch entry of receipts and lockbox functionality.

The AR module will support the setting of configurable credit limits for Palm Tran Partner and individual customers.

The AR module will support the automated generation of a credit hold and blocking of associated Media when the credit limit is reached.

The AR module will support the automatic generation of interest charges on Palm Tran Partner and Customer Accounts that are past due and generate dunning (collection) letters for overdue receivables when FARE SYSTEM Accounts become delinquent.

The AR module will support the aging of receivables and an automated, fully auditable, write-off process to be defined as part of design review.

The AR module will support the automatic generation of monthly statements detailing Palm Tran Partner account activity, including consolidation of multiple accounts receivable on to a single customer statement.

The AR module will provide standard AR reports, either directly or via the Data Warehouse, including: aged trial balance (with "as-of date" functionality), customer transaction, cash on account and customer listing reports.

The AR module will provide the ability to perform online queries of FARE SYSTEM Account activity (i.e., billing, collection, and adjustment) by customer and receivable.

Printed statements will be made available in braille and large print upon request of individual or Palm Tran Partner customers.

The FCSS will produce standard accounting reports, which accurately capture deferred and recognized revenue, in both summary and detail formats.

~~144.8.6~~ 130.8.6 Payment Application

The FARE SYSTEM Back Office shall include a Payment Application that supports the secure processing of credit, debit, and ACH payment transactions generated within the FARE SYSTEM. The Payment Application, to the greatest extent practicable, shall be COTS software and include PCI certified hardware, firmware and software.

~~144.8.6.1~~ 130.8.6.1 General Requirements

The Payment Application will connect directly to Palm Tran's payment processors and card association networks for the secure processing of payments. Connections to multiple payment processors (e.g., unique ACH and direct connect services) will be supported in order to process all payment methods specified. The Payment Application will be the sole gateway to Palm Tran's payment processors.

The Payment Application will be capable of properly processing any payment transactions with the payment processor(s) that were originally authorized by the applicable FARE SYSTEM equipment or FARE SYSTEM Backend while in "stand-in" (i.e., offline) mode due to communication outages or other issues.

The CONTRACTOR shall conduct any system testing and certifications required to process payments through Palm Tran's payment processor.

The CONTRACTOR shall demonstrate that the Payment Application is compliant with the latest standards and provide all necessary PCI and payment brand testing and certification for the Payment Application.

The Payment Application will use the CONTRACTOR-supplied payment API to capture payment transactions from all Frontend FARE SYSTEM Equipment and other relevant FARE SYSTEM components.

The Payment Application will be used to process payments generated by the following FARE SYSTEM equipment and other FARE SYSTEM components:

- BV, PV, MV, ATP (open payment of fares and subscriptions/autoloads)
- APOSs (Media and value sales)
- Customer Website (Media and value sales)

- B2B Portal (Media and value sales)
- CAM System (Media and value sales, adjustments and refunds)

EMV (and MSD if available) offline data authentication (i.e., CDA and DDA) will also be supported by all Frontend FARE SYSTEM Equipment and other FARE SYSTEM components that process payments in a card-present environment.

The Payment Application will support, at a minimum, robust configurable velocity checking, based on payment frequency, usage frequency, and value, across all sales channels, Frontend FARE SYSTEM Equipment and other applicable FARE SYSTEM components.

The Payment Application will allow acceptance or denial of non-EMV cards based on configuration by Palm Tran.

The Payment Application will include sufficient transaction logging to assist in revenue reconciliation, settlement and fraud analysis.

The Payment Application will enable the automated reconciliation of settlement files received for all payments processed through the Payment Application.

The Payment Application will communicate as needed with CONTRACTOR-provided Hardware Security Modules (HSMs) to decrypt/encrypt Customer PIN Data in compliance with ANSI TR-39 guidelines.

If provided within the Card Data or by messaging with card brands/issuers, the Payment Application will support the automatic identification of Contactless Bank Cards, including virtual cards issued in mobile wallets, upon Card Data entry to the FARE SYSTEM or otherwise captured via all sales and customer service channels.

The FARE SYSTEM shall comply with all rules and operating regulations for ACH transactions at the time of Revenue Service Acceptance.

The FARE SYSTEM shall comply with all rules and operating regulations for bank card transactions at the time of Revenue Service Acceptance.

144.8.6.230.8.6.2 Accepted Payments Methods

The Payment Application will support the processing of bank card payments for all major card brands, including Visa, MasterCard, American Express, and Discover and debit networks.

The Payment Application will support the processing of EMV-compliant payment transactions. The FARE SYSTEM will default to EMV processing for all EMV-compliant bank cards, issued inside and outside of the U.S.

The Payment Application will support the processing of Electronic Benefit Transfer (EBT) cards.

~~The Payment Application will support payments using Palm Tran payment vouchers.~~

The Payment Application will support the processing of alternative e-commerce payment methods, such as Apple Pay, MasterPass and PayPal.

The Payment Application will support the processing of ACH payments for online, mobile and Autoload sales channels. This functionality will be configurable and may be enabled or disabled based on sales channel and purchase criteria.

The FARE SYSTEM will be capable of supporting split payments for all one-time and recurring payments through all sales channels including the use of two bank cards, or a bank card and any other payment method accepted by the associated sales channel.

Any payment made using a pretax debit or credit card shall be identified as such when feasible and/or supported by bank card transaction messaging. The FARE SYSTEM shall comply with all applicable IRS regulations for pretax commuter benefits.

144.8.6.330.8.6.3 Tokenization

The FARE SYSTEM will not use full payment card data for internal processing and storing of transactions.

The FARE SYSTEM will use a secure token in place of payment card data, during fare payment processing, media and value sales, autoloading processing and customer service inquiries. The payment card data will be stored in a Token Vault and associated with the secure token.

Tokenization may be performed within the FARE SYSTEM or using a third-party solution external to the FARE SYSTEM (provided that the CONTRACTOR complies with all required information security practices).

If performed within the FARE SYSTEM, tokenization will be performed by the Payment Application, and may also be performed by the Front FARE SYSTEM Equipment or other FARE SYSTEM components accepting payment card data. All tokenization shall be completed using a secure, irreversible algorithm. No un-tokenized payment card data, encrypted or otherwise, will be stored in the ATP at any time.

The CONTRACTOR-provided software for completing Tokenization shall support PAN lookup for all open payment media, including mobile wallets, which make use of alias PANs or other card/device tokens. The same token will be returned for both the PAN and alias PAN (or another token).

The CONTRACTOR-provided software for completing tokenization will support the linking of an issuer-provided token to an individual customer that may access the FARE SYSTEM using multiple payment instruments from that issuer. This feature will be supported for all issuers that provide customer-specific tokens in the future.

144.8.6.430.8.6.4 Fraud Prevention

The Payment Application will employ measures to detect and prevent the fraudulent use of bank cards within the FARE SYSTEM. Fraud prevention measures will be subject to Palm Tran's review and approval during design review.

The Payment Application will support cardholder verification methods, including address verification and all methods defined by EMV, to allow Palm Tran to manage risk. For any given transaction, a customer may be prompted to enter a PIN, billing ZIP code, full billing address, or nothing, depending on the sales channel and Palm Tran-configurable parameters, including:

Country of card issuance (e.g., U.S., Canada, etc.)

Card brand (e.g., Visa, MasterCard)

Card type (e.g., EMV, prepaid, contactless, transit benefit, specific IIN, etc.)

For any bank card transaction determined to be fraudulent, the Payment Application shall immediately send a notification to the ATP, and addition of the associated bank card to the system-wide Negative List (if used).

The Payment Application will make use of auto-update and validation services for customer bank card and ACH payment sources kept on file. The auto-update service will enable the automatic updating and notification of bank card data changes, such as expiration date and PAN, when a card is replaced by the issuer. The ACH validation service will periodically verify that bank accounts are in an active state.

The Payment Application will support a configurable re-presentment feature for open payment transactions that initially result in a decline. The re-presentment functionality will enable the FARE SYSTEM to automatically reattempt authorization of the declined transaction over a configurable period of time or number of retries.

~~144.8.6.5~~ 30.8.6.5 Chargebacks and Reversals

The Payment Application will maintain records for no less than seven years to support the research, documentation and auditing of payments processed for dispute and chargeback resolution.

The Payment Application will support chargeback processing, including automated retrieval, reconciliation, and response for chargeback notifications, as well as automated media negative listing (subject to Palm Tran business rules) and reversal of load transactions within the FARE SYSTEM.

The tokenization software provided by the CONTRACTOR will allow for refunds and tracking of chargebacks without having to store bank card data.

~~144.8.7~~ 30.8.7 Data Warehouse

The FARE SYSTEM Back Office shall include a Data Warehouse (DW) that will serve as a repository for all FARE SYSTEM Data specified below, including fare collection data. The primary FARE SYSTEM Backend database and other supporting databases for maintenance, reporting and customer service will feed into and pull from the DW. The DW will be the basis for data analytics, archiving and FARE SYSTEM Back Office processing.

The DW will store all data generated by the FARE SYSTEM, including data generated by the FARE SYSTEM Backend, all other FARE SYSTEM Back Office software Applications and all Frontend FARE SYSTEM Equipment.

The core database engine within the DW shall be an enterprise ODBC-compliant relational database that can scale larger than Palm Tran transaction volumes. The DW will utilize the most recent DW platform and this platform will require the approval of Palm Tran.

At minimum, the DW will also collect data from:

- FARE SYSTEM Backend
- Device Monitoring System (DMS)
- Patron Account Management (PAM) System
- Financial Clearing & Settlement System (FCSS)
- Palm Tran legacy systems

Other data sources may be defined based on design reviews.

By way of clarification, and not limitation, Data captured in the DW will include at minimum:

- FARE SYSTEM Backend Open and Closed-Loop fare payment transactions
- Device Closed-Loop Transit Account sales transactions
- Device events and alarms from the DMS
- FARE SYSTEM Backend and FARE SYSTEM Back Office monitoring events and alarms
- Device Audit Register data
- Customer service incidents from the CAM System
- Actions within the CAM System affecting Transit Account value or status (e.g., credits, refunds and adjustments)

- Media and value orders created through the CAM System and stored in the IMS, including those associated with special/Palm Tran Partner programs
- Accounting entries generated by the FCSS
- Other analytics Data to support fraud detection and prevention
- Real-time website analytics and metrics, based on industry best practices, including to identify access attempts from unsupported devices, platforms, browsers, etc., and details on website/application “crashes”

The DW will be able to pull additional data sources as required by operational needs.

The DW will be fully compliant with Palm Tran security, PCI, EMV, and PII requirements.

For Open Payment transactions, the DW will store a tokenized version of the Primary Account Number (PAN), which will prevent the need to store the Payment Card Data, but still allow for the querying of transactions generated using a particular payment instrument.

FARE SYSTEM data maintained in the DW will be maintained in an individual event, record or transactional format. If data elements are aggregated, consolidated or combined within the DW, they will be organized in such a way as to allow standard Structured Query Language (SQL) query tools to extract events and transactions discretely. Normalization and de-normalization for purposes of improving database efficiency will be acceptable.

The DW will retain and provide online access to detailed transaction data for analysis for the minimum of (i) seven (7) years following the date that a transaction is generated, and (ii) such other period as required by Palm Tran data retention policies (if any). Summary data will be retained and available for a minimum of (a) ten (10) years, and (b) such other period as required by Palm Tran data retention policies (if any). Detailed and summary data will be defined during design reviews and will meet Palm Tran's approval with respect to data retention policies and procedures. These DW retention parameters will be fully configurable by Palm Tran.

The CONTRACTOR shall archive and maintain detailed and summary data from the DW in a Palm Tran-approved media format, and the CONTRACTOR shall maintain such Data in compliance with Palm Tran data retention policies and procedures.

The CONTRACTOR shall supply database queries and tools to enable Palm Tran to clean up and remove old or unwanted data from the DW. This will be an administrative function that would permanently delete data in a specified date range or other criteria. This functionality, including the queries and tools, shall comply with and otherwise support Palm Tran data retention policies and procedures.

As part of implementation, the CONTRACTOR shall deliver a full and complete data dictionary and schema for the DW. The CONTRACTOR will also provide details for the extract, transform and load (ETL) process for mapping to outside Data sources.

All FARE SYSTEM Data within the DW shall be accessible by standard SQL query tools and shall be retrievable as standard ASCII or binary Data using a standard SQL query. All database features and supported formats will be available for use by Palm Tran.

An interface to the DW will provide the ability to query the database directly, export the Data in a variety of formats including ASCII text, CRV, and Excel formats. A direct connection to the reporting system and other Third-Party reporting tools will be provided for predefined and custom reporting.

The CONTRACTOR shall provide a preliminary design for the DW, including:

- Data fields, length of fields, etc.

- Data to be stored, including the total amount of data storage available, data compaction schemes, etc.
- Time required for transmission of Data to the DW
- Communications protocols
- Test procedures to ensure that all capabilities specified are indeed present
- DW operating procedures
- Specific means of transmitting data to other applications
- Format of the data for transmission to other applications

This information will be submitted and refined during design reviews.

All such data will be transmitted to the DW in real-time, or on a configurable frequency that can be set depending on the source. The transmit frequency of such data not sent in real-time will occur no less than daily and will be configurable in increments of at most one minute.

All FARE SYSTEM Interfaces requiring access to real-time Data, including the ATP, FARE SYSTEM Websites, DMS and CAM System, will modify the source production databases directly, if possible. That data will be transmitted in the DW as soon as possible, at a frequency and format to be determined during design reviews.

The FARE SYSTEM will support the ability to completely anonymize the transaction data stored in the DW by masking and/or replacing the original account number and any PII contained in a transaction after a configurable period of time (e.g., seven years from the date of generation).

144.8.30.8.8 Reporting System

The FARE SYSTEM Back Office shall include a Reporting System that provides an interface to run pre-defined reports or custom reports. The primary data source for the Reporting System shall be the DW, though other sources of data may be utilized depending on the reporting need.

The CONTRACTOR shall provide a COTS Reporting System that interfaces with the DW for the generation of predefined and customized reports. The Reporting System will allow the viewing, running and scheduling of predefined reports, with a querying interface to define and save custom reports. The Reporting System will be subject to Palm Tran's review and approval.

The Reporting System will be robust enough to perform analytical and statistical queries against very large volumes of Data using in-memory data aggregation. Palm Tran's preference for a reporting tool is Tableau; however, the CONTRACTOR may suggest an alternative for Palm Tran's review and approval.

Predefined reports will include, but are not limited to:

- Ridership reports
- Sales reports
- Revenue reports
- Deferred revenue reports
- Financial settlement reports
- Maintenance reports
- Device and system performance reports
- Customer service reports
- Exception reports
- Fraud detection reports
- Device Errors and alerts

- Service planning reports
- System and device availability reports

A list of predefined reports will be defined with Palm Tran during design review.

The CONTRACTOR shall provide up to 100 predefined reports, defined by Palm Tran, for review and approval at Final Design Review.

The Reporting System will have the capability to define and run custom reports by Palm Tran users. These reports will be able to be saved and shared across user types and accessed by users of the Reporting System depending on their access permissions.

Custom reports will be defined using a query design tool or equivalent custom query tool. Custom reports will be able to access all fields of the DW.

Reports will be able to be run through a web interface, and results will be provided in several formats, including: Adobe Acrobat, Microsoft Excel, Microsoft Word, comma separate value or plain ASCII text. All file formats will include the same Data and general layout where possible. Data files (Excel and CRV) will be generated such that Data can be extracted without formatting and can be imported into other Third-Party tools without manipulation.

The Reporting System web interface shall be available across multiple browsers and platforms. Desktop and mobile browsers to be supported include, but are not limited to: Internet Explorer, Microsoft Edge, FireFox, Safari, Chrome and Opera.

Access to the Reporting System will be controlled through a password-controlled web interface. The execution and creation of reports will be configurable by user type. User accounts will be set up with custom access levels that define which reports can be viewed and what fields can be queried for custom reports. All access will be controlled through a centrally-managed user authentication and access control platform, which supports a usage audit trail. All access control and user authentication will comply with Palm Tran IT Security Standards and could potentially integrate with other Palm Tran authentication systems.

The CONTRACTOR shall be responsible for delivering all pre-defined customized reports at designated intervals, and such reports and intervals shall be defined and developed with Palm Tran during design review and system implementation.

The Reporting System will provide robust Business Intelligence (BI) reporting.

The Reporting System will generate web-based dashboards to display Palm Tran-defined data visualizations, including system performance indicators or metrics.

~~144.9~~30.9 Data Analysis and Reporting

~~144.9.1~~30.9.1 Dashboard

As part of the FARE SYSTEM back-office capabilities, the CONTRACTOR shall display FARE SYSTEM key performance information in a set of dashboards. Proposers shall describe the types of dashboards that the FARE SYSTEM is capable of displaying, including the ability for Palm Tran to create and/or configure these to display the information it would like to track.

The Dashboards will incorporate “drill-down” abilities, such that when a selected dashboard is “clicked” it displays the underlying tables for more detailed analysis. The dashboard design shall be finalized as part of the CDR.

~~144.9.230.9.2~~ Report Generation

The FARE SYSTEM Backend shall provide the functionality that will allow Palm Tran to conduct data analysis and reporting for the entire FARE SYSTEM. Reporting and Analysis shall be for individual elements to the entire FARE SYSTEM, without limitation to the range and combination of selectable elements and type of data. The FARE SYSTEM Backend shall maintain a database of ALL data transferred from the FARE SYSTEM and all FARE SYSTEM Components that is available for the production of reports, standard and ad hoc custom, according to the user’s access authorization level.

Menu driven report generation software shall be provided to allow the user to design, store and edit custom reports within the limitations of the data fields of the database. Menus and screens to support the generation of reports as well as the timing and location of the resulting output shall be provided.

The reporting program shall have common report tools similar to those found in Crystal Reports or Microsoft products.

Daily, weekly, monthly, quarterly, and annual data shall be maintained by the FARE SYSTEM Backend for printing periodic reports. Report frequency and report period parameters shall be programmable within the report-generating package provided by the CONTRACTOR.

It shall be possible to designate any established report to automatically be generated and printed or exported by the FARE SYSTEM Backend following data downloads from the FARE SYSTEM Components, or at any other specified intervals, based upon calendar Date and Time of day to the hour.

For the standardized reports provided by the CONTRACTOR, the maximum time required for a database search and report generation shall not exceed three (3) minutes, and the average time shall not exceed thirty (30) seconds.

Database will be normalized to an extent to be identified and approved by Palm Tran. Based on standard search criteria, fields will be indexed to optimize reporting.

The CONTRACTOR shall include in the system routines that will allow Palm Tran through authorized means, to add indexes to specific fields. Functions shall be available to re-index the file.

The CONTRACTOR shall prepare a Data Maintenance Plan and Procedures for database maintenance, archiving and management of current as well as historical data for Palm Tran’s approval. This shall be provided as part of the CDR package (CDR - 30 and CDR - 31).

~~144.9.2.130.9.2.1~~ Statistical Reporting and Analysis

Fare transaction records shall include the following minimum information:

- Day/date/time/location of payment
- Number and denomination of coins accepted
- Number and denomination of bills accepted
- Denomination and other pertinent data of smart cards and other media
- Ridership categories
- Partial payments accepted by vehicle operator

The FARE SYSTEM Devices will securely and accurately record all transactional information, including sales data, operational errors, and exception conditions, ridership information, and operator commands.

~~144.9.3~~ 30.9.3 Report Formats

Authorized FARE SYSTEM users shall have the option of routing standard report outputs to a user's screen, a downloadable file, or to a selection of printers on Palm Tran's network. User shall always have the option to display the report before deciding whether to print or export it.

Data shall be stored in a format complying fully with the Open Database Connectivity (ODBC) standard. The FARE SYSTEM shall be capable of porting raw and summarized data to other programs, such as spreadsheets, databases and accounting packages. Reports shall be available for export in the following formats, at a minimum:

- ODBC
- DBF
- ASCII Comma-Delimited (CSV)
- Adobe PDF
- Microsoft Excel

The FARE SYSTEM Backend shall report on transactional data in summary terms, or in terms of individual field information. The FARE SYSTEM Backend shall provide the ability to sort through the database of transactions, applying any number of filters (such as specific account numbers, days of the week, etc.) to develop reports of usage of fare media and ridership information.

The user shall be able to select, summarize, and sort various data by a variety of associated fields such as FARE SYSTEM Component Number, Employee Number, Time Period, and FARE SYSTEM Component Type.

All reports shall carry Palm Tran's Operating Name, the Date or Period for which data is reported, and the Date on which the report is generated by the FARE SYSTEM Backend.

The need for historical data requires the FARE SYSTEM to have the ability to produce reports that span two (2) or more changes in fare structure or level without special programming. This requires a minimum ability to obtain two (2) years of data online, with archived data (unlimited) readily available.

The following Standard Reports, at minimum, shall be available from the FARE SYSTEM Backend, along with the capability to design and generate Custom – Ad-Hoc Reports as required by Palm Tran's operations. Equivalent reports carrying the same information may be provided, but format is subject to Palm Tran acceptance.

The reports to be provided, system operating procedures, means of transmitting data to other applications, and the format of the data shall be presented as part of the CDR (CDR - 15).

~~144.9.4~~ 30.9.4 Previewing Reports

The user shall have the capability to designate the report output form - either printed or displayed on the monitor. When the report is displayed on the monitor for previewing, it shall be possible at any time during this preview to:

- return to the menu
- print the report and return to the menu

- output to an ASCII comma separated or ODBC compliant file usable by spreadsheet or database programs

~~144.9.5.1~~ 30.9.5 Standard Reports

The following reports are to be delivered with the system:

~~144.9.5.1~~ 30.9.5.1 Registered Card Report

Detailed report showing all registered cards, including, date registered, card type, amount/products, etc.

~~144.9.5.2~~ 30.9.5.2 Detailed Usage Report

Detailed report showing card usage, default sort by Card UID# or Serial #, including all transaction/event information for usage.

~~144.9.5.3~~ 30.9.5.3 Daily Summary

Summary Report of card usage by media type:

- 1 day
- 30 day
- Which route

~~144.9.5.4~~ 30.9.5.4 Fraud Management

Report showing possible fraud attempts sorted by Card UID#. The possible categories include, at minimum, the following:

- Hackers
- Duplicating cards
- Check card balances

~~144.9.5.5~~ 30.9.5.5 Bad List Report

Detailed report of all cards placed on Bad Card List sorted date hot listed and by Card number. Also include date removed from list as well as the following minimum information:

- Lost
- Stolen
- Dormant

~~144.9.5.6~~ 30.9.5.6 Stop Report

Detailed report by stop, reporting number of boarding and stop requests (data to be sent from the AVL system).

- Boarding buses
- Bus stop Request

~~144.9.5.7~~ 30.9.5.7 Point of Sale Data

Detailed sales report for all POS transactions by device type, including, at minimum, the following:

- Type sold
- Money received

- Number of cards sold
- Purchase location

~~144.9.5.8~~ 30.9.5.8 Card Program Type Usage

Detailed report for all unlimited access card usage listed by usage participant category and sorted by date and card ID, including the following at minimum:

- Students
- Seniors
- Child 6 – 10
- Children that are free
- TD usage
- Palm Tran Employees
- TRAC
- Rideshare
- Transfers
- Surcharge
- Bike
- Free Routes

~~144.9.5.9~~ 30.9.5.9 Refugees

Detailed report for all Refugee card usage sorted by date of transaction and card id, including, at a minimum, the following:

- Track registered cards
- Track language spoken

~~144.9.5.10~~ 30.9.5.10 Registered Cards

Detailed report for all registered cards sorted by card ID and date registered, including, at minimum, the following:

- Gender
- Age
- Race
- Income
- etc.

Registration locations and website would need disclaimer indicating all information is used for transit agency and is not sold, distributed, etc.

~~144.9.5.11~~ 30.9.5.11 Driver Report

Detailed report for driver usage patterns, including log on/off, errors, etc. sorted by date of event and driver ID, including, at minimum, the following:

- run #
- employee #
- route
- bus id
- etc.

144.9.5.1230.9.5.12 Add value

Detailed report of Add value transaction at Farebox sorted by date and card id as well as including, dollar amount loaded. Report will show total number of add value transactions at Farebox.

144.9.5.1330.9.5.13 Revenue Report

Detailed and Summary reports showing cash collected versus card usage sorted by date and device type, including, at minimum, the following:

- Location ID
- Bus ID
- Device ID
- Etc.

144.9.5.1430.9.5.14 Bus History Report

The purpose of this report is to provide a detailed listing of activity for a selected bus or a selected group of Bus IDs. The report may be further conditioned to select activity on a specific date or date range. The data available presented shall be selectable to include or exclude any or all of the following:

- Route/Run/trip/Fare-set/service number
- Alarms
- Driver numbers
- Coins/bill/TTP/CSC activity
- Diagnostics
- Bus ID

144.9.5.1530.9.5.15 Bus probing report

Detailed report of which buses were probed sorted by date of last probe and bus ID, including, at minimum, the following:

- status of probe
- driver ID
- device ID
- revenue agent ID
- cash box pulled ID
- Cash box inserted ID
- Etc.

144.9.5.1630.9.5.16 Route/Run Summary and Detail Reports

The Route/Run summary report shall be printed on request at the end of the operating day. The Fare-set and Service Code used for the particular trip shall be indicated by number in a specific category. Separate columns for each Fare-set and service code need not be provided. Summary totals from the Route/Run lists shall be printed in Route-by-Route order, beginning with the smallest Route Numbers and progressing to the highest Route Numbers. For each Route printed, the number of lists included in the summary will be indicated.

It shall also be possible to print more detailed reports on Route/Run data, sorting by and printing data for specific Routes, Runs and/or trips or all Routes/Runs/trips. The same data as described in the last

paragraph shall be printed. The report shall present the individual Route/Run lists in order by time, with the earliest trip first; the Route, Run, trip and Driver number will be shown on each record.

The data in the Route/Run reports shall be based on when the Route/Run record was actually created (actual Date and Time), regardless of when the bus was interrogated, and the data received in the FARE SYSTEM Backend.

The FARE SYSTEM shall have the capability to export summary information to a file for importing into a graphics or spreadsheet program for graphic presentation of Route/Run data by time of day (e.g. a range of time), Route or Run and for additional analysis to be performed by the operator.

After a Route/Run summary report has been satisfactorily provided, it shall be possible to enter the summary data onto removable disk.

It shall be possible to select range of dates for Route/Run summary information to be reported. It shall be possible to select a group of buses or Routes (individually, by groups, or by ranges) on which to Run Route/Run detailed reports, without having to reselect the report through the menu each time. A single menu item will give access to a selection function for the buses or Routes to be reported, and bus or Route Numbers can then be selected (typed in) individually, in groups (e.g. "bus 123, 567 and 345"), or in ranges (e.g. buses 123 through 128).

144.9.5.1730.9.5.17 Electronic Fare Media Reports

The FARE SYSTEM Backend shall have the capability to generate revenue, ridership, and billing reports detailing, summarizing, and aggregating magnetic, smartcard or other electronic fare media (if accepted) transaction activity. The reports shall be designed for accommodating Palm Tran's business requirements for analysis, reporting, summarizing, and auditing Electronic Media activity. Such reports shall include but not be limited to the following:

- Electronic fare media revenue by type, category, client, card
- Electronic fare media by type, category, client, card
- Transfer matrix summary
- Linked trip card uses
- Ridership by location (where AVL data is available)
- Revenue by location (where AVL data is available)
- Card use record
- Negative-listed card use

It shall be possible to filter such reports by conditions such as, but not limited to the following:

- Selected date or date range
- Selected time or time period
- Selected Route or Routes
- Selected Run or Runs
- Selected trip or trips
- Selected Fare-sets and Service Codes
- Selected card type or types
- Selected account or accounts
- Selected card or cards

CONTRACTORs shall familiarize themselves with the business requirements that may be supported by transactional reporting of CSC activity. CDR (CDR - 15) submittals shall specifically address how the FARE SYSTEM Backend reporting capability may be utilized to support these requirements.

~~144.9.5.18~~ 30.9.5.18 Farebox Status Reports

The FARE SYSTEM Backend shall have the capability to generate reports detailing, summarizing, and aggregating Farebox activity for identifying irregular operating conditions. The reports shall be designed accommodating Palm Tran's business requirements for analysis, reporting, summarizing, and auditing Farebox and other FARE SYSTEM Device operations. Such reports shall include but not be limited to the following:

- Coins counted by type
- Coins returned
- Bills counted by type
- Bills rejected
- SCU CSC cycles (any operation)
- SCU CSC reads
- SC CSC misreads
- SCU CSC writes
- SCU CSC write verify failure

It shall be possible to filter such reports by conditions such as, but not limited to the following:

- Selected vehicle or vehicles
- Selected date or date range
- Selected Route or Routes
- Selected component or components (e.g., coin, SCU, etc.)

CONTRACTORs shall familiarize themselves with the business requirements that may be supported by transactional reporting of Farebox activity. CDR (CDR - 15) submittals shall specifically address how the FARE SYSTEM Backend reporting capability may be utilized to support these requirements. Sample or demonstration reports shall be submitted.

~~144.9.5.19~~ 30.9.5.19 FARE SYSTEM Backend FARE SYSTEM Status Report

The purpose of this report is to provide information related to the FARE SYSTEM Backend. The information provided shall include the status of the FARE SYSTEM Backend and garage data hardware configuration, program configuration, system list files, Farebox and FARE SYSTEM data files, monthly summary files, and Route summary files. FARE SYSTEM Backend system status reports shall also be available to detail user log-on records, authorization, and system access. Included in this report group is report detailing changes made to the system sorted by user ID, date, time and type of change.

~~144.9.5.20~~ 30.9.5.20 Cashbox Security Reports

The Cashbox Security Reports shall be designed to identify and facilitate the analysis of events specific to cashbox handling. This shall include various reports to identify cashboxes not recently processed by the FRCS, cashbox operational errors or exceptions, cashbox activity or history, and cashbox audit summary reports.

The FARE SYSTEM Backend shall provide a report that lists, at minimum:

1. Any instance in which a cashbox removed from a Farebox is not dumped in a receiver for more than "Y" minutes, based on the last time a cashbox was "seen" by a Farebox or receiver vault and reported to the FARE SYSTEM Backend, either through hard wiring to the FARE SYSTEM Backend (receiver vault) or being interrogated on a subsequent day.
2. Any instance in which the serial number of the cashbox removed from a Farebox is different from the serial number reported installed the last time that Farebox was interrogated.
3. Any instance in which a Farebox is without a cashbox for more than "Z" minutes based on the last time a cashbox was "seen" by a Farebox and reported to the FARE SYSTEM Backend.
4. Any instance where a cashbox has been exchanged between Fareboxes other than after it has been vaulted.
5. All cashboxes that have not been in a Farebox or receiver in "W" hours or "X" days, where "W" is a number between 2 and 48 and "X" being a number between 2 and 20, settable by Palm Tran at their respective FARE SYSTEM Backend as required by Palm Tran operations.
6. Any cashbox which has not been "seen" by the FARE SYSTEM in "W" hours or "X" days, by reason of being in a Farebox not interrogated, shall be identified in a separate list, with the Farebox (bus) number in which that cashbox was last reported to the FARE SYSTEM shown and the Farebox that was next interrogated. It shall also be possible to print the history of a given cashbox or group of cashboxes, showing when they were vaulted, and which buses they were used in. This report shall cover a selected period of dates and be filtered to include one or more garages or the complete fleet.

The values for Y and Z above shall be defined during Design Review. These criteria shall be based on the last time a cashbox was "seen" by a Farebox or receiver vault and reported to the FARE SYSTEM Backend, either through hard wiring to the FARE SYSTEM Backend (receiver vault) or being interrogated on a subsequent day.

Where a cashbox is identified through the above criteria, the Date and Time the cashbox was last observed by the FARE SYSTEM shall be identified, as well as the serial number of the Farebox(es) and the serial number of the cashbox(es) involved.

It shall also be possible to print the history of a given cashbox, showing when it was vaulted, and in which buses it was used. This report shall cover a selected period of dates, by one or more garage or fleet wide. It shall be possible to print a list, over a selected range of dates, of known cashboxes and where last detected.

It shall be possible to select range of dates for cashbox information to be reported. It shall be possible to select a group of buses or cashboxes (individually, in groups, or by ranges) on which to Run cashbox detailed reports, without having to reselect the report through the menu each time. A single menu item will give access to a selection function for the buses or cashboxes to be reported, and bus or cashbox numbers can then be selected (typed in) individually, in groups (e.g. "cashbox 123, 567 and 345"), or in ranges (e.g. cashbox 123 through 128).

144.9.5-2130.9.5.21 Mobile Safe Security Report

The Mobile Safe Security Reports shall be designed to identify and facilitate the analysis of events specific to Mobile Safe handling. This shall include various reports to identify cashboxes processed by the Mobile Safe, Mobile Safe operational errors or exceptions, Mobile Safe activity or history, Mobile Safe audit summary reports.

A report shall also be provided which reports the serial numbers of the Mobile Safes installed and removed from each RCV, the time the Mobile Safes(s) were installed and removed, and the calculated amount of money, which should be in each of the Mobile Safe. The FRCS shall have the capability of automatically identifying the serial number of the Mobile Safe in each RCV and transmitting this to the FARE SYSTEM Backend.

By accumulating individual cashbox deposit data, the FARE SYSTEM shall also print, for each Mobile Safe (by identifying number), the total amount of coins, bills, and tokens (by value) deposited into the Mobile Safe from the time the Mobile Safe was last inserted into the receiver housing until it was removed.

The FARE SYSTEM Backend shall track the movement of Mobile Safes between the various garages and shall be capable of reporting current location of any Mobile Safe installed in an RCV and Mobile Safes not seen for a user settable number of days.

~~144.9.5.22~~ 30.9.5.22 Daily Reporting

Daily, all information from FARE SYSTEM Devices is to be consolidated in the FARE SYSTEM Backend.

The FARE SYSTEM Backend will generate reports that provide the following information:

- Sales (Value or rides added, passes sold, transfers sold)
 - Sales value collected, to be transferred to clearinghouse
 - Bank credit card sales value -- accounts to be charged and value to be transferred to clearinghouse
- Service provided (Value or rides used, transfers used)
 - Post billing arrangements, (e.g. sponsor accounts to be billed)
 - Value used to be transferred to Palm Tran providing service.
- Cards issued or replaced, aggregate and disaggregate by Card Type, agency, time period, etc.
- Total amount of funds by account (agency, sponsor, credit/debit card and clearinghouse) necessary to reimburse all accounts.
- Account Activity, reflecting all daily account activity for any given agency, sponsor, point of sale, etc. This shall include:
 - Account set-up detail for any new or changed account information.
 - Account maintenance, reflecting any changed information on individual accounts.
 - Account status including status of inactive, dormant, and expunged accounts as well as accounts placed on-hold for administrative reasons.
 - Account audit, providing a detailed audit trail of all system functions and transactions, which impact the account balance, or status of an account.
- Data shall be available for individual card types. It shall be possible to establish new card types as needed for Palm Tran business purposes, for example, frequent rider accounts.
- Manual changes to system, a detailed report showing all manually entered changes to the system such as reversals, account revisions, additions or subtractions of accounts, etc. All such manual changes must include identifying information, including at a minimum, Agent ID/Driver ID/Login ID, Date and Time of changes, etc., for auditing purposes.

The FARE SYSTEM Backend shall also analyze transferring passengers using cards, indicating transaction level and summary data on transfers received. Aggregate analytic information (such as Route issued, date, etc.) shall be available.

The FARE SYSTEM shall support and provide information to support the creation of reports including at least the following information by the FARE SYSTEM Backend:

- Ridership and revenue reporting, database to allow for reporting by time-period (hour, day, week, month, etc.), service type, Route, passenger types, etc.
- Ad-Hoc inquiries for Customer Service to analyze ride history of specific cards.
- For each operator log-in/log-off the following summary data shall be made available:
 - Agency Code
 - Bus Operator Number
 - Date of Log-in
 - Date of Log-off
 - Time of Log-in
 - Time of Log-off
 - CSC Processor Number
 - DCU Number (if stored in the fare collection device)
 - Bus ID (if stored in the fare collection device)
 - Log-off Status (N=normal manual, F=Forced automatic)
 - Fare Table number
 - Run number (if stored in the fare collection device)
 - Route Number (if stored in the fare collection device)
 - Trip number (if stored in the fare collection device)
 - Trip end (if stored in the fare collection device)
 - Trip end time (if stored in the fare collection device)
 - Cumulative value of initial fares deducted
 - Cumulative value of transfer fares deducted
 - Cumulative value of fares deducted
 - Cumulative value of fare shortages
 - Cumulative count of initial fares
 - Cumulative count of transfer fares
 - Cumulative count of fare shortages
 - Cumulative count of transactions
 - Cumulative count of misread conditions
 - Cumulative count of power restored
- Each card transaction will be captured in memory with the following data at minimum to be reported by the FARE SYSTEM Device to the FARE SYSTEM Backend:
 - CSC Data designator
 - Card serial number
 - Issuing agency
 - Remaining value
 - Fare value deducted
 - Fare value shortage (if applicable)
 - Transfer charge deducted
 - Transaction code
 - Originating Route and direction (or parking lot or Location ID)
 - Location
 - Use sequence number/number in group
 - Previous agency code
 - Previous date of use
 - Previous transaction code
 - Previous equipment number

- Successful check read or bad verify as appropriate
- Exception type
- FARE SYSTEM Device type
- Recharge amount

~~144.9.5.23~~ 30.9.5.23 Individual Unit Reports

It shall be possible to display or print a detailed report on all activity of a given FARE SYSTEM Device, or a group of FARE SYSTEM Devices (groupings shall be available by Location ID, by Route, by vehicle class, by division and by sales outlet) for a given Date or Group or range of Dates. This report shall contain all information since the last time the FARE SYSTEM Component(s) was queried. For each FARE SYSTEM Component selected, the FARE SYSTEM Backend shall print an individual detailed report. Headings shall include (as appropriate to the FARE SYSTEM Device type) at minimum:

- Cumulative revenue
- Real-time revenue
- Total number of riders in each active Full Fare Pre-Set
- Number of riders or sales in each active cell in the Fare Table
- Total Bills (Number and value)
- Sales by employee

Multiple pages shall be used if required.

The first line of each individual unit report (the "master list") shall indicate the Date and Time of day the FARE SYSTEM Component was last queried and the location (Bus ID or Location ID) and FARE SYSTEM Component number. Cumulative totals for the activity of that FARE SYSTEM Component between queries shall be printed, corresponding to the column headings.

Any maintenance diagnostics, special counts and alarm indications shall also be printed.

It shall be possible to select a group of FARE SYSTEM Devices or a range of Dates for which to run detailed reports, without having to reselect the report through the menu each time. A single menu item shall give access to a selection function for the FARE SYSTEM Components to be reported, and locations (Bus IDs or Location IDs) can then be selected (typed in) individually or in ranges (e.g. TVMs 123 through 128). Dates shall likewise be selected in ranges (e.g. January 1 through January 5).

~~144.9.5.24~~ 30.9.5.24 Daily Summary Report

The purpose of the Daily Summary Report is to provide a summary of activity for a given Transit Day. Totals shall be printed for items such as the number of buses probed or interrogated, total revenue, total key counts, and total CSC transactions by category, and buses reporting alarms. The Daily Summary Report may be printed upon user request, usually after the end of the operating day. It shall be possible to request a Daily Summary Report – System Summary report for the Entire System or individually and separately for each location or a selected group of the locations.

The Daily Summary Report shall provide daily system totals for all of the items listed in the Individual Reports. If desired by the operator, full fare counts may be combined into a single "total ridership" category.

The Daily Summary Report shall also print a summary of the data from the exception report to indicate the following:

- Total number of buses interrogated/not interrogated

- Security door and cashbox alarms
- Bypass alarms
- Maintenance alerts (including power supply)
- Memory cleared action
- Unknown Driver log-on
- Unknown bus
- Unknown Route
- Unknown Run
- Other anomalous data from the exception report

~~144.9.5.25~~ **30.9.5.25** Periodic Summary Reports

The FARE SYSTEM shall generate summary reports for specific periods. Any report may be generated for any user settable period, such as a day, week, month, year, or an ad-hoc period such as between any two user settable dates.

Summary data for periods shall report:

- The Entire FARE SYSTEM by mode (bus, flex, Paratransit, customer service, POS)
- User selectable, Bus IDs, group of Location IDs separately, entire mode, POS outlets or group of outlets, or the Entire FARE SYSTEM
- System totals
- Exception data
- Device types (e.g., TVM, Farebox, RST, etc.)
- Data type (ridership, revenue, etc.)

~~144.9.5.26~~ **30.9.5.26** Exception Reports

Exception reports shall also be available, that list, by FARE SYSTEM Components location and number, all units that report the following:

- Unknown maintainer, servicer, Driver, Route, Run and trip numbers;
- Memory clears;
- Maintenance Required conditions
- Low stock (coins, CSC media)
- Other diagnostics exceeding user settable parameters

These do not have to be printed on a single report.

Detailed exception reports shall be available that shall indicate for each unit having an exception alarm the time at which it was probed or last reported, the last known Driver, the route number, run number and route/run time.

If available, the operator number active at the time the alarm is generated shall be reported.

~~144.9.5.27~~ **30.9.5.27** Maintenance and Error Reports

Detailed report by device type listing all maintenance and error related events sorted by date of occurrence and event status (open/closed), including all information for diagnosis/troubleshooting as well as information for scheduling of Preventive and Remedial Maintenance activities.

~~144.9.6~~30.9.6 Fraud Analysis

The FARE SYSTEM shall provide analytic tools allowing analysis for potential fraudulent use, skimming or counterfeiting of CSCs or electronic fare Products. This shall include, at minimum:

System shall allow a negative list that shall “lock out” identified fare media by serial number.

- An audit trail shall be maintained for fare media throughout the entire media life cycle.
- FARE SYSTEM shall report the use of unauthorized fare media
- FARE SYSTEM shall detect instances where fare media has been improperly modified to add value or Products.
- FARE SYSTEM shall detect instances where duplicate fare media with identical or unauthorized serial numbers are used or unlikely patterns of usage based on geographic or time separation.

~~144.9.7~~30.9.7 Computer Access Log

The Transaction Log shall maintain a record of all uses of passwords to access reports, the reports accessed, the time of log-on and log-off, etc. In particular, all editing of data in the FARE SYSTEM shall be recorded in the Transaction Log. Editing of the Transaction Log shall be possible only with access through the highest-level password.

The Transaction Log shall maintain this information for a minimum of sixty (60) days. It shall not be subject to editing by users through any CONTRACTOR FARE SYSTEM Backend software.

The Transaction Log shall only be accessed and printed by an authorized Palm Tran Administrator as determined by their assigned security level within the FARE SYSTEM.

~~144.9.8~~30.9.8 FARE SYSTEM Components Status

FARE SYSTEM shall be able to report the status and provide exception reports that list FARE SYSTEM Components that fall outside user definable parameters. Minimum reports to be available shall include:

- Consumables status, including change reserve and CSC media.
- Replenished money: a detailed list of all replenished moneys at any TVM with TVM ID number, Employee ID number, Date, Time and amount of replenished money.
- Recovered Money: detailed list of all recovered moneys at any FARE SYSTEM Device with Device ID, and Location, Employee ID number, Date, Time, Event Code and amount of recovered money.

The FARE SYSTEM Backend application shall facilitate analysis of historical usage patterns and component, FARE SYSTEM Components and network reliability rates (MCBFs, time between failures, Availability, etc.).

~~144.9.9~~30.9.9 Field Replaceable Unit Failure Report

FARE SYSTEM shall provide a report listing the Unit Failures, type of Defect, Time and Date of Failure, Time and Date of Replacement, Device ID, Component ID of unit removed and inserted (if applicable), and Reconciliation Method (Device cleared, or Maintenance Personnel Entry/Action).

~~144.9.10~~30.9.10 Field Maintenance Report

FARE SYSTEM shall provide reports listing field maintenance work performed, based on maintainer entries on the designed maintenance keypad at the FARE SYSTEM Device. Report shall include, at

minimum, the Maintainer ID (as indicated by keyboard or card entry), Maintenance Performed (based on codes entered by maintainers), Date and Time at which the entry was made and, if available, the Date and Time when the particular FARE SYSTEM Device was opened and returned to service.

It shall be possible to enter work orders for maintenance from FARE SYSTEM Backend Workstations or other designated computers on Palm Tran's Network.

Field maintenance shall be fully searchable by Device, Maintainer, Date and Time period, LRU, etc.

FARE SYSTEM shall allow inventory tracking down to the LRU level.

~~144.9.11~~ 30.9.11 CSC Utilization Reports

Information shall be available listing the usage of a CSC for a specified period. The report shall include Media ID and applicable CSC transaction logs.

CSC reports shall be available by FARE SYSTEM Device, groups of FARE SYSTEM Devices, Locations, Routes and System-wide, by Day, Week, Month, Quarter and Year. These reports shall include sales by FARE SYSTEM Device, Usage, Load and Reload, Card Usage, and Bad Card usage.

Database is to provide consolidated data regardless from which device generated the data, or disaggregate data, filterable by media type.

FARE SYSTEM shall have available detailed listing of all card transactions, with FARE SYSTEM Component Number, Location, Date and Time of Transaction, Date and Time of Authorization, Sequential Number, Card Type, Card Number (complying with applicable banking regulations), Card Expiry Date, and Authorization Code, along with the Total Number and Value of approved and disapproved Credit, ATM, and Debit Card Transaction. Individual Credit Card Data shall not be retained nor provided for such reports.

FARE SYSTEM shall be capable of generating reports of the use of cards by specific Sponsor/School Organization(s) over a selected period. User shall be able to have data filtered by Individual Routes, Divisions, Locations, Group of Locations separately, Entire Mode, POS Devices or the Entire FARE SYSTEM. User shall be able to have reported data sorted by Route, Run, Time/Date (e.g., a range of time from a beginning to an end date and predetermined time periods of the day including pre-a.m. peak, a.m. peak, midday, p.m. peak, post-p.m. peak.) or by other criteria available in the database.

~~144.9.12~~ 30.9.12 Passenger Specific Data

FARE SYSTEM Backend shall have the capability of associating specific CSC Serial Numbers with information relating to specific passengers, passenger sponsors, demographic information relating to specific passenger groups, etc., for the purpose of obtaining card history or providing customer service to registered customers. The CONTRACTOR is responsible for ensuring any personal information captured by the FARE SYSTEM shall be maintained and handled securely (i.e., encrypted) in accordance with applicable federal, state and Palm Tran Data Privacy and Security regulations in effect at the time of NTP. A minimum of fifteen (15) alphanumeric data fields of no less than sixty (60) characters each shall be available for this purpose.

All Ad-Hoc database reporting functions shall apply to passenger data equally. In addition, it shall be possible to search on specific fields or character strings to filter data.

~~144.9.13~~ 30.9.13 Sample Reports

As part of the CONTRACTOR's Proposal, the CONTRACTOR shall provide samples of all reports available from the proposed FARE SYSTEM Backend, as well as procedures for generating custom reports not included in the FARE SYSTEM.

The CONTRACTOR shall develop a list of the various types of statistical data generated by the FARE SYSTEM Components and the associated selection, subtotal, and sort options available for data analysis and report generation at the FARE SYSTEM Backend. This matrix shall be submitted as part of the CDR (CDR - 16).

~~144.9.14~~ 30.9.14 Additional Reports

Palm Tran may elect to request the CONTRACTOR to develop up to ten (10) additional reports to be generated by the FARE SYSTEM Backend upon FARE SYSTEM startup. Palm Tran shall specify these as part of the CDR (CDR - 15). The CONTRACTOR will provide these as part of the PDR (PDR - 23).

~~144.9.15~~ 30.9.15 Custom Report Design

The report-generating package shall permit Palm Tran to design reports requiring various data selection, filter, subtotal, and sort options, including the linking of data fields in various reports.

It shall be possible for Palm Tran to define custom reports to be used on a repeating basis, so it shall be unnecessary to reenter the report's specifications each time a given analysis is to be conducted.

The FARE SYSTEM shall support custom-design reports requiring user inputs or import of data from other systems, along with automatically downloaded data (for example, for comparison of FARE SYSTEM Components-reporting vault values and those reported by Palm Tran's cash counting facility).

~~144.10~~ 30.10 FARE SYSTEM Backend Documentation and Training

The CONTRACTOR shall provide complete documentation and training regarding the FARE SYSTEM Backend use, maintenance, operation, security and network connectivity, including the methods to be used to generate reports and transfer data from the CONTRACTOR's FARE SYSTEM Backend to commercial database and spreadsheet programs.

Training of personnel is to be provided in manipulation of the database to obtain desired transaction or summary information. After such training Palm Tran's employees shall be capable of generating custom reports using the FARE SYSTEM Backend.

The CONTRACTOR is to provide full documentation for all Files and Fields in the FARE SYSTEM Backend database and the Methods for gaining access to the information for generating custom reports. This information is to be submitted at the time of system delivery and training of Palm Tran employees.

~~144.11~~ 30.11 FARE SYSTEM Backend Performance

The provided FARE SYSTEM Backend shall be delivered with sufficient data storage capacity to store online a minimum of 365 days of activity and full transactional data with a 100% reserve. Storage of this

quantity of data shall not degrade measurably the FARE SYSTEM Backend operating or report generation performance.

The CONTRACTOR shall provide means by which to archive data older than 365 days. The FARE SYSTEM Backend shall be provided functional capability to utilize such archived data to process comparative type reports, such as but not limited to reports utilizing and comparing data from non-consecutive month periods in two different years, or day-of-week comparisons over multiple month or annual periods.

The FARE SYSTEM Backend system architecture, application design, and performance shall ensure that all standard reports, provided by the CONTRACTOR, shall be generated under all system operating conditions. All such reports shall complete at a rate not less than 150% of the output device – screen or printer – capability.

The FARE SYSTEM Backend system architecture, application design, and performance shall ensure that all "Ad-Hoc" formed reports shall be generated and complete under all system operating conditions in not less than 200% of the period required by CONTRACTOR provided reports. CONTRACTORS shall be required to present system performance and stress testing analysis of the reports as part of the PDR (PDR - 3).

~~144.1230.12~~ FARE SYSTEM Backend Hosting

The FARE SYSTEM back office will be hosted by a third party or "cloud" hosting provider such as Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform, or equivalent local provider. The third-party hosting provider will provide the performance, security, and redundancy to support the requirements of the FARE SYSTEM's account-based back office.

The cloud hosting provider will adhere to applicable Agency IT/hosting standards, including the Palm Beach County ISS Cloud Computing Security Standard. The CONTRACTOR shall be responsible for installation, configuration, and testing of the hosted solution. The determination of cloud hosting capacity and functionality will be determined by the CONTRACTOR based on Palm Tran expected transaction volumes and performance requirements.

All cloud hosting operations will be transparent to Palm Tran. The capacity and bandwidth chosen will be commensurate with the required transaction volume and may be adjusted upon increased usage. Palm Tran will not be responsible for excessive cloud hosting costs that are not required to operate the system at the performance level specified in this specification.

The CONTRACTOR shall be responsible for the following back office operations activities:

- Monitoring system performance and health
- Ensuring timely and accurate processing of transactions
- Overseeing operation of all back-office support systems

The CONTRACTOR shall provide a high availability cloud-based system that offers maximum protection against data loss and system failure. Means will be provided in the system design to ensure complete recovery from the loss of any system components at any point during operation.

All hosted data will be protected against loss or failure at a given hosting site. The hosted solution will be equipped with the appropriate hardware, software, and procedures to provide redundancy and meet all performance requirements. Load balancing, automated failover, and data mirroring between multiple sites will be provided as necessary. Processor load, memory utilization, errors, and other system performance indicators will be available in real-time to help prevent performance degradation and

troubleshoot back office issues. Alarm types and thresholds will be able to be configured to allow for custom alerts.

In order to comply with federal cloud hosting requirements, the back-office system and back office data shall be hosted in the United States. The CONTRACTOR shall provide Palm Tran access to the hosting provider as necessary. The CONTRACTOR shall configure the hosted solution to include a static IP address to facilitate access by Palm Tran. Palm Tran shall be able to perform penetration testing and vulnerability scans on the hosted solution, as per Palm Tran standards. The CONTRACTOR shall provide an SOC 2 report on an annual basis.

The CONTRACTOR will notify the PTPM and/or designated Security Manager immediately following discovery of system downtime, regardless of whether or not a cause has been identified. Within five (5) days of the incident, the CONTRACTOR shall submit a detailed report to Palm Tran that contains the scope of the problem, cause, and actions taken to prevent it from occurring again.

The CONTRACTOR shall develop and submit for approval by Palm Tran a disaster recovery plan that describes data backup and recovery and ensures minimal data loss in the event of a catastrophic event or system failure. The disaster recovery plan will contain detailed procedures to be followed to restore the system to full operation following a disaster or failover event. The CONTRACTOR shall on a yearly basis demonstrate that the disaster recovery plan functions as expected.

The CONTRACTOR shall provide documentation and training for Palm Tran and Palm Beach County staff in all procedures to maintain the hosted environment and restore the system in the case of a disaster recovery event. However, the CONTRACTOR will retain primary responsibility for disaster recovery as part of ongoing operations and maintenance.

144.1330.13 FARE SYSTEM Backend Backup and Recovery

The CONTRACTOR shall ensure all data of the FARE SYSTEM is protected against data loss and system failure. The FARE SYSTEM Backend shall provide functionality and tools to ensure the backup and complete recovery from loss of data at any FARE SYSTEM Device or any point within the FARE SYSTEM.

The CONTRACTOR shall provide an evaluation of the types of disasters, which may impact the System's operations and detail the steps to be taken to survive and recover from such disaster. The CONTRACTOR shall provide Palm Tran with its Disaster and Recovery plan (DRP) as part of its Proposal. The DRP shall include provisions to ensure that all settlement information continue to be accessible. In addition, the CONTRACTOR shall outline the resources (i.e., people, systems, telephone lines, and operations sites) that must be committed in order to support the DRP.

The FARE SYSTEM Backend shall support a hot backup architecture and fail-over to back up servers, eliminating a single point of failure. As a minimum, the system shall be deployed on two independent platforms.

All Revenue and Sensitive data shall be protected 100% against loss. The CONTRACTOR is responsible for ensuring any Data generated and contained in any FARE SYSTEM Component shall not be deleted until it has been properly received by and stored at the FARE SYSTEM Backend.

~~144.1430.14~~ FARE SYSTEM Security and Access

The entire FARE SYSTEM is to be fully protected against Unauthorized Access and/or Modification, including, but not limited to, modification of programs, including viruses, unauthorized modification of program code, and unauthorized access for the purposes of stealing or corrupting data or code.

Security of the FARE SYSTEM and its associated data is of utmost importance. Palm Tran's expectation is that the provide FARE SYSTEM includes all necessary HW/SW provisions for ensuring the security of information and the prevention of Unauthorized Access. The CONTRACTOR shall be responsible for any breeches of the FARE SYSTEM that should have reasonably been prevented.

All access to the FARE SYSTEM shall require the entry of a unique Agent ID/Driver ID/Login ID and Password, which has been assigned to authorized users of the system. The Access to the FARE SYSTEM Backend and FARE SYSTEM Components shall be controlled through an authorization control file. Users shall be assigned an authorization level along with Agent ID/Driver ID/Login IDs, Passwords, CSCs and/or Personal Identification Numbers (PINs).

The authorization level shall be defined by function and/or type of data. The authorization control file shall be structured in a matrix-based format to simplify modifications to data/function categories and authorization levels.

The authorization control matrix shall be expandable up to 20 functions/data types and 10 authorization levels. Only those functions to which the user has access shall be displayed.

Initial function/data categories shall include:

- First Level Maintenance
- Second Level Maintenance
- Revenue Services
- Auditing

It shall be possible for a person with proper level of software authority to make changes to the database, and add, modify or delete persons and passwords from the authorization control matrix.

The system shall ensure passwords are changed at ninety (90) day intervals, minimum, and not reused.

The system shall provide password lockout if a configurable number of invalid passwords are entered

The time a person can remain logged-on before an error message is created and a re-login is required or, if desired, further FARE SYSTEM access denied shall be configurable.

The system shall support logging and reporting of all access by Agent ID/Driver ID/Login ID, Date, Time and Activity. Record of successful and unsuccessful access attempts to information systems shall be maintained and protected from unauthorized destruction and modification. The file shall be accessible for viewing to persons with the proper level of authority.

Means shall be provided to prevent unauthorized access to data at the FARE SYSTEM Backend or hacking into the FARE SYSTEM from outside computers.

FARE SYSTEM Devices shall respond only to authorized information requests cleared for data transmission at authorized times established with security codes.

Data and Information sent over public communication lines shall be encrypted. The CONTRACTOR shall submit with its Proposal its proposed encryption scheme.

The CONTRACTOR shall prepare a Security Plan detailing the security provisions included as part of the CDR (CDR - 19). This shall include the entire authorization control matrix, including a detailed description of all functions and data included in each category.

~~144.14.130.14.1~~ Access Control and Active Directory

The system should integrate with Palm Tran's Active Directory (AD) using standard Lightweight Directory Access Protocol (LDAP) architecture and protocols. The AD system in use by Palm Tran is a 2008R2 Native Functional level. Users are assigned permissions by groups, and any portion of the FARE SYSTEM Backend should integrate with AD groups and support security by LDAP Group lookup. At the end of the project a list will be provided, by the CONTRACTOR, with all Access Control Level (ACL)'s for each individual section and secured point of entry. For every subsystem that requires a different level of authentication, the ACL shall be provided in the FARE SYSTEM Backend system.

~~144.1530.15~~ Data Transmission System

The CONTRACTOR shall be responsible for the design, installation, and testing of the FARE SYSTEM Network and Data Transmission System (DTS) over Palm Tran's existing LAN/WLAN.

All Data shall be exchanged between all FARE SYSTEM Components and Systems via the FARE SYSTEM Network and Palm Tran's existing Network Infrastructure.

Design, installation, and testing of all communication hardware shall be coordinated with Palm Tran. Design and interfaces to existing Palm Tran systems shall be submitted as part of the CDR (CDR - 18). The Test Protocols for the data transmission network shall be submitted as part of the CDR (CDR - 22).

All data transfer formats and protocols between FARE SYSTEM Components and the FARE SYSTEM Backend shall conform to TCP/IP requirements. FARE SYSTEM Backend software shall be compatible with that currently in use at Palm Tran. All software shall be subject to Palm Tran Acceptance.

~~144.1630.16~~ Palm Tran Rider Account

The CONTRACTOR shall be responsible for the design, installation, and testing of the Palm Tran Rider Account Management portal. The Proposer shall describe its proposed Rider Account Management portal, including the processes for account registration, maintenance, opt-in functions, data fields, notifications, reports, etc. The FARE SYSTEM Backend shall provide the capability, through a web interface, to allow Palm Tran riders to register their CSCs. The registration shall establish and account, controlled with commonly accepted secure username/password schemes. Registration will capture the following minimal information:

- Full name – required entry field
- Telephone number (home, work, cell, other) – at least one number required to be entered
- CSC number as printed on the card – required entry field
- Mailing Address
- Email address

Once an account is established, the user can conduct the following operations:

- Create autoloan – requires a valid method of electronic payment for recurring charges
- Create directed loads – requires a valid method of electronic payment for a one-time charge
- View transaction history – since account registration

- View purchase history – since account registration
- Register additional CSCs
- Sign-up for text and/or email notifications regarding low card balance and/or fare product is about to expire.

The rider shall be able to access, securely, their account through the internet via a PC, Laptop, Tablet, mobile phone, etc.

~~145~~31 FARE SYSTEM Integration Elements

~~145.1~~31.1 Retail Network

A primary distribution channel for fare media and stored value will be an extensive network of retail merchants. The retail network will consist primarily of merchant locations that currently sell prepaid debit cards (e.g., gift cards) and where the point-of-sale (POS) system is already integrated with at least one (1) prepaid debit card network provider. The retail network will be managed by a provider experienced in the integration and management of these retail networks. As part of the CONTRACTOR's overall FARE SYSTEM solution, the CONTRACTOR will partner or subcontract with an experienced retail network provider. Ideally, the provider will have established relationships within Palm Beach County. Regardless, the CONTRACTOR will be responsible for working with its retail network provider to establish, develop and integrate the retail network, including the integration of any retail network provider-furnished POS equipment as part of the CONTRACTOR's FARE SYSTEM Solution. Proposers shall describe their Retail Network Development plan, including information about their proposed retail network provider. The selected CONTRACTOR shall update finalize their Retail Network Development Plan as part of the CDR package submittal.

Using the CONTRACTOR developed Fare Distribution API, an external retail system will be able to create a transit account, add value to the stored value in a transit account, and add a fare product to the transit account. The sale of fare media by a retail merchant will initiate the automatic creation of a transit account within the FARE SYSTEM.

The FARE SYSTEM back-office system shall be configurable to control what value(s) and/or fare products are available to the retail system. The transaction data will be fully compliant with the requirements defined in the System Security section for the handling of customer PII.

Transaction data elements will be defined during the CDR design review. Transaction data elements will include but not be limited to:

- Card type
- Unique card identifier
- Transit account number
- Date and time of transaction
- Transaction type
- Transaction value
- Beginning transit account balance
- Ending transit account balance
- Merchant ID
- Merchant name
- Merchant location

The CONTRACTOR shall work collaboratively with the retail provider to provide the necessary equipment, documentation, and services to support the successful completion of all relevant testing phases. The retail network provisioning and testing will be completed in coordination with the CONTRACTOR to support operation of a fully functional retail network no later than the commencement of revenue service.

The CONTRACTOR shall work collaboratively with the retail provider to develop test scripts that together accurately and completely confirm all features and functionality of the provider's retail network system. The CONTRACTOR shall submit the test scripts as part of the CDR package. The CONTRACTOR shall work with the retail provider to incorporate retail network functionality into Palm Tran's test facility.

The Palm Tran test facility will be connected directly to a retail provider-specified payment processor to fully test the processing of card, stored value and/or pass purchases using credit/debit as a form of payment.

The retail network will allow a merchant to reverse a transaction prior to authorization of the transaction with the FARE SYSTEM. Retail network transaction reversals will result in no charge to the customer. Once a sale is completed by the retail network (i.e., reversal is no longer possible), authorization and provision of refunds will be the responsibility of Palm Tran (or their agent) using the interfaces (e.g., CRM) to the FARE SYSTEM. The time window when a transaction reversal is permitted by the retail CONTRACTOR will be established during the CDR design review.

The CONTRACTOR shall work closely with the retail provider throughout the Field Integration Test to help resolve issues and implement fixes in the retail network identified during testing.

145.231.2 CAD/AVL

The CONTRACTOR shall be responsible for the integration of the Farebox with the CAD/AVL system installed on Palm Tran vehicles. The CONTRACTOR shall partner with the CAD/AVL CONTRACTOR and be fully responsible for the CAD/AVL integration, including all labor, hardware, and software costs incurred by both parties to successfully integrate the two (2) systems. Any licensing costs necessary to support the CAD/AVL integration will be included in the CONTRACTOR's cost proposal. Palm Tran's CAD/AVL provider is Avail.

The integration will use the CONTRACTOR-developed and provided CAD/AVL Integration API and will support single sign-on and the capture of geo-location and trip data. Single sign-on will enable the CAD/AVL login and routing data to be captured by the integrated Farebox, including but not limited to:

- Operator ID
- Pattern
- Block
- Route
- Run
- Direction
- Trip ID

The login and routing data will be appended to every fare transaction generated by the integrated Farebox. The Farebox will capture geo-location data generated by the CAD/AVL system, including;

- Raw Global Positioning System (GPS) coordinates
- Stop ID

The geo-location data will be appended to every fare transaction generated by the integrated Farebox. The integrated Farebox will also include an embedded GPS receiver, and append locally captured GPS coordinate data to each transaction. A detailed Interface Control Document (ICD) detailing message formats and contents, procedures, interfaces, and transport protocols will be provided for the onboard systems integration.

The interface will occur over the J1708 or other acceptable network, and will include, but not be limited to, the following commands/data to be transmitted to the CAD/AVL:

- Log on
- Log off
- Request to Talk
- Priority Request to Talk
- Run Number
- Driver ID

The final list of commands/data will be determined during the CDR design review.

The interface will occur over the J1708 or other acceptable network, and will include, but not be limited to, the following commands/data to be received from the CAD/AVL:

- Log on
- Log off
- Run Number
- Route Number
- Driver ID

The final list of commands/data will be determined during the CDR design review.

~~145.331.3~~ Other Modes

The CONTRACTOR developed and supplied fare payment API will support integration with modes of ancillary services; e.g., parking gates, bike rental kiosks, bike lockers and similar equipment to enable the payment of parking and bike sharing fees using a closed-loop transit account. The FARE SYSTEM will support configurable parking- and bike sharing-specific business rules, including flat fees paid at entry, and time-based fees calculated between entry and exit taps. The FARE SYSTEM will support configurable discounting of transit, parking, and/or bike fares and fees for cross-mode utilization to support first/last-mile policies in the region. These business rules will be determined during the CDR design review.

The FARE SYSTEM will support the loading of pre-tax (i.e., dedicated) parking and/or bike funds, which will be segregated within a closed-loop transit account and used only for the payment of approved fees. The CONTRACTOR shall design the FARE SYSTEM to report and settle parking- and bicycle-related payments separate from transit fares.

~~14632~~ Design Reviews

In order to ensure that the provisions of the Contract are adequately addressed, the CONTRACTOR design shall be subjected to Design Reviews, which shall include: Conceptual Design Review (CDR), Preliminary Design Review (PDR) and Final Design Review (FDR) at which times Palm Tran shall have the

opportunity to review, recommend change, and approve the FARE SYSTEM design and program progress.

The CONTRACTOR shall be required to submit documentation packages for the CDR, PDR and FDR in accordance with the requirements specified herein and as required by the Master Project Schedule (MPS). The Design Reviews will not be initiated by Palm Tran until all specified elements are complete and submitted in their entirety. The Design Reviews shall not be completed until the status of all elements of the appropriate package have been delivered by the CONTRACTOR and reviewed and approved by Palm Tran.

Except as otherwise indicated herein, Design Reviews shall be conducted at Palm Tran's facilities in the West Palm Beach, FL region.

~~146.132.1~~ Design Review Requirements

As indicated above, the Design reviews shall be conducted to evaluate and confirm the progress and technical adequacy of the design, as well as to ensure its conformance to the Contract Requirements. Prior to each review, a Design Review package shall be submitted that includes the CDRL and other items required for and to facilitate the review.

The CDR, PDR and FDR may not be conducted concurrently. Attendance at Design Review meetings may include representatives of other CONTRACTORS as determined by Palm Tran.

Unless otherwise authorized by Palm Tran, the CONTRACTOR may not proceed to the next Design Review without having completed successfully the prior design review.

~~146.232.2~~ Conceptual Design Review (CDR)

The CDR shall review the CONTRACTOR's proposed FARE SYSTEM, using the CONTRACTOR's Proposal and Conformed Contract documents as the basis from which the CONTRACTOR shall complete the CDR package. Since most of the proposed FARE SYSTEM is developed from components already developed and deployed in existing projects, the CDR will be used to identify and clarify Palm Tran specific items, initially indicated in the Proposers Proposal. Besides the CDR Deliverables mentioned herein, the following, at a minimum, shall be provided as part of the CDR package:

- Detailed technical descriptions of the FARE SYSTEM and its components
- Preliminary layouts for all FARE SYSTEM Components
- Drawing of passenger interface arrangements
- Preliminary installation layouts for all FARE SYSTEM equipment
- Mounting arrangements and installation methods
- Single-line power diagrams, control schematics, and functional block diagrams for each subsystem, including a functional overview
- A description of how each FARE SYSTEM Components, sub-system, or sub-component down to the lowest field replacement unit goes into limited operating condition
- List of special tools and Diagnostic and Test Equipment (DTE) for each subsystem
- List and description of all person-FARE SYSTEM Device interfaces
- Software system-level flow charts
- Software data backup and recovery procedures
- Software design descriptions for all programmable FARE SYSTEM Components
- Software version control system

- Testing Program Plan
- Draft Documentation
- FARE SYSTEM prototypes with software to demonstrate the proposed FARE SYSTEM

The following table illustrates the required CDR Deliverables:

Table 7 - CDR Deliverables

CDRL	Description	Notes
CDR - 1.	FARE SYSTEM ADA Compliance	ADA compliance will be verified
CDR - 2.	Automatic Fare Collection System Complete Design Details	Complete design details of the proposed FARE SYSTEM
CDR - 3.	Employer/Student Pass Program Application Complete Design Details	Complete design details of proposed Application
CDR - 4.	Electronic Validating Farebox Complete Design Details	Complete design details of proposed Farebox
CDR - 5.	Farebox Screen Flows and Messages	Provide complete details for Farebox Screen Flows and Messages
CDR - 6.	Installation Plan	Complete description of the FARE SYSTEM Installation Plans by Class of Vehicles and locations. Identify any requirement to relocate, reposition, remove, or otherwise modify vehicle handrails, or equipment to accommodate installation of the FARE SYSTEM equipment
CDR - 7.	Farebox Configuration Parameters	Provide complete detail for all Farebox parameters that are configurable by Palm Tran
CDR - 8.	DCU Complete Design Details	Complete design details of proposed DCU
CDR - 9.	DCU Mounting Location Details	Drawing of Preferred Mounting Location by Vehicle Class Identify any requirement to relocate, reposition, remove, or otherwise modify vehicle handrails, or equipment to accommodate installation of the DCU
CDR - 10.	DCU Screen Flows and Messages	Provide complete details for DCU Screen Flows and Messages
CDR - 11.	Full FARE SYSTEM Communication	Detailed Communication processing functionality and procedures for entire FARE SYSTEM, it will be subject to Palm Tran audit confirmation.
CDR - 12.	TVM dispensed CSCs	Provide specifications for CSCs to be used in FARE SYSTEM
CDR - 13.	TVM Screen Flows and Messages	Provide complete details for TVM Screen Flows and Messages
CDR - 14.	TVM Configuration Parameters	Provide complete detail for all TVM parameters that are configurable by Palm Tran
CDR - 15.	FARE SYSTEM Reports and Data	Complete list of reports for the proposed FARE SYSTEM, including reports at the device level. Complete System Operation Procedures Details for transmitting data to other applications Data format details
CDR - 16.	Statistical Data Analysis and report generation	Complete details about various types of statistical data generated by the FARE SYSTEM Include associated selection, subtotal, and sort options



CDRL	Description	Notes
CDR - 17.	FARE SYSTEM Backend Screen Flows and Messages	Complete details of the screen flows, menus, messages, etc. for the FARE SYSTEM Backend
CDR - 18.	FARE SYSTEM Network	Complete details of FARE SYSTEM Network Listing of any deficiencies associated with Palm Tran's LAN/WAN
CDR - 19.	Data Security Plan	Complete details for Proposed Data Security Plan
CDR - 20.	Draft Training Material	1 Electronic – 5 hard copies of all training materials
CDR - 21.	Draft Documentation	1 Electronic – 5 hard copies of all FARE SYSTEM Documentation/Manuals
CDR - 22.	Testing Program Plan	Complete TPP
CDR - 23.	Warranty Plan	Complete Warranty Plan
CDR - 24.	Program Management Plan	Complete PMP
CDR - 25.	CST/RST Screen Flows and Messages	Provide complete details for CST/RST Screen Flows and Messages
CDR - 26.	Electronic Payment and Clearinghouse Processing	
CDR - 27.	Change Management Process	Detail description illustrating the CONTRACTOR's Change Management Process for the FARE SYSTEM.
CDR - 28.	Quality Assurance Program Plan	Detailed QAPP for the FARE SYSTEM
CDR - 29.	Quality Assurance Program	Detailed QAP for the FARE SYSTEM
CDR - 30.	Data Maintenance Plan	Detailed Plan outlining the maintenance, archiving and management of the FARE SYSTEM Database
CDR - 31.	Data Maintenance Procedure	Detailed Procedure for the maintenance, archiving and management of the FARE SYSTEM Database

The CDR review will yield two categories of Action Items:

1. CDR Material, which is lacking in detail or insufficient, these Action Items will require corrections before receiving CDR Approval.
2. CDR Elements that will require changes to meet requirements, these Action Items will need to be completed and submitted as part of the PDR.

~~146.332.3~~ Preliminary Design Review

The PDR shall review the CDR Action Items to ensure requirements are met. At this phase, the FARE SYSTEM design should be greater than 85% complete. At a minimum, the PDR shall include:

- Final Detailed technical descriptions of the FARE SYSTEM and its components
- Final layouts for all FARE SYSTEM Components
- Final passenger interface arrangements
- Final installation layouts for all FARE SYSTEM equipment
- Finalized Mounting arrangements and installation methods
- Final Detailed Single-line power diagrams, control schematics, and functional block diagrams for each subsystem, including a functional overview

- Final Detailed description of how each FARE SYSTEM Components, sub-system, or sub-component down to the lowest field replacement unit goes into limited operating condition
- Final Detailed List of special tools and Diagnostic and Test Equipment (DTE) for each subsystem
- Final Detailed List and description of all person-FARE SYSTEM Device interfaces
- Final Detailed Software system-level flow charts
- Final Detailed Software data backup and recovery procedures
- Software design descriptions for all programmable FARE SYSTEM Components
- Software version control system
- Final FARE SYSTEM prototypes with software to demonstrate the proposed FARE SYSTEM

The following table illustrates the required PDR Deliverables:

Table 8 - PDR Deliverables

CDRL	Description	Notes
PDR - 1.	Locks and lock identities	Complete Description of all Locks and keys for the FARE SYSTEM.
PDR - 2.	Key Handling Procedure	Procedure for securely managing and distributing associated keys (physical and virtual) for the FARE SYSTEM.
PDR - 3.	FARE SYSTEM Processors Utilization	Demonstrate all FARE SYSTEM processors throughout the system while under load only utilize up to 50% of processing capacity.
PDR - 4.	TVM Equipment Power Consumption	Complete electrical details for all powered TVM devices confirming overall power consumption.
PDR - 5.	Farebox Equipment Power Consumption	Complete electrical details for all powered Farebox devices confirming overall power consumption.
PDR - 6.	RST/CST FARE SYSTEM Equipment Power Consumption	Complete electrical details for all powered RST/CST FARE SYSTEM devices confirming overall power consumption.
PDR - 7.	Complete FARE SYSTEM Design Documentation	Complete FARE SYSTEM Design Documentation, including flow diagrams, data structures, parameter tables, and all other design and development documentation, with each software package. Such documentation shall be accompanied by a functional description of the software as applicable to Palm Tran's FARE SYSTEM.
PDR - 8.	List of Commercially Available	Includes a description of the capabilities and proposed functionality.
PDR - 9.	Automatic FARE SYSTEM Complete Design Details	Final design details of the FARE SYSTEM
PDR - 10.	FARE SYSTEM Working Prototype	Working prototypes of entire FARE SYSTEM
PDR - 11.	FARE SYSTEM Test Criteria	Detailed description of all testing criteria for the FARE SYSTEM
PDR - 12.	Employer/Student Pass Program Application Complete Design Details	Final design details of proposed Application
PDR - 13.	Electronic Validating Farebox Complete Design Details	Final design details of proposed Farebox
PDR - 14.	Farebox Screen Flows and Messages	Final details for Farebox Screen Flows and Messages
PDR - 15.	Farebox Configuration Parameters	Final detail for all Farebox parameters that are configurable by Palm Tran
PDR - 16.	LLRU Serial Numbering	Complete listing of all LLRU Serial Numbers throughout the entire FARE SYSTEM.
PDR - 17.	Farebox Installation Plan	Final Description of the Farebox Installation Plans by Class of Vehicle – updated with any requirement to relocate, reposition, remove, or otherwise modify vehicle handrails, or equipment to accommodate installation of the Farebox equipment



CDRL	Description	Notes
PDR - 18.	DCU Complete Design Details	Final design details of proposed DCU
PDR - 19.	TVM Screen Flows and Messages	Final TVM Screen Flows and Messages
PDR - 20.	CST/RST Screen Flows and Messages	Final CST/RST Screen Flows and Messages
PDR - 21.	FARE SYSTEM Backend Screen Flows and Messages	Final screen flows, menus, messages, etc. for the FARE SYSTEM Backend
PDR - 22.	Full FARE SYSTEM Database Dictionary and Schema	Complete FARE SYSTEM Database Data Dictionary and Schema
PDR - 23.	FARE SYSTEM Reports and Data	Final reports for the proposed FARE SYSTEM, including reports at the device level. Final System Operation Procedures Final Details for transmitting data to other applications Data format details
PDR - 24.	Final Training Material	1 Electronic – 5 hard copies of all training materials
PDR - 25.	Test Procedures	Complete Test Procedures for all FARE SYSTEM Tests

The PDR review will yield two categories of Action Items:

1. PDR Material, which is lacking in detail or insufficient, these Action Items will require corrections before receiving PDR Approval.
2. PDR Elements that will require changes to meet requirements, these Action Items will need to be completed and submitted as part of the FDR.

~~146.432.4~~ Final Design Review

The FDR shall review the PDR Action Items to ensure requirements are met. At this phase, the FARE SYSTEM design should 100% complete. The FDR shall be the final stage to determine whether the detailed design conforms to the design requirements established in the Contract documents. At a minimum, the FDR shall include:

- All information submitted in the PDR, but 100% finalized.
- Final revisions of drawings and documentation
- Assembly drawings down to the LLRU level
- Final Software documentation, including all software development documentation available or used in the CONTRACTOR's design process, consisting of structured data flow diagrams, event tables and/or dialogue diagrams to the lowest level of decomposition with software module descriptions (or elemental process descriptions) in structured narrative format.
- Shut-down and start-up sequences
- Final Electrical schematic drawings, down to the individual signal or wire level, for each electrical circuit
- Final Software flow charts or structure charts that give an overview of the processor software
- Demonstrate completed algorithms expressed in program design language or pseudo code
- Final Input data definitions
- Final Output data definitions



- Final Interrupt structure definition
- Final Program parameters
- Final Diagnostic routines for processor self-test and subsystem self-test
- Final Error handling routines
- Final Data Dictionary for all program, data storage and data staging database entities
- Final installation plan and drawings.
- Final Testing and Cutover Plan.

The following table illustrates the required FDR Deliverables:

Table 9 - FDR Deliverables

CDRL	Description	Notes
FDR - 1.	Key Deliver	Delivery of Keys to designated Palm Tran personnel identified in PDR - 2.
FDR - 2.	Test Cases	All test cases for testing FARE SYSTEM
FDR - 3.	Certification and Conformance Test Results	Provide certified results, analysis, etc. for FARE SYSTEM showing conformance to requirements defined herein; e.g., EML.
FDR - 4.	Final FARE SYSTEM Design Documentation	Final FARE SYSTEM Design Documentation, including flow diagrams, data structures, parameter tables, and all other design and development documentation, with each software package. Such documentation shall be accompanied by a functional description of the software as applicable to Palm Tran's FARE SYSTEM.
FDR - 5.	Final list of Commercially Available	Includes a description of the capabilities and proposed functionality.
FDR - 6.	Finalized FARE SYSTEM Working Prototype	Final Working prototypes of entire FARE SYSTEM – First Articles of FARE SYSTEM.
FDR - 7.	Employer/Student Pass Program Application Complete Design Details	Final design details of proposed Application
FDR - 8.	Electronic Validating Farebox Complete Design Details	Final design details of proposed Farebox
FDR - 9.	Final As-Built Documentation	1 Electronic – 5 hard copies of all FARE SYSTEM Documentation/Manuals – all changes, modifications, etc. reflecting the FARE SYSTEM installed and in operation, which may differ from the original contract requirements, shall be updated and documented in the appropriate manuals, drawings, etc. for this final submittal.
FDR - 10.	Software Licenses	Delivery of all software licenses for the FARE SYSTEM

The FDR review will yield two categories of Action Items:

1. FDR Material, which is lacking in detail or insufficient, these Action Items will require corrections before receiving FDR Approval.
2. FDR Elements that will require changes to meet requirements, these Action Items will need to be completed before receiving FDR Approval.

~~146.4.1~~132.4.1 Design Baseline

For the purposes of change control, the design baseline shall be established at the FDR. Subsequent changes will need to be submitted to Palm Tran for approval prior to any implementation of any design

changes. The Proposer shall include within its Proposal its proposed Change Management Process (CMP). The CONTRACTOR shall submit its CMP as part of the CDR (CDR - 27).

~~147.133~~ TRAINING

The following section describes Palm Tran's requirements for CONTRACTOR provided Training. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

The CONTRACTOR shall be responsible for training Palm Tran and designated personal in all aspects of the FARE SYSTEM. This training will cover the Administration, Configuration, HW/SW/Life Cycle Maintenance, Operations, Programming, Security and subsequent Training.

The CONTRACTOR shall provide an Initial Training for all of the various elements of the FARE SYSTEM, which provides Palm Tran personnel with an in-depth understanding of the FARE SYSTEM. This initial training will allow Palm Tran personnel to work with and operate the FARE SYSTEM in Revenue Service. The Initial Training shall be completed prior to the FARE SYSTEM going into Revenue and shall not be given more than a month prior to the start of Revenue Service.

Additionally, the CONTRACTOR shall develop video/YouTube training modules to facilitate on-line training. The outline and scripts for the video training shall be provided as part of the CDR, to be finalized as part of the PDR.

Approximately eight (8) weeks, following this Initial Training, the CONTRACTOR shall provide a follow-up in-depth training. This follow-up training will use "live" trouble tickets as training examples and incorporate "field-trip" training sessions to work on the actual equipment in the field. The purpose of arranging the training in this manner is to provide Palm Tran personnel with an initial understanding of the Proposed FARE SYSTEM; allow Palm Tran to work with the new FARE SYSTEM such that they have clearer understanding of how the Proposed FARE SYSTEM works; and facilitate a fuller more enhanced and enriched learning experience.

The Proposer shall provide a sample of its Training Program Plan (TPP) that would cover the training of its proposed FARE SYSTEM. Also, the Proposers shall include in its proposed FARE SYSTEM MPS when and for how long training will be provided. This should be of sufficient detail to highlight each of the individual training modules.

The TPP shall be based on the CONTRACTOR's established standard training courses modified as required to reflect Palm Tran's installed system, and which shall include the topics and materials described herein. Training shall include course development, on-site instructors, the supply of appropriate handouts and manuals, the preparation of classroom aids, and all other items as required to prepare personnel to operate the CONTRACTOR supplied FARE SYSTEM.

~~147.133.1~~ General Outline

The training courses described in the section shall include the following:

~~147.133.1.1~~ Training Program Plan

The TPP shall include detailed outlines and lesson plans, which shall be submitted as part of the CDR (CDR - 22). Instruction shall be designed to include courses described below and shall cover equipment familiarization, systems operations, and field/shop maintenance. The minimum training required for the CONTRACTOR to provide is that which is necessary to bring those employees designated to the level of

proficiency required for operations, service, and maintenance of the furnished equipment. Formal training shall include, classroom, practical work, and shall be augmented by informal follow-ups as needed.

Training mock-ups shall be provided to assist with the training. The mock-ups shall be retained by Palm Tran for in-house training. Practical training on equipment shall occupy a significant portion of all training classes. A Palm Tran representative will attend each training class to respond to questions related to Palm Tran Policy.

Training for operators will be train the trainer, all other training will be with the end users, maintainers and system administrators.

All students will be expected to complete successfully tests, for respective training modules, to verify that they have learned and can demonstrate proficiency of the respective training topic. All tests will comprise oral, written and hands-on. All tests will be given and conducted in English.

The TPP will outline for each module the prerequisite skill sets and knowledge necessary in order to take the class. Also, the TPP will indicate the maximum number of students for the give module. The CONTRACTOR can assume each Palm Tran trainee/student shall possess, at minimum, the following skills and capabilities:

- Basic math skills
- A working knowledge of the English language
- A basic understanding and familiarity of basic electricity and electronics
- General understanding of the job tasks required to be fulfilled

In addition, for all field and shop maintenance training sessions the following are required:

- A basic understanding in computer hardware and software
- Knowledge of, and the ability to use testing devices, equipment and hand tools
- General understanding of the software tools listed in the software lesson plans
- Basic knowledge about Microsoft/ operating systems is assumed
- For the FARE SYSTEM Backend System and Database Administration, Certification for System and Database Administration and some basic software development knowledge (Java, C++, SQL, ODBC, Visual Basic, and XML) is required.

The training program is designed around modules that offer instruction on increasingly complex tasks. Some courses may require having successfully completed a prior course, which will be outlined in the TPP.

The CONTRACTOR will be responsible to provide all equipment and training aids necessary for conducting the training.

147.233.2 Instructor Qualification

The CONTRACTOR shall provide experienced and qualified instructors to conduct the training courses at the designated training facilities. Training should be oriented to the job classification of the students. Palm Tran Personnel expected for training are:

- Palm Tran Trainers
- Equipment Maintainers
- IT personnel

- Customer Service personnel
- Palm Tran Supervisors
- Palm Tran Management

The CONTRACTOR shall expect supervisory and management personnel to audit the training classes. If in the opinion of the designated Palm Tran management personnel, a CONTRACTOR instructor(s) lack the skill or knowledge to provide instruction or cannot communicate with the students Palm Tran reserves the right to request the training to be repeated and/or the instructor replaced at no cost to Palm Tran.

~~147.3~~33.3 Equipment

The CONTRACTOR shall provide and install a FARE SYSTEM training system that emulates the entire proposed FARE SYSTEM to be deployed at Palm Tran. The FARE SYSTEM training system will comprise the actual FARE SYSTEM Devices being delivered as part of the proposed FARE SYSTEM. This system may "hook" into the CFMS as long as training can be conducted without impacting or affecting the Actual Operations of the Production system.

~~147.4~~33.4 Training Material Submittal

The CONTRACTOR shall provide one (1) electronic and five (5) complete hard copies of all draft training materials as part of the CDR (CDR - 20). Final training material shall be submitted as part of the PDR (PDR - 24).

~~147.4.1~~33.4.1 Electronic Documentation and Training

All documentation and training material provided shall also be submitted in electronic pdf format. A directory of all files on the disk shall be listed in hard copy showing filenames, date, file size, and appropriate annotation to cross-reference the chapter and section.

~~147.4.2~~33.4.2 Reproduction of Training Material

Palm Tran reserve the right to reproduce portions or all training material for the sole use of Palm Tran.

~~147.4.3~~33.4.3 Update of Training Material

The CONTRACTOR will be responsible to keep the training material current during the warranty period. Any changes to the FARE SYSTEM shall be reflected in the appropriate training material.

~~147.5~~33.5 Training Schedule

As mentioned, the Proposer shall include in its proposed MPS when and for how long each type of training will occur.

~~147.6~~33.6 Driver Training

For Driver Training, the CONTRACTOR shall deliver Farebox Operator training. The CONTRACTOR shall provide sufficient documentation and data to train Palm Tran training personnel who will have responsibility to train Palm Tran personnel. The purpose of this training is to instruct Palm Tran training personnel in the operation of the Farebox system in sufficient detail to establish equipment and

operational familiarity. At the completion of training, Palm Tran trainers will demonstrate competency in the operation of the Farebox by successful achievement on performance and written examinations.

~~147.7~~33.7 Revenue Collection Training

For Revenue Collection Training, CONTRACTOR shall deliver Revenue Collection Facility Vault Handling and TVM revenue servicing training. The CONTRACTOR shall provide the services of a qualified and experienced instructor who shall conduct FRCS and TVM Revenue service training classes for Palm Tran personnel in the proper procedures for FARE SYSTEM vaulting, cashbox removal, and RCR operation, as well as TVM revenue vault removal and replacement. At the completion of training, Palm Tran personnel will demonstrate competency in the operation of the FRCS and TVM revenue collection process by successful achievement on performance and written examinations.

~~147.8~~33.8 Revenue Collection System Operation Training

For FRCS Operation Training, the CONTRACTOR shall deliver Revenue Collection Facility Vault Handling training. The CONTRACTOR shall provide the services of a qualified and experienced instructor who shall conduct FRCS training classes for Palm Tran personnel. In addition to the training elements described above, training shall also be provided in the proper procedures and operation of the RCV and Mobile Safe. At the completion of training, Palm Tran personnel will demonstrate competency in the operation of the FRCS by successful achievement on performance and written examinations.

~~147.9~~33.9 Maintenance Training

For Maintenance Training, the CONTRACTOR shall Field Repair & Maintenance and Shop Repair & Maintenance training. The CONTRACTOR shall provide Palm Tran with an experienced and qualified instructor who shall conduct maintenance training. The purpose of the training is to train Palm Tran maintenance personnel in all aspects of maintenance and repair of all equipment provided under this contract. This shall include troubleshooting and diagnostic methods and preventive maintenance techniques to be employed in the proper maintenance of the equipment. The CONTRACTOR shall develop the course material for use in this class and provide such training aids as may be required to illustrate and demonstrate the required topics.

At the completion of training, Palm Tran personnel will demonstrate competency in the maintenance of the fare collection and FRCS by successful achievement on performance and written examinations.

In addition, Palm Tran may send to the CONTRACTOR's designated manufacturing facility up to six (6) maintenance personnel to receive comprehensive instructions on the inspection, maintenance and repair of all of the equipment provided under this contract. The CONTRACTOR shall develop the course material for use in this training and provide such training aids as may be required to illustrate and/or demonstrate the required points. The CONTRACTOR shall provide an experienced and qualified instructor(s) for the duration of this course. CONTRACTOR shall be responsible for the transportation and per diem expenses of these personnel sent for this training.

This training shall include but not be limited to the following:

- Basic construction and operation of the FARE SYSTEM Components
- Examination and disassembly system including:
 - Bill validator
 - Coin validator

- CSC processor
- Electronic chassis
- Lower section and cashbox
- Electrical wiring harnesses
- Troubleshooting procedures
- Field-level repair of system and related equipment
- Preventive maintenance on all subassemblies
- Electrical wiring/troubleshooting
- Electronic theory and function of system
- J-1708, RS-485, and RS-232 interface ports
- Software overview of all interrelated systems
- Disassembly and repair of cashboxes and vaults

Each student will be required to tear-down and build-up a Farebox in the class

Class size will be limited to a maximum of eight (8) participants in each class.

~~147.1033.10~~ 147.1133.10 FARE SYSTEM Backend Training

For FARE SYSTEM Backend Training, the CONTRACTOR shall deliver Systems Programming & Repair and System Administration training. The CONTRACTOR shall provide an experienced and qualified instructor who shall conduct training classes related to the full and proper operation of the FARE SYSTEM Backend.

System operations training shall be conducted with the objective to familiarize Palm Tran personnel with the FARE SYSTEM Backend operating systems, communication environment, system protocols, and program logic required to support FARE SYSTEM Backend system configuration, operation, and maintenance.

Functional operations training shall be conducted with the objective to familiarize Palm Tran personnel with the FARE SYSTEM Backend functional operation, data management, and report generation. The training shall fully review all FARE SYSTEM Backend user functions, including but not limited to, data sorts and database management, report selection and generation, file management and retrieval, file back-up and restoration procedures, Fare Table and FARE SYSTEM management, and FRCS operation.

At the completion of training, Palm Tran personnel will demonstrate competency in the operation of the FRCS by successful achievement on performance and written examinations.

~~147.1133.11~~ 147.1133.11 Customer Service Training

For FARE SYSTEM Customer Service Training, the CONTRACTOR shall deliver Customer Service User, Account Management, and Administration training. The CONTRACTOR shall provide an experienced and qualified instructor who shall conduct training classes related to the full and proper operation of the FARE SYSTEM Backend and Frontend devices as it pertains to Customer Service.

The training shall be conducted with the objective to familiarize Palm Tran personnel with the FARE SYSTEM operations, account system overview, customer service screen navigation, and other information required to provide FARE SYSTEM customer support.

At the completion of training, Palm Tran personnel will demonstrate competency in the customer service operation of the FARE SYSTEM by successful achievement on performance and written examinations.

~~147.12~~33.12 Training Performance Measurement

Personnel trained in the operation and maintenance of the FARE SYSTEM equipment shall demonstrate proficiency by actual performance, written tests, and repair of equipment. The CONTRACTOR shall certify to Palm Tran that personnel passing the written and practical tests are capable of operating and maintaining the fare collection equipment and system.

~~147.13~~33.13 Passenger Education Program (PEP)

The CONTRACTOR shall provide samples of public education leaflets and instruction sheets for use in developing a Passenger Education Program (PEP). The CONTRACTOR shall supply photographs, clip art, graphic artwork, and other such material in suitable form to be used by Palm Tran to develop public education material. The CONTRACTOR and Palm Tran shall mutually agree on the form or forms of transmission.

The Proposer shall provide samples with its Proposal.

~~148~~34 DOCUMENTATION

The following section describes Palm Tran's requirements for CONTRACTOR provided Documentation. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

The CONTRACTOR shall deliver the CONTRACTOR's standard documentation modified as required to reflect Palm Tran's installed FARE SYSTEM, which is being provided by the CONTRACTOR. The Documentation shall be to the Lowest Level Replaceable Component (LLRC) and provide sufficient description, detail, and illustration to support installation, configuration, operation, maintenance, and repair of the equipment and systems provided in the exercise of this Contract. The PTPM or designated representative shall be the sole judge of accuracy of documentation and documentation submittals.

The CONTRACTOR shall be responsible for providing to Palm Tran Documentation for all aspects of the FARE SYSTEM. This will cover the Administration, Configuration, HW/SW/Life Cycle Maintenance, Operations, Programming, Security and Training.

The Proposer shall provide a listing of all the documentation being provided with the proposed FARE SYSTEM. Also, the Proposers shall include in its proposed FARE SYSTEM MPS when Documentation will be provided.

The CONTRACTOR shall provide one (1) electronic and five (5) complete hard copies of all draft Documentation as part of the CDR (CDR - 21). Final Documentation shall be submitted as part of the FDR (FDR - 9).

The CONTRACTOR will be responsible to keep the Documentation current during the warranty period. Any changes to the FARE SYSTEM shall be reflected in the appropriate Documentation.

Palm Tran reserve the right to reproduce documentation for their sole use and purpose.



~~148.1~~134.1 Special Tools

The CONTRACTOR shall provide a list of all special or custom tools or instruments required to install, maintain, or adjust any component in the proposed FARE SYSTEM. The CONTRACTOR shall also provide a list of suppliers of required special or custom tools or instruments.

The Proposer shall provide this list with its Proposal.

~~148.1.1~~134.1.1 Bill of Material

The CONTRACTOR shall provide a complete Bill of Material that includes unique part numbers, descriptions, generic names and generic part numbers for each component in the proposed FARE SYSTEM. The Bill of Material shall include identification to the Lowest Replaceable Component (LRC). Diagrams and drawings shall identify each FARE SYSTEM Components and shall call out each component with the unique part number as referenced in the Bill of Material. Sub-component detail of commercial equipment such as computers and peripherals shall also be called out.

~~148.1.2~~134.1.2 Listing of Sources

For all FARE SYSTEM parts, the CONTRACTOR shall provide a listing by sources, down to the LRC, for purchasing these components and parts. Listed sources shall be other than the CONTRACTOR and Subcontractors. For parts that are proprietary and only available from the CONTRACTOR, these shall be included in the listing, but denoted as proprietary. For all parts, the CONTRACTOR shall include the Manufacturer Part Number, List Price, Lead time and contract information.

~~149~~35 DELIVERY AND INSTALLATION

The following section describes Palm Tran’s requirements for CONTRACTOR provided Delivery and Installation. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

The Proposer shall provide a sample of a Delivery and Installation Plan (DIP) that it has used for similar AFCs as the one it is proposing for Palm Tran. The Proposer shall include its proposed Delivery and Installation schedule in the MPS being included as part of its Proposal.

It will be the responsibility of the CONTRACTOR to remove the existing FARE SYSTEM now in use on all buses. All costs with this task are to be included in the Proposal submitted. The existing FARE SYSTEM equipment will be retained by Palm Tran after their removal from the vehicles.

During the installation of the new FARE SYSTEM, the existing FARE SYSTEM must remain functional. The Proposer should describe its proposed FARE SYSTEM Transition Plan for keeping Palm Tran’s Current FARE SYSTEM in operation until it is ready to “cut” over to the proposed FARE SYSTEM. The CONTRACTOR’s Transition Plan should minimize as much as possible any impact to Palm Tran’s operations. The Proposer should highlight any specific requirements expected of Palm Tran.

The CONTRACTOR shall be responsible for all work involved in the running of any overhead or underground conduits for data and power cables up to 200 feet in length. All plans for such work shall meet all requirements of city and county building codes in effect at the time of NTP. The CONTRACTOR shall furnish the necessary cabling, electrical and data, for installing the proposed FARE SYSTEM, completely.



The CONTRACTOR shall be responsible for any required building permits and/or licenses necessary to complete this work for the entire FARE SYSTEM. The Proposer shall indicate in the Proposed MPS time to obtain any required permits, licenses and to have any required inspections conducted.

The CONTRACTOR shall provide storage and work facilities to accommodate the New FARE SYSTEEM Components and Palm Tran’s existing FARE SYSTEM fare collection system and equipment now in use on all Palm Tran buses and facilities at no additional cost to Palm Tran. All costs with this task are to be included in the Proposal submitted. The facility shall be situated near one of Palm Tran’s garage facilities, environmentally controlled, protected against the outside elements, secure, allow only authorized access, and setup under a renewable annual lease.

~~149.135.1~~ Installation Time

For Farebox Devices, Palm Tran generally maintains sufficient spare vehicles to support installations after the morning rush hour. The CONTRACTOR shall install FARE SYSTEM Devices on Palm Tran vehicles during the period vehicles are made available by Palm Tran. Palm Tran shall make vehicles available for installation during the following periods:

Table 10 – Farebox Installation Times

Weekdays:	11:00 PM through 4:00 AM
Saturday:	11:00 PM through 4:00 AM
Sunday:	7:00 PM through 4:00 AM

Vehicles may be made available at other times at the discretion of Palm Tran and by prior arrangement. At no time shall Palm Tran’s regular revenue service be disrupted.

~~15036~~ MAINTENANCE AND SPARE PARTS

The following section describes Palm Tran’s requirements for CONTRACTOR provided maintenance equipment, specialized tools and fixtures, spare parts and maintenance reporting system necessary to support the FARE SYSTEM. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

The CONTRACTOR shall submit a list of recommended parts (with part numbers and manufacturers), respective quantities, price, expected usage and component-level service life expectancies for Palm Tran spare-parts planning and budgeting requirements. The CONTRACTOR shall provide sufficient spare and replaceable components to ensure 99% FARE SYSTEM availability. Palm Tran will provide a lump sum for an initial quantity of spare parts with adjustments from actual usage against the CONTRACTOR’s recommendation.

~~150.136.1~~ Spare Parts and Itemized Price List

The CONTRACTOR shall prepare and submit to Palm Tran a recommended list of spare modules and parts to support the installed FARE SYSTEM, ensuring a 99% FARE SYSTEM availability. This list shall be grouped by equipment type, each module, part, and plug-in PC card assembly. The list shall provide complete ordering and procurement information for each item. Each item listed shall include, at minimum, the following information: item-name, description, current price, original manufacturer's name, part number, drawing reference number, recommended quantities, expected average delivery

time, expected life cycle, and alternative sources. Items that are common to more than one equipment, module, or subassembly shall be suitably cross-referenced.

Recommended quantities shall be provided based on expected usage. Alternatively, a recommendation based on a percentage not-to-exceed 10% of the installed base may be provided, as long as, this quantity will ensure a 99% FARE SYSTEM availability. All other requirements outlined in this section shall remain in effect.

Palm Tran will monitor actual usage against the CONTRACTOR's recommendations. Should actual usage in Revenue Service exceed the CONTRACTOR's recommendations by greater than fifty percent (50%), the FRB shall conduct an investigation and based on its findings, determine a course of action, which could be for the CONTRACTOR to provide additional spare parts and/or implement corrective actions to remedy the issue at no additional cost to Palm Tran.

The stock level shall be consistent with the normal replacement anticipated. This level shall be a function of the total equipment in service and the availability from the CONTRACTOR's normal supply operation for such parts. Future spare purchases shall be provided within a nominal 90-day time period. The CONTRACTOR shall identify and justify any long lead spare parts that cannot be provided within the specified time period and provide alternative supply approaches. The list of long lead parts will be updated by the CONTRACTOR as required during the design life of the system.

The prices quoted in this list shall be in effect for a minimum of one-year (1) period from FARE SYSTEM Acceptance.

~~150.236.2~~ Consumables

The CONTRACTOR shall provide a list of recommended consumable spare parts, such as bulbs, belts, fuses, bearings, etc., to support the FARE SYSTEM for a period of one year. This list shall include, at minimum, the following information: item-name, description, current price, original manufacturer's name, part number, drawing reference number, recommended quantities, expected average delivery time, expected life cycle, and alternative sources.

Palm Tran shall purchase consumable spares and monitor actual usage against the CONTRACTOR's recommendations. Should actual usage in Revenue Service exceed the CONTRACTOR's recommendations by greater than fifty percent (50%), the FRB shall conduct an investigation and based on its findings, determine a course of action, which could be for the CONTRACTOR to provide additional parts and/or implement corrective actions to remedy the issue at no additional cost to Palm Tran.

~~150.336.3~~ CONTRACTOR Responsibility

For fifteen (15) years after delivery and Final Acceptance of the FARE SYSTEM, the CONTRACTOR shall maintain an adequate inventory of spare parts for all the equipment furnished under this contract. In situations where a part or component is no longer available, the CONTRACTOR shall identify a compatible replacement solution. The replacement solution will represent the most cost-effective approach that retains the overall form, fit and functionality of the affected part or component, including all Field Modification Instructions (FMIs) to support the implementation of the replacement solutions. The CONTRACTOR shall ensure that a sufficient number of original components are available through the base warranty.

The CONTRACTOR shall submit to Palm Tran an executed document Acceptable to Palm Tran, defining a binding responsibility to furnish all CONTRACTOR-designed modules and spare parts, their drawings and specifications, including any applicable patent information.

In the event the CONTRACTOR fails to furnish these parts within a reasonable time, a period not to exceed ninety (90) days after receipt of order, the CONTRACTOR shall notify Palm Tran to arrange suitable replacements. This arrangement shall include providing sufficient information to allow Palm Tran to procure suitable manufacture of the parts affected.

~~150.4~~ 136.4 Maintenance Support Equipment

Palm Tran anticipates performing all levels of maintenance, preventative, field repair, shop-level and overhauls to all equipment in the FARE SYSTEM. Shop level repairs include repairs to the LRC level as defined by the CONTRACTOR; for example, a PC board is considered an LRC.

The CONTRACTOR shall provide maintenance support equipment that includes the following:

~~150.4.1~~ 136.4.1 Standard Support Equipment

Standard support equipment includes equipment or tools that are commercially available from more than one source. The CONTRACTOR shall supply Palm Tran a list of all support and test equipment and tools required to operate and maintain the equipment.

~~150.4.2~~ 136.4.2 Special Tools

The CONTRACTOR shall provide a list of any special tools needed to maintain the FARE SYSTEM. Special tools are defined as special diagnostic tools and equipment for each subsystem and equipment that are not readily available from commercial sources. The CONTRACTOR shall be responsible to provide any special tools needed for maintenance of the FARE SYSTEM that are not identified in the Proposal at no cost to Palm Tran. The CONTRACTOR shall provide sufficient documentation to allow Palm Tran to manufacture or procure these special tools as needed.

~~150.4.3~~ 136.4.3 Special Test Fixture

The CONTRACTOR shall supply Special Test Fixtures (STF) that provide the means for maintenance personnel to bench test, repair, and calibrate each major module and/or subassembly of the FARE SYSTEM.

STF shall operate as a complete functioning FARE SYSTEM. The CONTRACTOR shall provide whatever interlock bypasses may be necessary to ensure a fully functional test system capable of testing any modules and sub-assemblies provided as part of this contract.

The STF shall be sufficient to conduct comprehensive in-house testing, service validation, and repair over the entire service life of the FARE SYSTEM equipment. The STF shall be configured in order to maximize effectiveness and efficiency of the maintenance program, such that LCRs are mounted suitable for operation from a standard workbench. All interconnections including wiring, harness, plugs, sockets and other connections shall be the same as used in the respective FARE SYSTEM Equipment, except in cases where longer cables or wires are required to connect the various components while they are disassembled. The mounted components shall be arranged in such a manner that each module can be separately exercised to perform its functions; verifying the proper operation of all sub-system

components shall be possible with a level of accuracy and completeness identical to the criteria used during manufacturing and acceptance tests.

Also, the STF shall contain all provisions necessary to communicate with the CFMS, simulate the FARE SYSTEM installed in the field, troubleshoot integral machine faults in a controlled environment, and to test FARE SYSTEM modifications prior to full implementation of such modifications.

~~150.536.5~~ Maintenance Reporting

The proposed FARE SYSTEM shall capture in individual transaction and event records detailed information pertaining to the FARE SYSTEM and its components such that FARE SYSTEM, at any given time, is reporting the health of the system down to the individual components. The FARE SYSTEM shall include a System Status Monitor, which shows the health using color coded graphical representation. The monitor will allow Palm Tran to “drill” from a high-level system view down to individual components. Status shall include, at minimum, the following:

- Device ID
- Component Serial Number
- Error codes
- Date of occurrence
- Status of Error
- Date of maintenance activity
- Date of last PM
- Current or Last user ID logged in
- Component specific data
- Etc.

In addition, all diagnostic/troubleshooting information from the FARE SYSTEM shall be sent to Palm Tran’s Enterprise Asset Management (EAM) system for tracking and scheduling of all maintenance and troubleshooting activities.

Lastly, all FARE SYSTEM devices shall allow diagnosis via a laptop as well as report self-check information via an email update through the maintenance department’s Verint surveillance system.

~~151.37~~ TESTING

The following section describes Palm Tran’s requirements for CONTRACTOR provided testing and inspections to certify and accept the FARE SYSTEM. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

All of the FARE SYSTEM Components, sub-systems, systems processes, etc. constituting the entire FARE SYSTEM shall be tested individually and as an integrated whole to ensure that the delivered FARE SYSTEM meets requirements of Palm Tran. The CONTRACTOR’s obligations shall include all labor, materials, support services, or other FARE SYSTEM Components, software or services required to completely inspect and test all hardware and software of the FARE SYSTEM, including the CFMS; whether it is implemented as a hosted system or not.

~~151.137.1~~ Testing Program Plan

The Proposer shall provide with its Proposal a sample of its Testing Program Plan (TSPP), which illustrates all of the testing to be provided for a similar system as its proposed FARE SYSTEM. The objective of the Test Program is to ensure that the equipment furnished under this Contract shall meet all the requirements of Palm Tran. The Proposer shall indicate in its proposed MPS when and for how long testing will be conducted.

The CONTRACTOR shall provide the TSPP as part of the CDR (CDR - 22). This plan will include a description of all tests to be performed, test objectives, expected results, setup, prerequisites, when, where and other pertinent information to provide Palm Tran with a clear understanding of the FARE SYSTEM testing. The TSPP will be the guiding document being followed for the testing of the FARE SYSTEM throughout the course of the project. Each of the individual tests outlined within the TSPP will have its own specific, more detailed, test procedure.

The CONTRACTOR, as witnessed by Palm Tran, will be required to perform the following minimum tests:

A. Design Review Test (DRT):

The purpose of the DRTs is to provide check points during the respective Design Reviews to evaluate the progress and technical adequacy of the design and conformance with the requirements of this Contract. The successful completion of the applicable Design Reviews shall be a prerequisite before proceeding with the next review and applicable testing.

B. First Article Test (FAT):

The purpose of the FAT shall be to verify that FARE SYSTEM hardware and software to be supplied functions as defined.

C. Design Qualification Testing (DQT):

The purpose of the DQT shall be to verify that the FARE SYSTEM hardware and software to be provided meets the requirements of this Contract, including integration with all components of Palm Tran's current systems; e.g., the Avail CAD/AVL system.

D. Pre-Shipment Testing (PST):

The purpose of the PST shall be to verify the FARE SYSTEM hardware and software is ready to be shipped in preparation for Installation.

E. Pre-Installation Checkout (PIC)/In-Service Qualification Test (ISQT):

The purpose of the PIC and ISQT shall be to provide an assurance of equipment performance and an early warning of any problems, as well as to verify that the FARE SYSTEM hardware and software delivered meets Palm Tran's requirements as a fully integrated system and is ready for being installed in the field.

F. Reliability, Maintainability and Accuracy Test (RMAT):

The purpose of the RMAT is to test and ensure the system meets all of Palm Tran's requirements and is ready to be accepted by Palm Tran.

G. System Acceptance Test (SAT):

The purpose of the SAT is to conduct the final testing after all corrective actions have been implemented ahead of Palm Tran accepting the FARE SYSTEM and beginning the Warranty Phase of the Contract.

~~151.1.1~~ 137.1.1 Test Procedures

The CONTRACTOR shall as part of the PDR (PDR - 25) all of the test procedures for the above defined test phases. The Proper shall include Sample Test Procedures illustrating the above tests as conducted for other similar FARE SYSTEM projects. Each procedure shall include a detailed testing schedule indicating the sequence of each test, where and when each test shall take place, and a description of the CONTRACTOR's Quality system for control of the test equipment throughout the entire program, including parts lists, drawings, inspection and test records, networks and maintenance records. Information provided for each inspection and test shall include, at minimum, the following:

- Inspection/test title
- Organization performing and responsible for the inspection/test
- Inspection/test location
- Inspection/test purpose and objectives
- Inspection/test pass/fail criteria
- A complete software test plan and individual test scripts for each delivered program and interface
- Inspection/test schedule providing the following information at a minimum:
 - Inspection/test procedure submittal
 - Inspection/test start date
 - Inspection/test duration
 - Inspection/test report/Certification submittal
- Outline and format of test data sheets, defining the responsibilities of the CONTRACTOR and Palm Tran, and the methodology for correcting variances
- Procedure to be followed for the resolution of test problems and failure recurrence.

The TSPP and Test Procedures shall cover all CONTRACTOR, Supplier and Subcontractor inspections and tests to be performed, including those performed under the CONTRACTOR's QA plan. No inspections or tests shall be performed before the CONTRACTOR has received Palm Tran's authorization to proceed with a given test.

All testing will be conducted with Palm Tran. For any test in which Palm Tran elects not to participate, the CONTRACTOR shall provide proof of testing. This proof shall include certification that the respective Test Procedure was followed.

In event of test failure or failure recurrence, a re-test shall be performed for all FARE SYSTEM Components affected by adjustments resulting from testing, up to and including the Entire System if Palm Tran reasonably determines such is needed.

~~151.1.2~~ 151.1.3 37.1.2 Detailed Inspection Sheets

For each inspection, the CONTRACTOR shall provide detailed check-off sheets to be used during the inspection process. The check-off sheets shall include, but not be limited to, the following information:

- Information provided in the Inspection and Testing Plan (repeated)
- Measuring and Test Equipment Serial and Calibration Date
- FARE SYSTEM Components to be inspected
- Measurements to be taken, including required instrumentation
- Features required to be present
- Criteria required to be met
- Any related documentation (drawings, prints, vendor specifications, and recommendations)
- Fields for witnesses' names and signatures
- All other information required to monitor and manage the inspection

~~151.1.3~~ 151.1.3 37.1.3 Inspection and Test Reports

The CONTRACTOR shall submit a written report for each inspection and test, including copies of all inspection/test data to be submitted as evidence for each test and Palm Tran's review. The Inspection/test reports shall include all historical data, such as inspections and tests performed, failures, modifications and repairs, pertaining to the item, FARE SYSTEM Components or System tested. These reports shall include, at a minimum, the following:

- Reference to the appropriate Article of the Inspection and Testing Plan and to the corresponding Detailed Inspection Sheets or Detailed Test Procedures;
- Description of test performed;
- Date of the test;
- Description of all problems;
- Description of any preventive maintenance performed during the test, including the duration of such activities;
- Test results;
- Identification of the CONTRACTOR's test engineer, and Palm Tran's representative;
- Retest schedule and procedures, if required.
- If a retest, discussion of changes made prior to retest;
- Identification and signatures of the CONTRACTOR's test engineer, and Palm Tran's representative; and,
- Copies of datasheets.

~~151.1.4~~ 151.1.4 37.1.4 Testing Facilities

Except for FAT and PST, all testing shall be conducted at Palm Tran.

~~151.1.5~~ 151.1.5 37.1.5 Failure Review Team

Refer to Section 9.4.

~~151.1.6~~ 151.1.6 37.1.6 Fleet Defect

In the event that the failures, hardware or software, are exhibiting a pattern of the same failure, a Fleet Defect shall be declared. The test in progress at the time will be stopped and the CONTRACTOR shall be

given one (1) week to resolve the defect or if that is not feasible, to submit a remedial corrective action plan and schedule for Palm Tran's review and approval. Once the defect has been resolved, a two (2) week period will be allowed to verify that the resolution has been made satisfactorily and the stopped test will be restarted from the beginning.

~~152.238~~ 152.238 WARRANTY AND GUARANTEE

The following section describes Palm Tran's requirements for CONTRACTOR provided warranties and guaranties of the FARE SYSTEM. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

~~152.138.1~~ 152.138.1 Warranty Plan

The Proposer shall provide a sample of its warranty plan as used for another project similar to the proposed FARE SYSTEM. The CONTRACTOR shall submit its Warranty Plan for the proposed FARE SYSTEM as part of CDR (CDR - 23). The Warranty Plan shall detail all processes and procedures to be used for all anticipated warranty redesign, repairs, or replacements during the Warranty Period.

Palm Tran's approval of the Warranty Plan shall not limit or waive any Palm Tran warranty rights.

~~152.238.2~~ 152.238.2 Warranty Coverage

The CONTRACTOR warrants to Palm Tran that entire FARE SYSTEM, including all hardware, software, FARE SYSTEM Components constituting the FARE SYSTEM, including without limitation, the equipment, computer systems and software (including firmware), furnished under this Contract shall be free from known Deficiencies under normal operating use and service. Deficiencies found during the Warranty Period shall be corrected in accordance with the provisions of this Warranty.

Warranties with respect to hardware, software and third-party products shall be separated.

Only written warranties shall be valid, no oral representations or warranties are allowed.

The CONTRACTOR shall provide all labor and material to replace, during the period of this Warranty, without expense to Palm Tran, all hardware and software FARE SYSTEM Components that may be damaged due to defects in material and workmanship, or failure of such FARE SYSTEM Components to comply with the Contract requirements.

Third party components/third party software (e.g. Microsoft, etc.) embedded in CONTRACTOR's products are subject to the warranty and license conditions available from such third parties. In case of any Defect occurring as a result of failures or malfunction caused by Third Party Software, the CONTRACTOR shall use its reasonable endeavors to take such measures as are required to return the FARE SYSTEM or affected FARE SYSTEM Components to Revenue Service, subject always to the conditions of any Third-Party Software supplier.

Palm Tran shall notify the CONTRACTOR of Defects within a reasonable time after a Defect becomes apparent.

Warranties defined in the Contract are exclusive and are established expressly in lieu of all other warranties, conditions, and representations, express or implied, available under law or in equity, including any implied warranties of merchantability or fitness for a particular purpose.

Palm Tran shall maintain FARE SYSTEM Components not under maintenance contract with the CONTRACTOR in accordance with the CONTRACTOR's Training and Documentation.

Subject to the warranty provisions and the Warranty Plan, CONTRACTOR shall be solely responsible for all materials and workmanship, including all specialties and accessories, whether manufactured by the CONTRACTOR or others, used in the FARE SYSTEM and for adequate installation and connection of all FARE SYSTEM Components constituting the FARE SYSTEM.

During the Warranty Period, and subject to the warranty provisions and the Warranty Plan, the CONTRACTOR shall, at no additional charge to Palm Tran shall:

- Correct any Defect in the FARE SYSTEM or any FARE SYSTEM Components, and provide such work required to maintain the FARE SYSTEM so that it operates properly and in accordance with the FARE SYSTEM Specifications. The CONTRACTOR will do this by delivering two updates per year to resolve minor "bugs" or discrepancies, inconsistencies, brief interruptions, and other flaws that do not materially impact performance of the intended functions and patches as required resolving Critical and High Failures.
- Provide unlimited telephone support twenty-four (24) hours a day, seven (7) days a week.
- Initiate work on Incidents with Priority 1 – Critical and incidents with Priority 2 – High within two (2) hours of Palm Tran's call for assistance to CONTRACTOR, regardless of time of day or day of week.
 - Incidents with Priority 1 – Critical and Incidents with Priority 2 – High are limited to issues involving substantial System failure that are critical to the operation of FARE SYSTEM.
- CONTRACTOR shall initiate work on non-urgent issues, within four (4) hours from receipt of a service request.

The Warranty will not apply to the extent that the failure or Defect of a FARE SYSTEM Component arises out of improper use of the equipment other than as specified in the Contract, improper maintenance, repairs or alterations by Palm Tran or any other third party, where Palm Tran or the third party failed to follow required repair procedures as described in the Accepted CONTRACTOR provided Documentation, including Third Party Manuals supplied by CONTRACTOR.

The Warranty shall not apply to the extent that a FARE SYSTEM Component has been subjected to uses substantially more severe than the environmental conditions that are identified in the Contract or damage caused by vandalism, operator error, misuse, accident, force majeure events or abuse.

The FRT shall confirm all warranty claims prior to submitting to the CONTRACTOR.

~~152.3~~ 152.338.3 Warranty Period

The CONTRACTOR warrants the FARE SYSTEM from the time of delivery of any component to Palm Tran through until the end of the Warranty Period. The Warranty Period shall begin at the time of Final FARE SYSTEM Acceptance for a period of two (2) years.

~~152.4~~ 152.438.4 Notice of Defect

During the Warranty Period, Palm Tran will promptly notify the CONTRACTOR of any equipment, material, software, product, or workmanship supplied under the Contract that experiences a failure. The CONTRACTOR shall be required to take prompt remedial action and the FRT shall review each and every failure to determine if covered under the warranty.

~~152.5~~38.5 Fleet Defect

A "Fleet Defect" is an identical Hardware Defect, Failure or Malfunction that affects 5% of any FARE SYSTEM Components delivered under this Contract within the Warranty Period. Also, a Systematic Software Defect, Failure or Malfunction that affects the FARE SYSTEM and/or 5% of any FARE SYSTEM Component delivered under this Contract within the Warranty Period will be classified as a Fleet Defect. A Fleet Defect affects the ability of the FARE SYSTEM to perform in accordance with requirements of this Contract.

If a Fleet Defect is declared, the CONTRACTOR shall submit a Corrective Action Plan (CAP) for Palm Tran's Review and Approval. The CAP shall include a detailed description of the intended approach to remedy the defect, a CAP schedule, and resources needed. Prior to implementation, the Contract and Palm Tran will test the remedy using the test plans defined herein. Once installed, the system will go through another round of Acceptance Testing to ensure there are no residual affects to the production system. The CONTRACTOR shall provide a one (1) year warranty on any FARE SYSTEM Components supplied under such a Fleet Defect CAP, calculated from the time of Palm Tran's Acceptance of the implemented Corrective Action in the Production FARE SYSTEM.

The FRT shall make the determination of a Fleet Defect. Palm Tran shall provide CONTRACTOR written notice of any FARE SYSTEM Components that experiences a Fleet Defect during the Warranty Period as soon as reasonably possible after Palm Tran has received FCR Notification of said Fleet Defect.

The CONTRACTOR shall repair or replace the FARE SYSTEM Components affected by a Fleet Defect at no expense to Palm Tran.

~~152.6~~38.6 Remedial Action Response

Unless otherwise approved by Palm Tran, the CONTRACTOR shall complete remedial action within ten (10) working days of being reported or provide a reasonable provisional solution when remedial action cannot be completed within ten (10) working days. Should the CONTRACTOR materially fail to take appropriate remedial action within the specified period, upon notice to the CONTRACTOR, Palm Tran may elect to take appropriate action on behalf of the CONTRACTOR? Should Palm Tran elect to do so, Palm Tran may invoice the CONTRACTOR for labor, material, and handling costs incurred by Palm Tran for taking said action. Material and handling cost will be invoiced at actual cost. Labor will be invoiced at Palm Tran's actual direct labor cost rates of the individual(s) performing the work.

~~152.7~~38.7 Negligence

The provisions of this warranty shall not apply in the event of negligence on the part of Palm Tran, its customers, employees, or representatives. Environmental conditions of operating use expressly identified in the Contract, including but not limited to temperature, humidity, vibration, ambient and transient electric conditions, dust, and dirt within the limitations specified by the requirements of the Contract and normal customer use of the FARE SYSTEM are not considered negligence.

~~152.8~~38.8 Exclusions

The warranty shall not be required to cover the replacement and maintenance of consumable items and normal wear and tear parts that have reached their expected life time as identified in Section 36.

~~152.9~~ 138.9 Warranty Support

The CONTRACTOR shall make available full and competent engineering services to diagnose and correct all failures associated with the performance of product covered by the terms of the warranty. Also, at the request of Palm Tran, the CONTRACTOR shall provide competent field representatives as necessary during the period of the warranty to support timely identification, diagnosis, and remedial actions required by the Warranty provisions. Failure to do so may limit the ability of Palm Tran to effect proper remedial action and may be cause for a resulting Fleet Defect.

~~152.10~~ 138.10 Post Warranty

Subsequent to the Warranty Period all parts, assemblies, and equipment shipped to the CONTRACTOR or designated repair facility shall be subject to CONTRACTOR published repair, shipping, and handling charges. The onsite services of CONTRACTOR field representatives for diagnosis, repairs, or other technical support shall be compensated in accordance with the CONTRACTOR published fee schedule. The CONTRACTOR shall be required, upon request of Palm Tran, to give evidence that the applicable fee schedule is reasonable, customary, and published.

~~153~~ 139 PROJECT MANAGEMENT

The following section describes Palm Tran's requirements for CONTRACTOR provided Project Management of the FARE SYSTEM. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

The CONTRACTOR shall be responsible to ensure the execution of this contract is managed effectively and efficiently to the mutual benefit of the CONTRACTOR and Palm Tran. It shall be the responsibility of the CONTRACTOR to appropriately employ as necessary the personnel, tools, and systems to manage the project and contract.

Palm Tran considers the effective management of the project to have significant if not otherwise identified cost benefit to Palm Tran and to the contract.

~~153.1~~ 139.1 Program Management

The CONTRACTOR's Program Management shall be comprehensive to enable the PTPM to ascertain that the CONTRACTOR shall comply with the requirements of the Contract Documents, and to enable the PTPM to monitor the contractual effort.

The CONTRACTOR shall designate a responsible individual, subject to acceptance by the PTPM, to serve as PM for the entire term of the Contract. The Proposer shall name its intended PM for this project and include their resume in its Proposal. This individual shall have prior experience in management of FARE SYSTEM procurements and be familiar with design, Subcontractor equipment procurements, fabrication, test, and inspection of FARE SYSTEM Components. The PM shall be fluent in the reading and writing of the English language. Palm Tran shall have the right to require removal of the Program Manager should he/she be deemed incompetent or obstructive in carrying out the work.

The CONTRACTOR shall establish an organization to manage properly the various stages of the FARE SYSTEM Contract. The organization shall be dedicated and shall be highly responsive at all times to the needs of Palm Tran as required by this Contract.



~~153.1.1~~ 153.1.1 ~~139.1.1~~ Project Management Plan

The Proposer shall include in its Proposal, its proposed Program Management Plan (PMP) for the proposed FARE SYSTEM.

The CONTRACTOR shall submit its PMP to the PTPM as part of the CDR (CDR - 24). Throughout the project, the CONTRACTOR shall update the PMP as necessary to incorporate changes in the project or in its schedule. At a minimum, the PMP shall include the following:

- A Project Organization Chart including a definition of the authority, responsibilities, and qualifications and experience of all key personnel, including key subcontractors.
- The Methods and Communications to be used to control the MPS, Design Reviews, CONTRACTOR’s Request for Information (RFI), Project Performance, Program Changes, Subcontracts, Purchase Orders, Material Procurement and Management, In-service Support, Warranty, Quality Assurance Analysis and Control, Tests, and Demonstrations.
- A Submittal List and Schedule listing drawings, documents, and data the CONTRACTOR shall submit for review during the Design Review phases of the program, including a schedule for the submittal of this information.
- A Contract Deliverable Requirement List (CDRL) based on the information in this Contract – refer to Table 10 1, Table 10 2, and Table 10 3. The CDRL shall contain the specific format of the deliverable, quantity, frequency, schedule, and the specific reference section of the Contract Document as required. The CDRL shall be in accordance with the following column headings:
 - Item Number
 - Deliverable Description
 - Applicable Contract Reference Section
 - Scheduled Delivery Date(s)
 - Current PTPM review/acceptance status
 - Quantity: Number of documents, units, or copies required

~~153.1.2~~ 153.1.2 ~~139.1.2~~ Document Control

The CONTRACTOR shall track and control all Contract correspondence to and from the CONTRACTOR and the PTPM. The CONTRACTOR shall establish a Project Management Share Point site for the central repository of all documentation required under this contract, including all correspondence between the CONTRACTOR, its Team and Palm Tran.

The Proposer shall include a description of its proposed Document Control Process for the proposed FARE SYSTEM.

~~153.1.3~~ 153.1.3 ~~139.1.3~~ Master Project Schedule

The Proposer shall provide in its Proposal its proposed MPS for the proposed FARE SYSTEM. The CONTRACTOR will revise the MPS throughout the life of the Project starting from NTP.

The CONTRACTOR and Palm Tran shall use the MPS for executing the work for this Contract. The CONTRACTOR shall generate the MPS using Primavera Project Planner for Windows or Microsoft Project Professional. The MPS shall conform to the Scope of work, schedule and delivery requirements set forth in the Contract. The MPS may only be modified through mutual agreement between the PM and PTPM and/or by Contract Change Order.

At a minimum, the MPS shall include the following:

- Work item descriptions with WBS numbering
- Estimated work item duration in working days
- Successor and Predecessor interrelationships
- Responsible Party
- Milestone Delivery Dates

~~153.1.4~~ 153.1.4 Monthly Progress Reports

The CONTRACTOR shall submit to the PTPM a Monthly Progress Report (MPR) that covers activities for the previous month. At a minimum, the MPRs shall include:

- A summary narrative of the work actually completed for the reporting period and work expected to be done in the following month
- An updated MPS highlighting:
 - Actual Start Dates, Completion Dates and Durations
 - Revised Estimated Start Dates, Completion Dates and Durations
 - Percent Complete for Activities in Progress
 - Revised Successor/Predecessor relationships
 - Additions/deletions of any WBS elements
 - Slippage
- Existing/unresolved or anticipated problems or issues
- Updated CDRL, including status of all deliverables
- Updated Submittal List and Schedule, including status of all submittals.
- Updated Action Item log showing status
- Table summarizing the month's scheduled meetings including:
 - Date of meeting
 - Meeting Topic
 - Attendees
- Summary of Invoice:
 - Total Contract Value at time of Award
 - Value of Individual Change Orders
 - Value of individual Subcontracts – include name of Subcontractor and indicate if DBE, amount invoiced, amount paid to date, amount remaining
 - Total Amount Invoiced to date
 - Total Amount Paid to Date
 - Total Contract Amount Remaining
 - Highlight any risk of overages – include details explaining the nature and probability

~~153.1.5~~ 153.1.5 Action Item Log

The CONTRACTOR shall maintain a log of all identified Action Items arising from Design Review Meetings, Design Review Progress Meetings, and through formal correspondence or e-mails. All action items shall have a responsible party assigned and expected due date. The CONTRACTOR shall not assign any action item to the PTPM or to Palm Tran without the PTPM's knowledge and concurrence.

At a minimum, each Action Item in the log shall contain the following:

- Item Number
- Where captured; i.e., minutes, email, letter, etc.

- Description of Action
- Requesting Party
- Assigned Party
- Status (open/closed/in progress/deferred etc.)
- Date Opened
- Estimated Close Date
- Actual Closed Date
- Progress Notes

~~153.1.6~~ 139.1.6 Project Meetings

In addition to the bi-weekly progress meetings, the CONTRACTOR's PM shall organize and participate in various meetings throughout the performance of this Contract as outlined in this article. The PM shall facilitate the scheduling of such meetings and shall provide the required information in a timely manner.

~~153.1.6.1~~ 139.1.6.1 Agenda and Notices for Project Meetings

Agenda and Notices for meetings shall be prepared and distributed by Palm Tran with input from the CONTRACTOR; distribution shall occur five days in advance of each meeting date.

~~153.1.6.2~~ 139.1.6.2 Minutes of Meetings

Minutes of meetings shall be produced by the CONTRACTOR and submitted to Palm Tran's Program Director within two business days after any meeting. Minutes shall include a written record of activities, the revised Action Item Log, work performed, and milestones achieved, and any other relevant document pertaining to the meeting discussion.

~~153.1.7~~ 139.1.7 Contract Kick-off Meeting

Within 15 calendar days after the date of the NTP, the PTPM will hold a Contract Kick-off Meeting at Palm Tran's offices. In attendance shall be the PTPM, the PM, and other appropriate Palm Tran and CONTRACTOR personnel or representatives of third parties. The PTPM shall prepare an agenda and a report of the meeting for distribution five (5) days ahead of the Kick-off meeting. The CONTRACTOR shall be responsible for the internal distribution of the report of the meeting within its own organization. The Kick-off Meeting shall permit all parties to the Contract to understand the overall schedule, terms and conditions, scope of work, methods of communication, and responsibilities. In addition, the parties shall discuss and identify the items that the CONTRACTOR shall be required to submit for each Design Review.

~~153.1.8~~ 139.1.8 Progress Meetings

PTPM shall chair at least two Progress Meetings each month, at Palm Tran offices or another location selected by PTPM. The CONTRACTOR shall prepare and distribute an agenda to all participants expected to attend the meetings no less than five (5) calendar days prior to the scheduled meeting date.

Attendees may include, but are not limited to, representatives of Palm Tran and its contractors, the PM, and other appropriate CONTRACTOR and Subcontractor personnel, based upon the anticipated agenda. Progress Meetings may be conducted by conference call as mutually agreed and scheduled between the CONTRACTOR and Palm Tran. Costs associated with conference calls shall be at the CONTRACTOR's expense. The CONTRACTOR shall provide in the meeting invitations a dial-in number to facilitate the conference calls. Palm Tran may schedule additional Progress Meetings or other technical meetings as circumstances require.

At a minimum, the agenda for Progress Meetings shall include the following items:

- Review minutes of previous meeting(s) as needed
- Review updated MPS
- Review updated Submittal List and Schedule
- Review updated Action Item Log
- Review work accomplished since previous meeting, including but not limited to:
 - Design status
 - Fabrication problems
 - Product delivery problems
 - Schedule slippages
 - Problems arising from proposed changes or other circumstances, which might affect progress of the work
- Review the sequence of critical work and schedule of manufacturing using the MPS and MPRs
- Discuss engineering, manufacturing, and quality control (QC)
- Discuss any needed corrective measures to maintain the MPS
- Discuss coordination with other contractors
- Discuss any safety issues, particularly as they effect construction
- Any other issues related to the Contract

CONTRACTOR shall prepare and distribute the reports of the meetings. The CONTRACTOR shall be responsible for the internal distribution of the report of the meeting within its own organization.

153.1.939.1.9 Design and Configuration Control

Palm Tran shall monitor the CONTRACTOR's efforts to determine the degree to which the objectives of the Contract are being achieved during the Design Reviews. Design reviews shall be conducted jointly by Palm Tran and the CONTRACTOR and coordinated by PTPM. Ten (10) days prior to each review, CONTRACTOR shall submit a data package that includes the CDRL and items required for the respective Design Review. Minutes of the review meetings shall be distributed by Palm Tran.

These reviews shall be conducted to evaluate the progress and technical adequacy of the design and the conformance to the requirements of the Contract. The CONTRACTOR shall provide Palm Tran with documentation and notice of design milestones in accordance with the requirements and schedule defined herein.

The documentation shall provide Palm Tran adequate detail to become familiar with the design status existing at the time of the scheduled review. The CONTRACTOR shall present documentation summary and supplementary information during the review such that the Design Review meetings shall serve as a technical review of CONTRACTOR progress toward meeting Contract requirements. At the completion of the review, the status of the review shall be presented in the form of a statement of action items and schedule of accomplishment necessary to obtain Palm Tran concurrence with program technical progress.

Documentation for Design Reviews shall include design, manufacturing and installation plans. The CONTRACTOR's program for design and configuration control shall meet the requirements described in the Contract.

Submittals must be reviewed and Accepted by Palm Tran, or specific waivers granted, before continuing to the next stage of design.

~~153.1.9.1~~ 139.1.9.1 Design Principles

Commonly accepted industrial design principles shall be employed throughout the design and manufacturing processes. Design calculations, layouts, and other documentation summarizing the human factors engineering considerations shall be submitted during the Design Reviews. Industrial design aspects of the FARE SYSTEM Components shall be reviewed during the scheduled Design Review meetings. Topical reviews to address key issues shall be held as needed. The documentation shall include, a description of the major assumptions, human capabilities and limitations, and the results of any simulation programs made to determine the requirements for design are met.

~~153.1.9.2~~ 139.1.9.2 Design Reviews

As indicated, the Design reviews shall be conducted to evaluate and confirm the progress and technical adequacy of the design, as well as to ensure its conformance to the Contract Requirements. Prior to each review, a Design Review package shall be submitted that includes the CDRL and other items required for and to facilitate the review.

The CDR, PDR and FDR may not be conducted concurrently. Attendance at Design Review meetings may include representatives of other contractors as determined by Palm Tran.

The CONTRACTOR may not proceed to the next Design Review without having completed successfully the prior design review.

~~153.1.9.2.1~~ 139.1.9.2.1 Conceptual Design Review

The CDR shall review the CONTRACTOR's proposed FARE SYSTEM, using the CONTRACTOR's Proposal and Conformed Contract documents as the basis from which the CONTRACTOR shall complete the CDR package. Since most of the proposed FARE SYSTEM is developed from components already developed and deployed in existing projects, the CDR will be used to identify and clarify Palm Tran specific items, initially indicated in the Proposers Proposal. Besides the CDR Deliverables mentioned herein, the following, at a minimum, shall be provided as part of the CDR package:

- Detailed technical descriptions of the FARE SYSTEM and its components
- Preliminary layouts for all FARE SYSTEM Components
- Drawing of passenger interface arrangements
- Preliminary installation layouts for all FARE SYSTEM equipment
- Mounting arrangements and installation methods
- Single-line power diagrams, control schematics, and functional block diagrams for each subsystem, including a functional overview
- A description of how each FARE SYSTEM Components, sub-system, or sub-component down to the lowest field replacement unit goes into limited operating condition
- List of special tools and Diagnostic and Test Equipment (DTE) for each subsystem
- List and description of all person-FARE SYSTEM Device interfaces
- Software system-level flow charts
- Software data backup and recovery procedures
- Software design descriptions for all programmable FARE SYSTEM Components
- Software version control system
- Testing Program Plan
- Draft Documentation
- FARE SYSTEM prototypes with software to demonstrate the proposed FARE SYSTEM

The following table illustrates the required CDR Deliverables:

Table 11 - CDR Deliverables

CDRL	Description	Notes
CDR - 1.	FARE SYSTEM ADA Compliance	ADA compliance will be verified
CDR - 2.	Automatic FARE SYSTEM Complete Design Details	Complete design details of the proposed FARE SYSTEM
CDR - 3.	Employer/Student Pass Program Application Complete Design Details	Complete design details of proposed Application
CDR - 4.	Electronic Validating Farebox Complete Design Details	Complete design details of proposed Farebox
CDR - 5.	Farebox Screen Flows and Messages	Provide complete details for Farebox Screen Flows and Messages
CDR - 6.	Installation Plan	Complete description of the FARE SYSTEM Installation Plans by Class of Vehicles and locations. Identify any requirement to relocate, reposition, remove, or otherwise modify vehicle handrails, or equipment to accommodate installation of the FARE SYSTEM equipment
CDR - 7.	Farebox Configuration Parameters	Provide complete detail for all Farebox parameters that are configurable by Palm Tran
CDR - 8.	DCU Complete Design Details	Complete design details of proposed DCU
CDR - 9.	DCU Mounting Location Details	Drawing of Preferred Mounting Location by Vehicle Class Identify any requirement to relocate, reposition, remove, or otherwise modify vehicle handrails, or equipment to accommodate installation of the DCU
CDR - 10.	DCU Screen Flows and Messages	Provide complete details for DCU Screen Flows and Messages
CDR - 11.	Full FARE SYSTEM Communication	Detailed Communication processing functionality and procedures for entire FARE SYSTEM, it will be subject to Palm Tran audit confirmation.
CDR - 12.	TVM dispensed CSCs	Provide specifications for CSCs to be used in FARE SYSTEM
CDR - 13.	TVM Screen Flows and Messages	Provide complete details for TVM Screen Flows and Messages
CDR - 14.	TVM Configuration Parameters	Provide complete detail for all TVM parameters that are configurable by Palm Tran
CDR - 15.	FARE SYSTEM Reports and Data	Complete list of reports for the proposed FARE SYSTEM, including reports at the device level. Complete System Operation Procedures Details for transmitting data to other applications Data format details
CDR - 16.	Statistical Data Analysis and report generation	Complete details about various types of statistical data generated by the FARE SYSTEM Include associated selection, subtotal, and sort options
CDR - 17.	CRMS Screen Flows and Messages	Complete details of the screen flows, menus, messages, etc. for the CRMS
CDR - 18.	FARE SYSTEM Network	Complete details of FARE SYSTEM Network Listing of any deficiencies associated with Palm Tran's LAN/WAN
CDR - 19.	Data Security Plan	Complete details for Proposed Data Security Plan
CDR - 20.	Draft Training Material	1 Electronic -- 5 hard copies of all training materials
CDR - 21.	Draft Documentation	1 Electronic -- 5 hard copies of all FARE SYSTEM Documentation/Manuals
CDR - 22.	Testing Program Plan	Complete TPP
CDR - 23.	Warranty Plan	Complete Warranty Plan
CDR - 24.	Program Management Plan	Complete PMP
CDR - 25.	CST/RST Screen Flows and Messages	Provide complete details for CST/RST Screen Flows and Messages



CDRL	Description	Notes
CDR - 26.	Electronic Payment and Clearinghouse Processing	
CDR - 27.	Change Management Process	Detail description illustrating the CONTRACTOR's Change Management Process for the FARE SYSTEM.
CDR - 28.	Quality Assurance Program Plan	Detailed QAPP for the FARE SYSTEM
CDR - 29.	Quality Assurance Program	Detailed QAP for the FARE SYSTEM
CDR - 30.	Data Maintenance Plan	Detailed Plan outlining the maintenance, archiving and management of the FARE SYSTEM Database
CDR - 31.	Data Maintenance Procedure	Detailed Procedure for the maintenance, archiving and management of the FARE SYSTEM Database

The CDR review will yield two categories of Action Items:

1. 1. CDR Material, which is lacking in detail or insufficient, these Action Items will require corrections before receiving CDR Approval.
2. 2. CDR Elements that will require changes to meet requirements, these Action Items will need to be completed and submitted as part of the PDR.

153.1.9.2.239.1.9.2.2 Preliminary Design Review

The PDR shall review the CDR Action Items to ensure requirements are met. At this phase, the FARE SYSTEM design should be greater than 85% complete. At a minimum, the PDR shall include:

- Final Detailed technical descriptions of the FARE SYSTEM and its components
- Final layouts for all FARE SYSTEM Components
- Final passenger interface arrangements
- Final installation layouts for all FARE SYSTEM equipment
- Finalized Mounting arrangements and installation methods
- Final Detailed Single-line power diagrams, control schematics, and functional block diagrams for each subsystem, including a functional overview
- Final Detailed description of how each FARE SYSTEM Components, sub-system, or sub-component down to the lowest field replacement unit goes into limited operating condition
- Final Detailed List of special tools and Diagnostic and Test Equipment (DTE) for each subsystem
- Final Detailed List and description of all person-FARE SYSTEM Device interfaces
- Final Detailed Software system-level flow charts
- Final Detailed Software data backup and recovery procedures
- Software design descriptions for all programmable FARE SYSTEM Components
- Software version control system
- Final FARE SYSTEM prototypes with software to demonstrate the proposed FARE SYSTEM

The following table illustrates the required PDR Deliverables:

Table 12 - PDR Deliverables

CDRL	Description	Notes
PDR - 1.	Locks and lock identities	Complete Description of all Locks and keys for the FARE SYSTEM.
PDR - 2.	Key Handling Procedure	Procedure for securely managing and distributing associated keys (physical and virtual) for the FARE SYSTEM.
PDR - 3.	FARE SYSTEM Processors Utilization	Demonstrate all FARE SYSTEM processors throughout the system while under load only utilize up to 50% of processing capacity.
PDR - 4.	TVM Equipment Power Consumption	Complete electrical details for all powered TVM devices confirming overall power consumption.



CDRL	Description	Notes
PDR - 5.	Farebox Equipment Power Consumption	Complete electrical details for all powered Farebox devices confirming overall power consumption.
PDR - 6.	RST/CST FARE SYSTEM Equipment Power Consumption	Complete electrical details for all powered RST/CST FARE SYSTEM devices confirming overall power consumption.
PDR - 7.	Complete FARE SYSTEM Design Documentation	Complete FARE SYSTEM Design Documentation, including flow diagrams, data structures, parameter tables, and all other design and development documentation, with each software package. Such documentation shall be accompanied by a functional description of the software as applicable to Palm Tran's FARE SYSTEM.
PDR - 8.	List of Commercially Available	Includes a description of the capabilities and proposed functionality.
PDR - 9.	Automatic FARE SYSTEM Complete Design Details	Final design details of the FARE SYSTEM
PDR - 10.	FARE SYSTEM Working Prototype	Working prototypes of entire FARE SYSTEM
PDR - 11.	FARE SYSTEM Test Criteria	Detailed description of all testing criteria for the FARE SYSTEM
PDR - 12.	Employer/Student Pass Program Application Complete Design Details	Final design details of proposed Application
PDR - 13.	Electronic Validating Farebox Complete Design Details	Final design details of proposed Farebox
PDR - 14.	Farebox Screen Flows and Messages	Final details for Farebox Screen Flows and Messages
PDR - 15.	Farebox Configuration Parameters	Final detail for all Farebox parameters that are configurable by Palm Tran
PDR - 16.	LLRU Serial Numbering	Complete listing of all LLRU Serial Numbers throughout the entire FARE SYSTEM.
PDR - 17.	Farebox Installation Plan	Final Description of the Farebox Installation Plans by Class of Vehicle – updated with any requirement to relocate, reposition, remove, or otherwise modify vehicle handrails, or equipment to accommodate installation of the Farebox equipment
PDR - 18.	DCU Complete Design Details	Final design details of proposed DCU
PDR - 19.	TVM Screen Flows and Messages	Final TVM Screen Flows and Messages
PDR - 20.	CST/RST Screen Flows and Messages	Final CST/RST Screen Flows and Messages
PDR - 21.	CRMS Screen Flows and Messages	Final screen flows, menus, messages, etc. for the CRMS
PDR - 22.	Full FARE SYSTEM Database Dictionary and Schema	Complete FARE SYSTEM Database Data Dictionary and Schema
PDR - 23.	FARE SYSTEM Reports and Data	Final reports for the proposed FARE SYSTEM, including reports at the device level. Final System Operation Procedures Final Details for transmitting data to other applications Data format details
PDR - 24.	Final Training Material	1 Electronic – 5 hard copies of all training materials
PDR - 25.	Test Procedures	Complete Test Procedures for all FARE SYSTEM Tests

The PDR review will yield two categories of Action Items:

1. PDR Material, which is lacking in detail or insufficient, these Action Items will require corrections before receiving PDR Approval.



2. PDR Elements that will require changes to meet requirements, these Action Items will need to be completed and submitted as part of the FDR.

153.1.9.2.339.1.9.2.3 Final Design Review

The FDR shall review the PDR Action Items to ensure requirements are met. At this phase, the FARE SYSTEM design should 100% complete. The FDR shall be the final stage to determine whether the detailed design conforms to the design requirements established in the Contract documents. At a minimum, the FDR shall include:

- All information submitted in the PDR, but 100% finalized.
- Final revisions of drawings and documentation.
- Assembly drawings down to the LLRU level.
- Final Software documentation, including all software development documentation available or used in the CONTRACTOR's design process, consisting of structured data flow diagrams, event tables and/or dialogue diagrams to the lowest level of decomposition with software module descriptions (or elemental process descriptions) in structured narrative format.
- Shut-down and start-up sequences.
- Final Electrical schematic drawings, down to the individual signal or wire level, for each electrical circuit.
- Final Software flow charts or structure charts that give an overview of the processor software.
- Demonstrate completed algorithms expressed in program design language or pseudo code.
- Final Input data definitions.
- Final Output data definitions.
- Final Interrupt structure definition.
- Final Program parameters.
- Final Diagnostic routines for processor self-test and subsystem self-test.
- Final Error handling routines.
- Final Data Dictionary for all program, data storage and data staging database entities.
- Final installation plan and drawings.
- Final Testing and Cutover Plan.

The following table illustrates the required FDR Deliverables:

Table 10 3 FDR Deliverables

CDRL	Description	Notes
FDR - 1.	Key Deliver	Delivery of Keys to designated Palm Tran personnel identified in PDR - 2.
FDR - 2.	Test Cases	All test cases for testing FARE SYSTEM
FDR - 3.	Certification and Conformance Test Results	Provide certified results, analysis, etc. for FARE SYSTEM showing conformance to requirements defined herein; e.g., EMI.
FDR - 4.	Final FARE SYSTEM Design Documentation	Final FARE SYSTEM Design Documentation, including flow diagrams, data structures, parameter tables, and all other design and development documentation, with each software package. Such documentation shall be accompanied by a functional description of the software as applicable to Palm Tran's FARE SYSTEM.
FDR - 5.	Final list of Commercially Available	Includes a description of the capabilities and proposed functionality.
FDR - 6.	Finalized FARE SYSTEM Working Prototype	Final Working prototypes of entire FARE SYSTEM – First Articles of FARE SYSTEM.



CDRL	Description	Notes
FDR - 7.	Employer/Student Pass Program Application Complete Design Details	Final design details of proposed Application
FDR - 8.	Electronic Validating Farebox Complete Design Details	Final design details of proposed Farebox
FDR - 9.	Final As-Built Documentation	1 Electronic – 5 hard copies of all FARE SYSTEM Documentation/Manuals – all changes, modifications, etc. reflecting the FARE SYSTEM installed and in operation, which may differ from the original contract requirements, shall be updated and documented in the appropriate manuals, drawings, etc. for this final submittal.
FDR - 10.	Software Licenses	Delivery of all software licenses for the FARE SYSTEM

The FDR review will yield two categories of Action Items:

1. FDR Material, which is lacking in detail or insufficient, these Action Items will require corrections before receiving FDR Approval.
2. FDR Elements that will require changes to meet requirements, these Action Items will need to be completed before receiving FDR Approval.

~~153.1.9~~339.1.9.3 Design Baseline

For the purposes of change control, the design baseline shall be established at the FDR. Subsequent changes will need to be submitted to Palm Tran for approval prior to any implementation of any design changes. The Proposer shall include within its Proposal its proposed Change Management Process (CMP). The CONTRACTOR shall submit its CMP as part of the CDR (CDR - 27).

~~153.1.10~~339.1.10 Pre-Installation Meetings

The CONTRACTOR and Palm Tran will conduct a Pre-Installation meeting at least 15 days prior to installation of FARE SYSTEM Components at any site. The purpose of this meeting is to review and confirm all logistics are in place, appropriate POCs are known and aware of the scheduled installation, as well as to ensure the overall readiness of all involved to begin the installation.

~~153.1.11~~339.1.11 Coordination

Coordination of work between Contracts and use of Palm Tran facilities shall be arranged through PTPM. All correspondence between CONTRACTOR and Palm Tran shall be through PTPM.

CONTRACTOR shall coordinate scheduling, submittals, and the work of the various Sections of the Contract Document to assure efficient and orderly sequence of installation of interdependent elements.

~~153.1.12~~339.1.12 Palm Tran’s Project Manager Review

The PTPM will review all CONTRACTOR Submittals and recommend appropriate action based on the submittal’s conformance with Palm Tran’s requirements as expressed in the Contract Documents. The PTPM will review all submittals expeditiously and provide a list of required changes and/or Acceptance within five (5) to ten (10) business days, or within a mutually agreeable timeframe. The MPS will indicate review periods and predecessor/successor relationships. The review or Approval of the CONTRACTOR's submittals by the PTPM shall not relieve the CONTRACTOR of any of its obligations under this Contract. The review will not constitute approval of safety precautions or, unless otherwise specifically stated, of any construction means, methods, techniques, sequences or procedures. The review and acceptance of

a specific item shall not indicate review and acceptance of an assembly of which the item is a component.

~~153.1.13~~ 153.1.13 CONTRACTOR's Responsibilities

The CONTRACTOR shall prepare, review, approve, and submit to the PTPM all submittals required by the Contract within the times indicated. Development time for Submittals and Submittal due dates shall be illustrated in the MPS.

For each submittal, the CONTRACTOR, by affixing the CONTRACTOR's signature to each submittal, certifies and represents that the CONTRACTOR has determined and verified materials, test results, field measurements, and field construction criteria related thereto, and has checked and coordinated the information contained within such submittals with the requirements of the work and of the Contract Documents.

The CONTRACTOR is not relieved of responsibility for deviations from the requirements of the Contract Documents by the PTPM's review and disposition of submittals unless the CONTRACTOR has specifically informed the PTPM in writing of such deviation at the time of submittal and the PTPM has given written approval to the specific deviation. The CONTRACTOR is not relieved of responsibility for errors or omissions in submittals by the PTPM's review thereof.

Any work requiring review and/or approval by the PTPM, the CONTRACTOR shall wait for the PTPM's notification to conduct the respective work.

~~153.1.14~~ 153.1.14 Safety

The CONTRACTOR shall be required to ensure all personnel are appropriately trained, and if required certified, for the work being performed. The CONTRACTOR shall be responsible for adherence to all applicable Palm Tran safety standards, regulations, and procedures. The CONTRACTOR shall ensure all personnel are properly identified while onsite and engaged in activity related to the performance of this Contract. The CONTRACTOR shall take steps necessary to protect public safety in and around all work areas.

~~153.2~~ 153.2 CONTRACTOR's Quality Assurance (QA) Program and ISO Certification

~~153.2.1~~ 153.2.1 General

The CONTRACTOR shall plan, establish, and maintain a Quality Assurance Program Plan (QAPP) and QAP in compliance with the requirements specified by ISO 9001: 2000 Quality Management Standard. The CONTRACTOR's QAPP and QAP shall be imposed upon all entities within the CONTRACTOR's organization and on all subcontractors whenever Contract work is performed.

The Proposer shall include its Proposal its QAPP used in a similar project as the proposed FARE SYSTEM.

The CONTRACTOR shall submit the QAPP and QAP for the FARE SYSTEM project as part of its CDR package (CDR - 28 and CDR - 29).



~~153.2.2~~ 153.2.239.2.2 ISO Certification

The Proposer shall submit with its Proposal verification that it is ISO 9001:2000 Certified and certify that all FARE SYSTEM equipment manufactured for this project shall be manufactured in facilities that are ISO 9001:2000 certified.

~~153.2.3~~ 153.2.339.2.3 Quality Assurance Program Plan

The CONTRACTOR shall prepare and submit for approval a Quality Assurance Program Plan (CDR - 28) that addresses control of the quality of the CONTRACTOR’s design, equipment furnished, installation workmanship, testing, training, and documentation.

The CONTRACTOR shall use and abide by the Quality Assurance Program Plan to execute the work in the Contract. The Quality Assurance Program Plan shall describe the methods for planning, implementing, and maintaining quality, schedules, and cost. The Quality Assurance Program Plan shall contain a company policy statement that clearly defines the responsibilities of CONTRACTOR’s QA personnel. An organization chart shall be included to show the reporting relationships of all QA staff, and shall indicate the CONTRACTOR’s QA/QC representative, who shall be a full-time employee of the CONTRACTOR. The organization chart shall show the CONTRACTOR’s Quality Control Engineer (QCE) not reporting directly to the PM and having independent direct access to the CONTRACTOR’s Senior Manager.

The Quality Assurance Program Plan shall also contain a collection of all forms that the CONTRACTOR shall use for the documentation of quality control activities that assure compliance of materials, processes, personnel, and products to the applicable specifications.

~~154.40~~ 154.40 SOFTWARE AND INTELLECTUAL
PROPERTY REQUIREMENTS

The following section describes Palm Tran’s requirements for CONTRACTOR provided Software and Intellectual Property of the FARE SYSTEM. The Proposer shall provide a detailed description of its proposed solution for addressing this section.

The CONTRACTOR shall furnish all software, documented and operational in accordance with the Contract.

~~154.1~~ 154.140.1 Software Maintenance and Support

CONTRACTOR shall provide continued maintenance and support of Software, throughout the Project, the Warranty Period and for the first two (2) years after the end of the Warranty Period. The cost for this shall be included in the Total Contract Price. Thereafter, maintenance and support fees shall be as agreed by the CONTRACTOR and Palm Tran.

In addition the CONTRACTOR will make available at additional cost software support services for the Equipment and Licensed Software, including any updates, releases, and new versions, for ten (10) years from the Effective Date, and will make available software support services at additional cost for an additional five (5) years beyond the first ten (10) years but will not be obligated to include updates, releases, and versions as part of those software support services during the additional five (5) year

support period if such updates, releases, and versions are not otherwise available through CONTRACTOR.

~~154.2~~40.2 Software documentation

Project Specific Software shall be fully documented. Final as-built Documentation (FDR - 9) of the software shall be delivered as part of the FDR Package. CONTRACTOR shall update the documentation as required during the Contract Term, including the initial two years of software support services, and any option years exercised by Palm Tran, to reflect all updates, bug fixes or other changes. The Documentation will not be amended in a manner that materially reduces the functionality of the Software or the FARE SYSTEM. Software documentation shall be delivered to Palm Tran in a manner agreed to maintain security over the information provided.

~~154.3~~40.3 Software source code

In accordance with the Software License Conditions and the Master Escrow Agreement between the CONTRACTOR and Iron Mountain Intellectual Property Management, Inc. (Iron Mountain), the CONTRACTOR shall place in escrow all firmware and software source code and documentation, in both electronic and hardcopy formats, developed by the CONTRACTOR for the FARE SYSTEM purchased under this Contract.

CONTRACTOR-produced firmware and software source code and documentation to be provided shall include all application firmware and software for the all FARE SYSTEM Components as well as any firmware and software developed for embedded microprocessors that are integrated into any modules for FARE SYSTEM Components.

Firmware and software documentation shall provide the following:

- General description and operation
- Firmware and software architecture and basic program functions
- Data flow information
- Annotated source code listing, with comments and descriptions pertaining to each module sufficient allow an experienced programmer to understand the program
- Detailed memory map and listing
- Input/output port map

In addition to the firmware and software source codes and documentation described above, the CONTRACTOR shall also place in escrow the following:

- A licensed copy of all software tools such as debuggers, assemblers, and compilers, needed to convert the supplied source code into executable form used by the target processors.
- Hardware devices, such as EPROM programmers, with their accompanying firmware and software tools, necessary to transfer the executable programs onto the storage device used by any embedded microprocessor.
- Documentation that describes the procedures necessary to convert the supplied source code into executable format.

Prior to making the escrow deposit, the CONTRACTOR shall implement with Palm Tran an Escrow Deposit Verification Test. This test, which shall be documented within the TPP and have its own Test

Procedure, shall verify the content of the escrow deposit can in actually generate the same executables currently in operation within the FARE SYSTEM.

For any updates to the any of the deposited material during the Contract Term, the CONTRACTOR shall update the escrow deposit. The CONTRACTOR shall fully test such updates and changes as well as provide release notes prior to implementing it on the system equipment. The CONTRACTOR shall place in escrow all such documentation along with the software and source code.

The CONTRACTOR shall maintain the materials in escrow with Iron Mountain for not less than 15 years from the end of the base warranty period. At the time of initiating the escrow agreement, the CONTRACTOR shall prepay the escrow agent to provide escrow services for at least 15 years.

The CONTRACTOR shall submit a complete inventory of the items deposited into escrow to the PTPM at the inception of the escrow.

The CONTRACTOR shall pay all costs related to the escrow account. The data shall immediately be obtainable and usable by Palm Tran should the material in escrow be released under the terms of the Master Escrow Agreement.

~~15541~~ Abbreviations and Acronyms

The following table describes the abbreviations and acronyms used throughout this document.

Table 13 - Abbreviations and Acronyms

Abbr./Acronym	Definition	Abbr./Acronym	Definition
A	Accuracy	MCBF	Mean Cycles Between Failures
A or AMP	Ampere	MDBF	Mean Days Between Failure
AASHTO	American Society of State Highway & Transportation Officials	MDT	Mobile Data Terminal; Miami-Dade Transit
ABA	American Banking Association	MIB	Management Information Base
ACH	Automated Clearing House	MID	Message Identifier
ACL	Access Control Level	MIFARE	NXP contactless chip family
AD	Active Directory	MIFI	My Wi-Fi
ADAAG	Americans with Disabilities Act Accessibility Guidelines	MIL	Master Issues List
ADAAG – ADA	ADA Accessibility Guidelines	MIL-STD	U.S. Military Standard
AES	Advanced Encryption Standard	MIMO	Multiple-input, Multiple-output
AFC	Automated Fare Collection	MMS	Maintenance Management System
ANSI	American National Standards Institute - National Electrical Safety Code C2	MOA	Memorandum of Agreement
ANSI X9.24	Financial Services Retail Key Management	MPR	Monthly Progress Report
ANSI/NCITS 322	American National Standard for Information Technology - 2002 Card Durability Test Methods	MPS	Master Project Schedule
APC	Automatic Passenger Counter	MS	Microsoft
API	Application Programming Interface	MSD	Magnetic Stripe Data
APTA	American Public Transportation Association; American Public Transit Association	MTBF	Mean Time Between Failure
AR	Accounts Receivable; Acceptance Rate	MTTR	Mean Time to Repair
ASCII	American Standard Code for Information Interchange	NEC	National Electrical Code
ASME	American Society of Mechanical Engineers	NEMA	National Electrical Manufacturers Association Standards
ASQC	American Society for Quality Control	NEMA 250	National Electrical Manufacturers Association Publication - 2003
ASTM	American Society for Testing and Materials Standards	NFC	Near Field Communication
ATM	Automated Teller Machine	NFPA	National Fire Protection Association
ATP	Account-Based Transaction Processor	NFPA 130	National Fire Protection Association Standard for Fixed Guideway Transit and Passenger Rail System
AVL	Automatic Vehicle Location System	NFPA 70	National Fire Protection Association National Electrical Code
AWG	American Wire Gauge	NIST	National Institute of Standards and Technology - Guidelines to Cyber Security (Protecting the Confidentiality of PII)
B2B	Business-to-Business	NIITSA	The National ITS Architecture
BBR	Back-of-the-Bus Reloader	NTD	National Transit Database

Abbr./Acronym	Definition	Abbr./Acronym	Definition
BCT	Broward County Transit	NTP	Notice to Proceed
BI	Business Intelligence	NXP	Semiconductor Company owns MIFARE
BLE	Bluetooth Low Energy	ODBC	Open Database Connectivity
BV	Bus Validator	OEM	Original Equipment Manufacturer
CAD	Computer-Aided Design; Computer Aided Dispatch	OMB	Office of Management and Budget
CAD/AVL	Computer-aided Dispatch/Automatic Vehicle Location System	OOS	Out of Service
CAP	Corrective Action Plan	OSHA	Occupational Safety and Health Administration
CD	Compact Disk	OSI	Open Systems Interconnect
CDA	Combined Data Authentication	OTT	Opportunities Thru Transit
CDMA	Code Division Multiple Access	P2PE	Point to Point Encryption
CDR	Conceptual Design Review	PA DSS	Payment Card Industry Payment Application Data Security Standards
CDRL	Contract Data Requirements List	PAM	Patron Account Management
CDRL	Contract Deliverable Requirement List	PAN	Primary Account Number
CFMS	APTA's Contactless Fare Media Standard	PAYGO	Pay As You Go
CFR	Code of Federal Regulations	PC	Personal Computer; Printed Circuit
CID	Card Interface Device	PCI	Payment Card Industry
CMP	Change Management Process	PCI PTS	Payment Card Industry PIN Transaction Security
Contractor	CONTRACTOR	PCI-DSS	Payment Card Industry Data Security Standard (Information security standard for organizations handling branded credit card data)
COTS	Commercial-off-the-Shelf	PCMCIA	Personal Computer Memory Card International Association
CRM	Customer Relationship Management (system)	PDF	Portable Document Format
CRMS	Central Reporting and Management System - FARE SYSTEM Backend	PDR	Preliminary Design Review
CSC	Contactless Smart Card; Card Security Code	PDU	Portable Data Unit
CSR	Customer Service Representative	PEP	Passenger Education Program
CST	Customer Service Terminal	PIC	Pre-Installation Checkout
CSV	ASCII Comma-Delimited	PID	Parameter Identification Definitions
Db	Decibel	PII	Personally, Identifiable Information
DBA	Database Administrator	PIN	Personal Identification Number
DCU	Driver Control Unit	PM	Project Manager; Preventive Maintenance
DCU-ID	DCU – Driver Information Display	PMBOK	Project Management Book of Knowledge
DCU-RD	DCU – Revenue Display	PMP	Project Management Plan
DDA	Dynamic Data Authentication	POC	Point of Contact
DIP	Delivery and Installation Plan	POP	Proof of Payment
DMS	Device Monitoring System	POS	Point of Sale
DQT	Design Qualification Testing	POSC	Point of Sale Computer
DRP	Disaster and Recovery Plan	POST	Point of Sale Terminal
DRT	Design Review Test	PST	Pre-Shipment Testing
DTE	Diagnostic and Test Equipment	PTSB	Palm Tran Service Board
DTS	Data Transmission System	PV	Platform Validator
EBT	Electronic Benefit Transfer	QA	Quality Assurance

Abbr./Acronym	Definition	Abbr./Acronym	Definition
ECMA-352	Near Field Communication Interface and Protocol-3	QAP	Quality Assurance Program
ECR	Engineering Change Request	QAPP	Quality Assurance Program Plan
ECU	Electronic Control Unit	QC	Quality Control
EDP	Electronic Data Processing	QCE	Quality Control Engineer
EFT	Electric Funds Transfer	QSA	Qualified Security Assessor
EIA	Electronics Industries Association	RA	Revenue Agent
EMC	Electromagnetic Compatibility	RCP	Revenue Collection Process
EMI	Electromagnetic Interference; Electro Magnetic Interface	RCR	Revenue Collection Receiver
EMV	Europay, MasterCard, Visa Integrated Circuit Card/Contactless Specifications for Payment Systems	RCV	Revenue Collection Vaults
EN55022	European Norm Emissions standards for CE marking	RFI	Radio Frequency Interference; Radio Frequency Interface; Request for Information
EN55024	European Norm Immunity standards for CE marking	RFID	Radio Frequency Identification
EPROM	Erasable Programmable Read Only Memory	RFID-Tag	Radio Frequency Identification Label
ERP	Enterprise Resource Planning (system)	RMAT	Reliability, Maintainability, and Accuracy Test
ESN	Electronic Serial Number	RST	Retail Sales Terminals
ESPP	Employer/Student Pass Program	RTIS	Real Time Information System
EU	Extended Use	RVP	Revenue Vaulting Process
FAI	First Article Inspection	SAE	Society of Automotive Engineers
Farebox	Electronic Validating Farebox	SAE J1113-13	Society of Automotive Engineers - Electrostatic Discharge
FAT	Factory Acceptance Testing; First Article Test	SAE J1455	Society of Automotive Engineers - Vibration and Shock
FCC	Federal Communications Commission	SAM	Secure Access Modules
FCC Part 15	Class B Radio Frequency Devices	SAS	Statement on Auditing Standards
FCS	Fare Collection System	SAT	System Acceptance Test
FCSS	Financial Clearing and Settlement System	SBA	Susan B. Anthony U.S. \$1.00 Coin
FDR	Final Design Review	SCCW	Smart Card Certification Workstation
FED-STD-795	Uniform Federal Accessibility Standard	SCU	Smart Card Unit
FIPS	Federal Information Processing Standards	SDK	Software Development Kit
FISMA	Federal Information Security Management Act	SFRTA	South Florida Regional Transportation Authority (aka Tri-Rail)
FIT	Factory Integration Testing	CONTRACTOR	System Integrator
	Florida State Building Code	SID	Subsystem Identification Numbers
FMI	Field Modification Instructions	SIT	System Integration Testing
FRCS	Farebox Revenue Collection System	SLA	Service Level Agreement
FRT	Failure Review Team	SMA	Software Maintenance Agreement
FTA	Federal Transportation Administration	SMS	Short Message Service
FTP	File Transfer Protocol	SNM	Station Network Module
Golden Dollar	Sacagawea and Presidential U.S.\$1.00 Coins	SNMP	Simple Network Management Protocol
GSM	Global System for Mobile Communications	SOC	Service Organizational Control
GUI	Graphical User Interface	SOP	Standard Operating Procedure
HW	Hardware	SQL	Structured Query Language

Abbr./Acronym	Definition	Abbr./Acronym	Definition
I/O	Input/Output	SRED	Secure Reading and Exchange of Data
ICD	Interface Control Document	SSAE	Statements of Standards for Attestation Engagements
IEC	International Electrotechnical Commission Standards	SSL	Secure Socket Layer
IEC529	International Electrotechnical Commission Standard 529	STF	Special Test Fixtures
IEEE	Institute of Electrical and Electronics Engineers Standards	SW	Software
IEEE 802.11	Standard (b/g/n) for wireless data communications	TCIP	Transit Communication Interface Protocols
IEEE 802.11i	Standard for wireless data network security	TD	Transportation Disadvantaged (program run by Palm Tran)
IETF	Internet Engineering Task Force Standards	TDEA	Triple Data Encryption Algorithm
IIN	Issuer Identification Number	TLS	Transport Layer Security
IMCS	Incident Management System	TMA	Transportation Management Association
iOS	Operating System for Apple products	TPP	Training Program Plan
IP	Internet Protocol	t-purse	Transit Purse
IRS	Internal Revenue Service (US)	Trapeze ICD	Trapeze Interface Control Document
ISO	International Standards Organization	TSC	Transit Standard Consortium
ISO 9001	International standard requirements for a quality management system	TSPP	Testing Program Plan
ISO/IEC 14443	Contactless Smart Card Standard Parts 1-4	TVM	Ticket Vending Machine
ISO/IEC 18092/ECMA-340	Near Field Communication Interface and Protocol-1 (NFCIP-1)	U.S.	United States
ISO/IEC 21481	Near Field Communication Interface and Protocol-2	UBC	Uniform Building Code
ISO/IEC 27001	Information Security Management	UI	User Interface
ISO/IEC 7810	Identification Cards - Physical Characteristics	UID	Unique Identification Number
ISO/IEC-8583	Financial transaction card originated messages	UL	Underwriter Laboratories
ISQT	In-Service Qualification Test	UL 60950-1	Information Technology Equipment - Safety Standard
ITS	Intelligent Transportation Systems	UMC	Uniform Mechanical Code
ITU	International Telecommunications Union Standards	UPC	Uniform Plumbing Code
IVOMS	Integrated Vehicle Operations Management System	UPS	Uninterrupted Power Supply
IVR	Interactive Voice Response system	USB	Universal Serial Bus
KPI	Key Performance Indicator	UX	User Experience
KSR	Key Security Representative	V	Voltage
LAN	Local Area Network	VAN	Vehicle Area Network
LCD	Liquid Crystal Display	VCST	Virtual CST
LDAP	Lightweight Directory Access Protocol	VEI	Vending Equipment Interface
LLRC	Lowest Level Replaceable Component	CONTRACTOR	Prime Contractor
LLRU	Lowest Level Replaceable Unit	VPN	Virtual Private Network
LRC	Lowest Replaceable Component	W3C	World Wide Web Consortium - Mobile Web Application Best Practices
LRU	Line Replaceable Unit	WAN	Wide Area Network
LU	Limited Use	WBS	Work Breakdown Structure
M/WBE	Minority/Women Owned Business Enterprise	WCAG	Web Content Accessibility Guidelines 2.0



Abbr./Acronym	Definition	Abbr./Acronym	Definition
Max	Maximum	Wi-Fi	Wireless LAN
		WLAN	Wireless Local Area Network



ATTACHMENT 1

~~156.1~~ 156.2 Palm Tran Existing Fare Policies

The following describes the fare policies associated with Palm Tran’s fixed route bus and Paratransit door-to-door services in Palm Beach County; where, Palm Tran’s mission is to provide access to opportunity for everyone; safely, efficiently and courteously.

~~156.1~~ 156.2.1 General Information

Palm Beach Board of County Commissioners establishes the principles and policies that governs recovery of passenger revenues in support of Palm Tran operations.

~~156.1.1~~ 156.2.1.1 Palm Tran Service Board

The Palm Tran Service Board (PTSB) is an advisory board to Palm Tran and the Board of County Commissioners regarding Palm Tran’s fixed route and paratransit programs and services.

The mission of the PTSB is to make Palm Tran bus service more efficient and to serve as the ongoing mechanism for the participation of citizens in the continued development, implementation and assessment of all Palm Tran services.

The PTSB meets on the fourth Thursday of each month to review and discuss existing and proposed Palm Tran service. These meetings are designed to provide the public and interested parties with the opportunity to be heard in regard to existing or proposed services. Comments may also be submitted in writing in advance of these meetings.

~~156.2~~ 156.2.2 Palm Tran Fixed Route

~~156.2.1~~ 156.2.2.1 Fixed Route Base Fare

~~156.2.1.1~~ 156.2.2.1.1 Tickets Available for Purchase on Bus:

- Cash Full Fare: \$2.00. per Boarding-One way
- Cash Half Fare: \$1.00. per boarding-for qualified passengers One way
- Cash Full Fare: \$5.00 1 Day Unlimited. Valid for calendar day
- Cash Reduced Fare: \$3.50 1-Day Unlimited for qualified passengers. Valid for calendar day

~~156.2.1.1~~ 156.2.2.1.2 Tickets Available for Advanced Purchase (Not Available on Buses):

- One Trip Quik Pass \$2.00
- Unlimited 1 Day Quik Pass \$5.00
- Unlimited 1 Day Quik Pass Reduced \$3.50
- Unlimited 31 Day Quik Pass \$70.00
- Unlimited 31 Day Quik Pass Reduced \$55.00
- Unlimited 20 Week Student Pass Reduced Bus Pass to Class \$55.00 (PB School Board Only)

~~156.3.1~~ 156.3.4 2.3 Methods of Payment

~~156.3.1~~ 156.3.4 2.3.1 Cash

Cash is accepted on all Palm Tran Fixed Route Buses though the Farebox no change will be issued. For overpayments exceeding \$1.00 a Fare Card may be requested for the balance of the overpayment. The fare card is valid to pay for future rides on Palm Tran's Fixed Route Service. The Fare Card is not redeemable for cash.

Denomination of US Currency accepted by the Farebox are Dollars bills in the denominations of \$1.00, \$2.00, \$5.00, \$10.00 and \$20.00. Coins accepted by the Farebox 0.01 cents, 0.05 cents, 0.10 cents, 0.25 cents, 0.50 cents and \$1.00 Susan B Anthony coin.

Cash is accepted at Palm Tran's Connection Office, Intermodal Location and at listed library locations. The maximum denomination of bill accepted is \$100.00.

Customers can purchase with coins, however for payments over \$5.00 coins must be wrapped with purchaser's name, address and phone number indicated on the wrapping.

~~156.3.2~~ 156.3.4 2.3.2 Checks

Checks are accepted at Palm Tran's Connection location and via mail.

A valid picture ID must be shown when presenting a check in person. Identification must be in the form of a valid driver's license or state indemnification with a photo.

Checks must be for the exact amount of the purchase, drawn on banks in the United States, must be in United States funds, no temporary checks acceptable, check must have name and address preprinted on check, no two-party checks accepted, no postdated checks are accepted.

No check will be accepted if there is evidence of erasure, alteration, mutilation, or is otherwise of questionable appearance. No check will be accepted if there is any doubt as to the validity of the signature.

No personal or payroll checks are not to be cashed or otherwise substituted for Palm Tran funds for any customer or employee.

Check being accepted will be checked against Palm Tran's bad check list, such persons will not be permitted to pay by personal or business check.

Returned checks are subject to a service charge of \$20 or 5% of the check, whichever is greater as referenced in Florida State Statute 68.065.

~~156.3.3~~ 156.3.4 2.3.3 Credit and Debit Cards

Payment by Credit and Debit Cards are only accepted at Palm Tran Connection Office, Intermodal and listed library locations. Payment with Credit and Debit Card are not accepted on Palm Tran's Fixed Route Service, Connection Service or Belle Glade Flex Service.

Credit and Debit Cards accepted are VISA, MasterCard, Discover Card and American Express Cards.

Proof of identity required at time of payment with purchase by credit or debit card.

Credit or Debit Card must be physical present at time of payment. Payment with Credit or Debit Card and not available by mail or by phone.

156.442.4 Exact Change





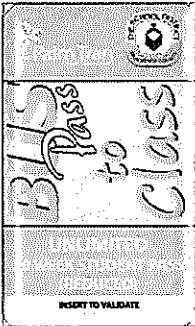
Use exact change, there is no cash refund. The Farebox does not make change. Upon request, a fare card can be issued for over-payment in excess of \$1.00 which can be used towards future rides on Palm Tran. You may deposit more than the fare, but the Farebox does not make change and the bus operator does not handle cash.

Palm Tran is not responsible for damaged or lost cards. Non-Refundable.

There are no transfers between Palm Tran buses; you must pay an additional full fare.

156.542.5 Quik Pass Bus Passes

Palm Tran also offers Passes that may be purchased in advance for riders who travel more frequently.

<p>One Trip Tic Quik Pass: 1 Trip Ticket to use for future rides on Palm Tran.</p> 	<p>Unlimited 1Day Quik Pass: valid for unlimited rides all day. Calendar Day use only.</p> 	<p>Unlimited 1Day Reduced Quik Pass: valid for unlimited rides all day. Calendar day use only.</p> 
<p>Unlimited 31-day Quik Pass: valid for unlimited rides for 31 consecutive days beginning the first day of use.</p> 	<p>Unlimited 31-day Quik Pass Reduced: valid for unlimited rides for 31 consecutive days beginning the first day of use.</p> 	<p>School District Semester 20-week Pass: valid for unlimited rides for 20-week calendar days from day of activation. School Board Only.</p> 

156.5.1.142.5.1 Transportation Disadvantage Bus Pass Program

Palm Tran's Transportation Disadvantage program allows Palm Beach County residents who qualify for the program the ability to purchase Palm Tran Bus Passes 31-Quik Pass and 1 Day Quik Pass at a reduced rate to allow them access to opportunities within Palm Beach County.

156.5.1.142.5.1.1 Program Qualifications

156.5.1.1.142.5.1.1.1 Proof of Income:

- Last Year's Income Tax Return-Annual adjusted gross income from previous year.
- Current Retirement/Pension Statement-Current letter showing benefit amount.
- Unemployment Benefits (current letter/stub)-Current weekly/biweekly benefit amount.
- Two Weekly or Bi-Weekly Pay Stubs (no more than two months old). -Current wage earnings.
- Social Security Wage printout SEQY -Current wage-earning summary.
- Social Security Wage printout TPQY-Current Social Security Retirement, Survivors and Disability benefit letter.

156.5.1.1.142.5.1.1.2 Legal Status:

- U.S. Driver's License-Issued by Department of Motor Vehicles in the United States.
- State Identification Card- Issued by Department of Motor Vehicles in the United States.
- Voter Registration Card-Issued by the Supervisor of Elections office.
- Social Security Card-Issued by United States Social Security Administrator Office.
- U.S. Birth Certificate-Issued by the Department of Health Vital Statistics Office.
- U.S. Passport-Issued by the Department of Homeland Security U.S. Citizenship and immigration Services.
- Permanent Resident Card- Issued by the Department of Homeland Security U.S. Citizenship and immigration Services.
- Employment Authorization Card- Issued by the Department of Homeland Security U.S. Citizenship and immigration Services.
- I-9, Employment Eligibility Verification- Issued by the Department of Homeland Security U.S. Citizenship and immigration Services.
- I-94, Arrival/Departure Form- Issued by the Department of Homeland Security U.S. Citizenship and immigration Services.

156.5.1.142.5.1.2 Purchase Locations

Palm Tran Connection- The Transportation Disadvantaged Program (TD) offer to new applicants and recertification's are done annually at this location only. Customers can purchase full fare/reduced day & monthly passes as well.

Intermodal Tri Rail Kiosk- Those approved for the Transportation Disadvantaged Program (TD) can purchase passes at this location. New applicants or annual recertification's must be done at Palm Tran Connection main office. Customers can purchase full fare/reduced day & monthly passes as well.

Transportation Disadvantaged Program Income Requirements

These requirements are based on the Federal Poverty Level Guidelines. These figures are updated annually by the Department of Health and Human Services.

- 31-Day Quik Pass Reduced: \$15.00. TD customers with an annual income of 75% or less of the Federal Poverty Level.

- 31-Day Quik Pass: \$20.00. TD customers with an annual income between 76% and 150% of the Federal Poverty level.
- TD 1 Day Quik Pass: \$1.50. Calendar Day Only.

~~156.6~~42.6 Half/Reduced Fare Requirements

Palm Tran offers a half fare on our single-trip cash fare and a reduced price on all QUIK Passes for those who qualify. Passengers riding for a half fare or using a reduced fare QUIK Pass must be able to present identification when boarding the bus which can include:

- Senior - any person 65 years or older with a photo ID issued by Palm Tran, a valid driver's license or Florida State ID card. A Florida State Identification card can be obtained from the Driver's License Bureau.
- Student - age 21 or under. Must show valid school ID.
- Disabled - any person who has received a half fare ID issued by Palm Tran or our paratransit division, Palm Tran Connection, based on documented disabilities.
- Medicare - Recipient must show their Medicare card to receive a half fare.
- Veteran's Administration - Must show their "Service Connected" VA card.

Customers with a Medicaid card do not receive a half fare.

~~156.7~~42.7 Free Fare Requirements

- Children 8 and under ride free when accompanied by a fare paying passenger.
- Police officer in uniform or with badge.
- Customers with a Connection ADA ID Card issued by Palm Tran Connection.

~~156.8~~42.8 Promotions and Special Events

Fare promotions, including special event fares, may be used to attract riders to Palm Tran services. Fare promotions can be a cost-effective method of attracting riders to new services (such as new bus routes and new rail lines) and existing services. For the purpose of this policy, Fare Promotions shall be defined as any new fare card, fare media, cash fare or other transit fare which is not part of the adopted fare structure and may be priced higher or lower than Palm Tran's regular fares. Fare Promotions are not required to include a specific fare for seniors, Medicare cardholders or individuals with disabilities, however the rates charged seniors, Medicare cardholders or individuals with disabilities during off-peak hours must not exceed one-half of the rates generally applicable to other persons at peak hours (excluding the Fare Promotion) as required by FTA regulations (Code of Federal Regulations, Title 49, Subtitle B, Chapter Vi, Part 609). Fare Promotions must be able to be implemented within the capabilities of the current fare collection technology in use at the time of the implementation. Fare Promotions shall not exceed a six (6) month period. If the promotion is deemed to be successful and management desires it to be part of the fare structure, then management shall bring the issue and analysis to the Commission for adoption into the current fare structure.

~~156.9~~42.9 Transfers

There are no transfers between Palm Tran buses; you must pay an additional full fare.



~~156.9.1~~ 42.9.1 Transferring to or from BCT:

To BCT from Palm Tran: Ask the driver for a free BCT Transfer

To Palm Tran from BCT: \$0.50 with valid BCT transfer

Transferring from Tri-Rail to Palm Tran:

\$0.50 with valid Tri-Rail transfer or ticket boarding at any location other than a Tri-Rail station will be regular fare.

~~156.9.2~~ 42.9.2 Transferring from Palm Tran to Tri-Rail:

Passengers with a valid Tri-Rail fare product (Smartcard or Paper Ticket), originating or returning their trip with BCT, MDT or Palm Tran, must pay the full fare on that system. Those without a Tri-Rail fare product receive \$2 off a full fare or \$1 off a discounted One –Way or Round-Trip Tri-Rail product, with proof of transfer from one of the three county fixed route systems.

~~156.10~~ 42.10 Locations

West Palm Beach Intermodal Transit Center • 150 Clearwater Dr., WPB

Palm Tran Connection • 50 S Military Trail, Suite 101, WPB

FAU OWL Card Center • 777 Glades Rd., Boca Raton

Village of North Palm Beach Library • 303 Anchorage Dr., NPB

Palm Beach County Library System Branches •

Monthly Full & Reduce Quik Bus Passes Only.

Main Library 3650 Summit Blvd. West Palm Beach, FL 33406 (561) 233-2600 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.	Okeechobee Blvd Branch 5689 West Okeechobee Blvd. West Palm Beach, FL 33417 (561) 233-1880 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.
Royal Palm Beach 500 Civic Center Way. Royal Palm Beach, FL 33411 (561) 790-6030 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.	Acreage Branch 15801 Orange Blvd. Loxahatchee, FL 33470 (561) 681-4100 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.
Belle Glade Branch 725 NW 4th Street. Belle Glade, FL 33430 (561) 996-3453 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.	Clarence E. Anthony Branch 375 SW 2nd Avenue. South Bay, FL 33493 (561) 992-8393 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.
Loula V. York Branch 525 Bacom Point Road Pahokee, FL 33476 (561) 924-5928 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.	Jupiter Branch 705 Military Trail Jupiter, FL 33458 (561) 744-2301 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.



Gardens Branch 11303 Campus Drive Palm Beach Gardens, FL 33410 (561) 626-6133 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.	Tequesta 461 Old Dixie Highway North Tequesta, FL 33469 (561) 746-5970 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.
Wellington Branch 1951 Royal Fern Drive Wellington, FL 33414 (561) 790-6070 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.	Greenacres Branch 3750 Jog Road. Greenacres, FL 33467 (561) 641-9100 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.
Lantana Road Branch 4020 Lantana Road Lake Worth, FL 33462 (561) 304-4500 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.	West Boynton Branch 9451 Jog Road Boynton Beach, FL 33437 (561) 734-5556 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.
Glades Road Branch 20701 95th Avenue South Boca Raton, FL 33434 (561) 482-4554 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.	West Boca Branch 18685 State Road 7 Boca Raton, FL 33498 (561) 470-1600 Monthly Full & Reduced Quik bus passes only. No Transportation Disadvantage Quik passes sold.
Hagen Ranch Road Branch 14350 Hagen Ranch Road Delray Beach, FL 33446 (561) 894-7500	

~~156.1142.11~~ 156.1142.11 Riders Rules

For the safety and comfort of all passengers, observe the following rules while riding a Palm Tran bus.

- No illegal weapons or controlled substances of any kind may be carried aboard Palm Tran buses or Palm Tran property. Exceptions to this policy are those persons duly authorized and/or licensed to carry a legal weapon or firearm.
- As a courtesy, please allow the front seats of the bus to remain open for passengers using wheelchairs, scooters and walkers.
- All ADA Mobility Devices or Aid passengers should utilize the safety straps located in the front of the bus.
- Eating, drinking and chewing tobacco are not allowed.
- No Littering or Solicitation is permitted on the bus or bus stops.
- No one is permitted to post signs, notices, or any other form of written or printed materials on or within any Palm Tran property, without the expressed written approval of Palm Tran.
- Smoking is not allowed. This includes tobacco and electronic odor-free cigarettes.
- No alcoholic beverages are allowed on the bus.
- Passengers should dress appropriately. (i.e. shirts, shoes, pants, skirts)
- Shoes and shirts must be worn by riders at all times.
- You may play your personal media devices, but only with headphones and at a low volume.
- Pets are permitted if enclosed in a proper carrying cage.

- The size of the container must not impede a rider's safe egress from the vehicle or bus; this excludes service animals (i.e. guide dogs, signal dogs, or other animals individually trained to perform tasks for customers with a disability).
- The pet and/or service animal does not cause damage, create a nuisance or inconvenience while using service.
- Service animals as defined by the Americans with Disabilities Act (ADA) will be allowed to board.
- Keep carry-on items out of the aisle including carts and strollers. If possible, fold strollers and carts.
- Baggage, luggage and packages are not permitted to remain in aisle and must remain in rider's control at all times.
- Please do not talk to or distract the bus driver while the bus is in motion.
- Palm Tran personnel are not required to provide baggage assistance.
- Always stand behind the standee line near the front doors and hold on while the bus is in motion.
- Seating Policy, except for ADA riders, seating is available on first come, first served basis.
- Passengers who cause a disturbance on the bus or who interfere with the safe operation of the bus and/or who vandalize the bus will be subject to removal or arrest.
- Bikes on Buses (B.O.B.) cannot accommodate mopeds, gas or battery powered motor bikes or scooters of any kind, or tandem bicycles. Portable bikes and scooters (only if secured into a carrying case or bag) are allowed inside the bus.
- Palm Tran and its operators are not responsible for items left on the bus, at the bus stops, or at the Intermodal Transit Center.
- No loitering. Only transit related activities are permitted at our bus stops and Intermodal Transit Center.
- Please be courteous to other passengers when using cell phones.
- Signal your stop request at least one block in advance, exit through the rear doors and step clear of the bus. Remember to take your belongings with you.
- Surfboards and Hoverboards are not allowed on the bus.
- Stay seated or hold the handrail (if standing) before the bus moves or is in motion.
- Hold your baby and folded stroller when on the bus.
- Ask the bus operator if you require the bus to be lowered or repositioned so you may exit safely.
- Security – Customers use the Palm Tran system at their risk. Palm Tran is not responsible for acts of vandalism, violence or theft which may occur on any Palm Tran bus, at a Palm Tran bus stop or Palm Tran parking lot.
- If an incident occurs, and Palm Tran is notified, an investigation will be conducted by the proper authorities.
- Any customer that is injured on Palm Tran property including bus, bus stop and parking lots should notify a Palm Tran representative immediately or within 24 hours of the incident. Injuries will be investigated by the proper authorities. Any persons that wish to report an incident or injury may call 561-841-4287 during regular office hours Monday through Friday from 8:30 a.m. to 5:00 p.m.
- Rider Code of Conduct.
- You can be issued a Trespass Notice by Palm Tran personnel for violating any of the following rules while riding the bus. Defiance may result in exclusion from the transit system.
- Assaulting or battering a bus operator or any other Palm Tran employee or passenger.

- Possessing a weapon except when in the possession of a law enforcement officer. This includes firearms, knives, and machetes.
- Smoking. This includes tobacco and electronic odor-free cigarettes.
- Misuse of fare media.
- Causing a disturbance on the bus, distracting a bus operator or interfering with safe operation of the bus.
- Loitering. Only transit-related activities are permitted at bus stops, Intermodal Transit Center and on Palm Tran property.
- Failure to pay the appropriate fare.

~~156.1242.12~~ 1242.12 Palm Tran's Non-Discrimination Policy

Federal Title VI Civil Rights Assurance Notice under the Americans with Disabilities Act

Palm Tran hereby gives public notice that it is Palm Tran's policy to assure full compliance with Title VI of the Civil Rights Act of 1964 (Title VI), and the Americans with Disabilities Act (ADA). Palm Tran is committed to ensuring that no person is excluded from participation in, or denied the benefits of its services, or be subjected to discrimination on the basis of race, color, sex or national origin (Title VI) or because of an individual's disability (ADA).

Modifications to Policies and Procedures: Palm Tran will make reasonable modifications to policies and programs to ensure that people with disabilities have an equal opportunity to enjoy all of its programs, services and activities. The ADA does not require Palm Tran to take any action that would fundamentally alter the nature of its programs or services or impose any undue financial or administrative burden. Whenever feasible, requests for modifications should be made in advance. The request from the individual with a disability should be as specific as possible and include information on why the requested modification is needed in order to allow the individual to use Palm Tran's services.

Should you have any questions, concerns or if you believe you have been subjected to discrimination under Title VI or ADA, begin our complaint process by contacting:

Palm Tran

Attn: Customer Service Administrator

50 S. Military Trail • Suite 101

West Palm Beach, FL 33415

Call: 877-930-4287 • Email: PT-ADA@pbcgov.org

www.palmtran.org



Palm Tran
 Public Transportation

CONNECTION
Independence through mobility.



~~156.13~~42.13 HURRICANE SEASON POLICY

June 1st Thru November 30th

For the safety of our customers and operators, Palm Tran's hurricane policy requires bus service to be discontinued if:

- Winds reach a sustained level of 40-45 miles per hour.
- Emergency operations personnel deem driving conditions unsafe.

We recommend having an emergency transportation plan in place to get you safely to your destination in the event that Palm Tran is required to implement this policy. Once roads are safe to travel, service will resume as quickly as possible.

~~156.14~~42.14 PALM TRAN'S "BIKES ON BUSES" PROGRAM POLICY

There is No Age Requirement, No Additional Charge & No Permit Needed to bring your bike on the bus. Bikes must be placed on the bike rack located outside in front of the bus. Riders need to keep in mind on the following rules below.

- Buses can accommodate 2 bikes and rack space is available on a first-come, first-served basis.
- Bus operators are not required to physically assist the customer.
- It is the rider's responsibility to ensure the bike is properly secured to the rack on the front of the bus.
- When you are exiting the bus don't forget your bike. Remember to tell the driver that you are retrieving your bicycle and exit through the front doors.
- If you forget your bike call Lost and Found: (561) 841-4287 option#3. Please provide a description of the bicycle, first and last name, and phone number.
- You will only receive a returned call if your bicycle has been found.

~~156.15~~42.15 Palm Tran Lost and Found

Provide the following information to our customer service agents: description of the lost item(s), first and last name & phone number.

- Palm Tran fixed-route bus riders: call customer service (561) 841-4287 Monday through Friday, 6:00 am – 6:00 pm, Saturday 8:00 am – 5:00 pm.
- When you call, be ready with information that can help us identify your lost item, such as a detailed description or a unique characteristic of an item.
- Knowing the route number, the number of the bus, the stops at where you boarded or got off, the time of day you traveled, and the direction of travel can help.
- Connection riders, please call customer service at (561) 649-9838, option #6 if you have left something behind.
- Connection Customer Service hours are Monday thru Friday, 8:00 a.m. – 5:00 p.m. Closed on holidays.
- Palm Tran does not assume responsibility for lost items. Before leaving the bus, always check your packages and personal belongings.

~~156.16~~42.16 Palm Tran Park & Ride

Palm Tran has 18 FREE Park and Ride locations

Belle Glade • West Tech

BOCA RATON • CONGRESS AVE. AND 82ND ST. BOCA RATON • BOCA RATON TRI-RAIL

BOYNTON BEACH • BOYNTON TRI-RAIL DELRAY BEACH

DELRAY BEACH TRI-RAIL JUPITER • WEST JUPITER RECREATION CENTER JUPITER

FLORIDA'S TURNPIKE

LAKE WORTH • LAKE WORTH TRI-RAIL STATION

LAKE WORTH • FLORIDA'S TURNPIKE

MANGONIA PARK • MANGONIA PARK TRI-RAIL STATION

PALM BEACH GARDENS • GARDENS MALL

PALM BEACH GARDENS • PALM BEACH GARDENS TURNPIKE ROYAL PALM BEACH • SHOPS AT SOUTHERN PINES WELLINGTON • PALMS WEST HOSPITAL

WELLINGTON • WELLINGTON GREEN MALL

WEST PALM BEACH • FIRE RESCUE STATION #7

WEST PALM BEACH • OKEECHOBEE BLVD., AND SR 7/US 441

WEST PALM BEACH • WPB INTERMODAL CENTER/TRI-RAIL STATION

~~156.17~~42.17 Palm Tran Connection

Introduction: Palm Tran's policy, in compliance with the Americans with Disabilities Act of 1990 (42U.S.C. Section 12143) and the implementing FTA Regulations (49 CFR Section 37.121) is that ADA complementary paratransit fares will equal to no more than twice the regular fixed-route fare for the same trip. If the Act is changed, this policy shall be changed to be consistent with federal law. If ADA complementary paratransit provides service beyond or in addition to the federally defined ADA complementary paratransit service, a higher fare shall be charged for that service.

~~156.18~~42.18 Connection Program Descriptions

~~156.18.1~~42.18.1 The Americans with Disabilities Act (ADA) Program

The Americans with Disabilities Act (ADA) Program is transportation that is provided within 3/4 of a mile of a Palm Tran bus route during the same hours and days as Palm Tran fixed route bus service. To become eligible for ADA service, an individual must have a disability which prevents them from riding the fixed route bus. An individual must first complete an ADA application to be eligible for service.



~~156.18.242.18.2~~ 156.18.242.18.2 The Transportation Disadvantaged (TD) Program

The Transportation Disadvantaged (TD) Program is sponsored by the State of Florida Transportation Disadvantaged Trust Fund. Service is provided anywhere in Palm Beach County during the same hours and days as Palm Tran fixed route bus service.

Transportation Disadvantaged (TD) Eligible customers may qualify for a discounted TD Bus Pass if they meet household income guidelines that fall between at 150% of the Federal Poverty Level or below. Applicants must apply in person at Palm Tran CONNECTION offices located at: 50 South Military Trail, Suite 101, West Palm Beach, FL 33415. If you have any questions, you may also contact the office at 561-649-9838, option #7.

TD trips will require a \$3.50 fare per one-way trip fare for all trips. There will be no exceptions. Customers are expected to pay their fare upon boarding. Failure to have your fare ready may result in the rescheduling of your transportation.

~~156.18.342.18.3~~ 156.18.342.18.3 The Division of Senior Services (DOSS) Program

The Palm Beach County Board of County Commissioners, the Area Agency on Aging and the Florida Department of Elder Affairs fund the Division of Senior Services (DOSS) Program, for individuals who are age 60 or older, per the eligibility guidelines established by the Older Americans Act (OAA). Service is available Monday through Friday from 8am to 5pm, excluding major holidays.

Transportation will be provided to the following approved nutrition/meal sites:

Gloria Williams Multicultural Center 501 21st St. West Palm Beach, FL 33407	Greenacres Community Center 501 Swain Blvd. Greenacres, FL 33463
Lindsay Davis, Sr Community Center 1550 W 28th St. Riviera Beach, FL 33404	Mid-County Senior Center 3680 Lake Worth Rd. Lake Worth, FL 33461
MorseLife 4847 Fred Gladstone Dr. West Palm Beach, FL 33417	North County Senior Center 5217 North Lake Blvd. Palm Beach Gardens, FL 33418
Pahokee Wellness Center 360 Main St. Pahokee, FL 33411	Tanner Park Community Center 105 E. Palm Beach Rd. South Bay, FL 33493
Village of Royal Palm Beach/Harvin Cultural Center 151 Civic Center Way Royal Palm Beach, FL 33411	West County Senior Center 2916 State Road #15 Belle Glade, FL 33430

~~156.1942.19~~ 156.1942.19 Connection Fares

All fares are payable in cash (exact change only).

Drivers are not permitted to make change or accept tips of any kind.

CONNECTION encourages our riders to take advantage of the more cost-effective fixed route transportation by offering bus passes and allowing ADA Paratransit eligible customers with an ADA CONNECTION ID, to use the fixed route at no charge.

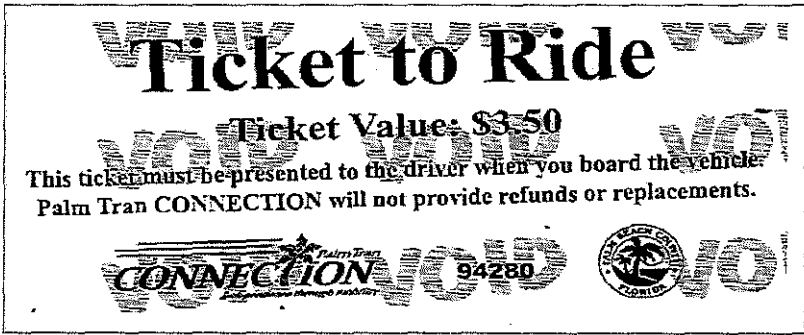
Photo ID's are available to ADA Paratransit eligible customers Monday through Friday, 8am to 5 pm at the CONNECTION office.



The following fares are set by the Board of County Commissioners and may change at any time:

Fare Product	Fare Price
Americans with Disabilities Act (ADA) Program	\$3.50 per one-way trip
Division of Senior Services (DOSS) Program	Trips to meal-sites at designated route times NO CHARGE
Transportation Disadvantaged (TD) Program	\$3.50 per one-way trip
Personal Care Attendant (PCA)	NO CHARGE
Escorts	\$3.50 per one-way trip
Children age 8 and under when accompanied by a fare paying passenger	NO CHARGE

Not Responsible for lost or stolen tickets. Tickets to Ride are non- refundable.



156.2042.20 Connection ADA Fix Route Pass

CONNECTION ADA Fixed Route Pass entitles existing Connection ADA rides to use any of Palm Tran’s Fixed Route buses for no charge.

Connection will issue a Connection ADA contactless EU smart card ID that will consist of Name, Client ID Number, Issue Date, Expiration Date (depending on eligibility) and Photo of client and be usable in the FARE SYSTEM.

The Connection ADA Fixed Route Pass must be tapped on the farebox when boarding a fix route bus.



~~156.21~~42.21 Flex Route Service/Dial A Ride

Flex Service and Dial-A-Ride Service

Connection Belle Glade Flex Route Service Proposed Fares				
Flex Route Ticket Types	Regular Fare/Reduced Fare	With Connection ADA Fixed Route Pass	With Palm Tran One-Day Quik Pass	With Palm Tran 31-Day Quik Pass
One-Trip	\$1.00/\$0.50	\$0.00	\$0.00	\$0.00
Dial-A-Ride	\$2.00/\$1.00	\$0.00	\$0.00	\$0.00
Route Deviation	\$0.50	\$0.00	\$0.00	\$0.00

~~156.22~~42.22 Flex Service and Dial-A-Ride Service Transfers

With a Palm Tran Connection ADA Fixed Route Pass will be honored for the Flex Route Service and Dial-A-Ride Service. Palm Tran will also honor valid Palm Tran 1 Day and 31-Day Quik Passes, either full or reduced fare, that have been previously purchased for the Flex Route, Route Deviation and the Dial-A-Ride Service at no additional charge.

Passengers transferring from trips that originate on the Flex Route Service and Dial-A-Ride service to Palm Tran Fixed Route Service or Connection Service without a Connection ADA Fixed Route Pass or a valid Palm Tran 1 Day or 31-Day Quik Pass will pay the required fare for that service at time of transfer.

~~156.23~~42.23 Palm Tran and Connection Fare Table

Service	Media	Description	Fare
Fixed Route	Cash	1 Trip Base	\$2.00
Fixed Route	Cash	1 Trip Reduced	\$1.00
Fixed Route	Cash	1 Day Unlimited Full Fare	\$5.00
Fixed Route	Cash	2 Day Unlimited Reduced Fare	\$3.50



Fixed Route	Pass	31-Day Quik-Pass Full Fare	\$70.00
Fixed Route	Pass	31-Day Quik-Pass Reduced Fare	\$55.00
Fixed Route	Pass	31-Day Quik-Pass Transportation Disadvantage1	\$20.00
Fixed Route	Pass	31-Day Quik-Pass Transportation Disadvantage2	\$15.00
Fixed Route	Pass	20-Week Student Pass (Palm Beach School Board Only)	\$55.00
Fixed Route	Pass	1 Trip Quik Pass	\$2.00
Fixed Route	Pass	1 Day Unlimited Quik-Pass Full Fare	\$5.00
Fixed Route	Pass	1 Day Unlimited Quik-Pass Reduced Fare	\$3.50
Fixed Route	Pass	1 Day Unlimited Quik Pass Transportation Disadvantage	\$1.50
Connection	Cash	1 Trip Cash Fare	\$3.50
Connection	Pass	10 Trip "Ticket to Ride" Paratransit	\$35.00
Flex Route	Cash	1 Trip	\$1.00
Flex Route	Cash	1 Trip Reduced	\$0.50
Flex Route	Cash	Flex Route Deviation	\$0.50
Dial-A-Ride	Cash	1 Trip	\$2.00
Dial-A-Ride	Cash	1 Trip Reduced.	\$1.00

TD Customers with annual income between 76% and 150% of the Federal Poverty Level

TD Customers with annual income of 75% or less of the Federal Poverty Level

EXHIBIT A
ATTACHMENT A
PAYMENT MILESTONES
Contract No. F-19-056/SS

Palm Tran Payment Milestones

Milestone	Description	Estimated Completion Date	Notes	Palm Tran Payment Milestone
MS-1.	Project Documentation Approval	NTP + 3 Weeks	Contractor needs to have submitted for Palm Tran's review/approval at least 5 days prior	2.5%
MS-2.	Conceptual Design Review Phase Approved	NTP + 4 Weeks	Contractor needs to have submitted for Palm Tran's review/approval at least 5 days prior	2.5%
MS-3.	Preliminary Design Review Approval	NTP + 7 Weeks	Contractor needs to have submitted for Palm Tran's review/approval at least 5 days prior	2.5%
MS-4.	Final Design Review Approval	NTP + 10 Weeks	Contractor needs to have submitted for Palm Tran's review/approval at least 5 days prior	2.5%
MS-5.	First Article Testing Approval	NTP + 12 Weeks	Contractor needs to have submitted First Article Test Procedures for Palm Tran's review/approval at least 5 days prior	5.0%
MS-6.	Design Qualification Testing Approval	NTP + 15 Weeks	Contractor needs to have submitted Design Qualification Test Procedures for Palm Tran's review/approval at least 5 days prior	5.0%
MS-7.	Production Acceptance/Pre-shipment Testing Approval	NTP + 20 Weeks	Contractor needs to have submitted Production Acceptance/Pre-shipment Testing Test Procedures for Palm Tran's review/approval at least 5 days prior	5.0%
MS-8.	Pilot Test Approval	NTP + 25 Weeks	Contractor needs to have submitted Pilot Test Procedures for Palm Tran's review/approval at least 5 days prior	10.0%
MS-9.	Complete Rollout*	NTP + 27 Weeks	installed units will have been commissioned and placed into Revenue Service Mode successfully. * Palm Tran would like to have the entire FARE SYSTEM in revenue service by this milestone; however, recognizing the aggressive nature of the schedule, at minimum, the Contractor MUST have all Fareboxes and TVMs installed by this date. If Proposers are separating out other components, these MUST be clearly indicated in their proposed schedule, AND this and the subsequent Milestones will be split 50/50; i.e., first half for the fareboxes/TVM; second half for the remainder of the system. (NOTE: To account for the Open Payment Software being delivered at a later date, \$200,000 will be withheld from the MS-9 payment and will be paid upon the completion of this milestone for the open payment implementation).	20.0%
MS-10.	Reliability, Maintainability and Accuracy Test	NTP + 31 Weeks	Contractor needs to have submitted Reliability, Maintain ability and Accuracy Test Procedures for Palm Tran's review/approval at least 10 days prior	10.0%
MS-11.	System Acceptance Test Approval	NTP + 35 Weeks	Contractor needs to have submitted System Acceptance Test Procedures for Palm Tran's review/approval with Reliability, Maintain ability and Accuracy Test Procedures	10.0%
MS-12.	Successful Closeout of Punch list Items	NTP + 40 Weeks	1. Resolve all blocker and major issues. 2. Resolved Minor/Cosmetic issues in collaboration with Palm Tran priorities.	10.0%
MS-13.	Palm Tran Acceptance of FARE SYSTEM/Start of Contractor Warranty	NTP + 44 Weeks	Predicated on Milestones MS – 1 though MS – 12 having been approved by Palm Tran	10.0%
MS-14.	End of Contractor Warranty Period	MS – 13 + 2 years	Per Contract Warranty Terms and Conditions	5.0%
			Total:	100.0%

EXHIBIT B
CONTRACTOR'S PROPOSAL
DATED July 17, 2019
Contract No. F-19-056/SS

Including:

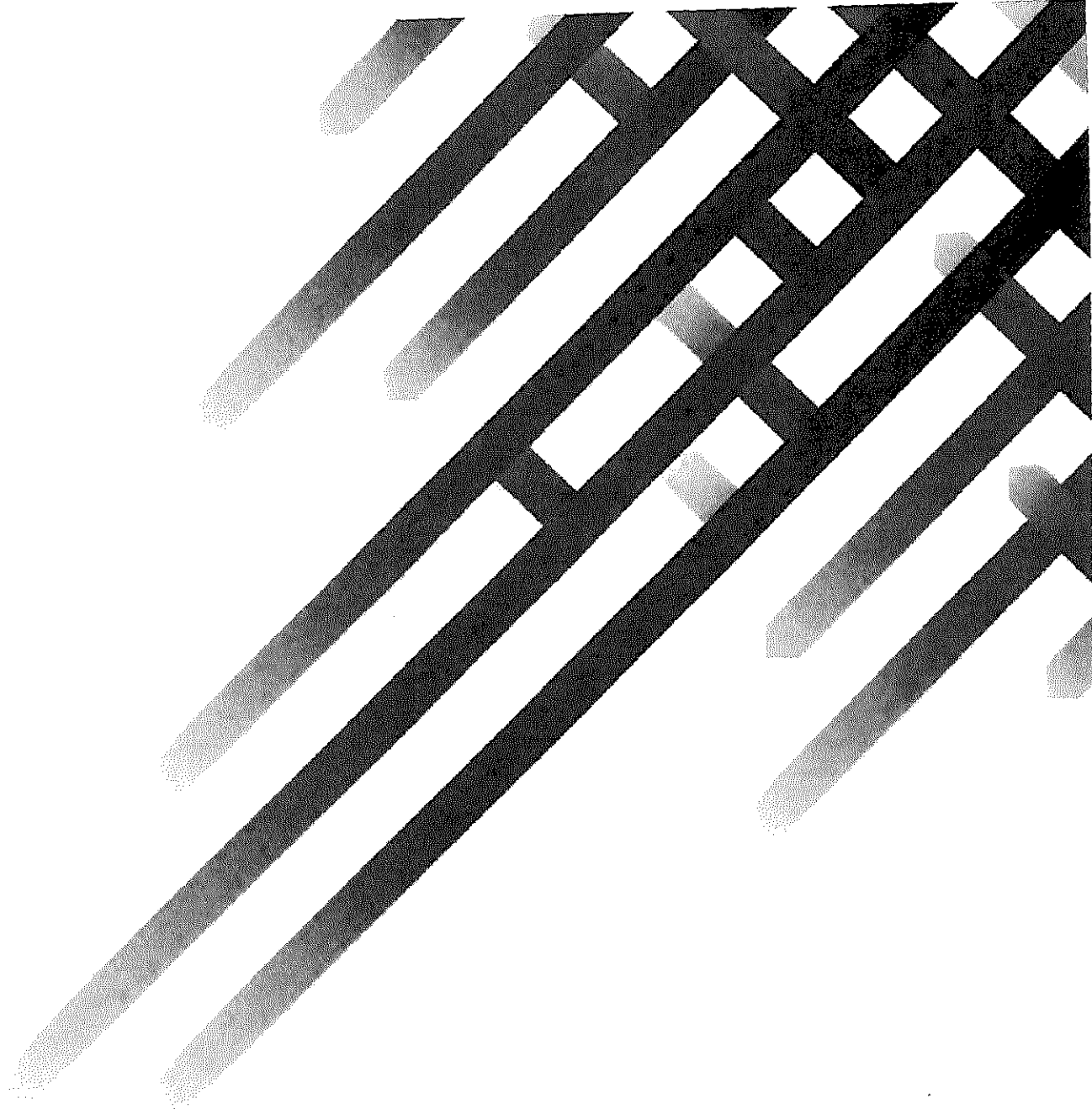
- Pricing, DBE
- Disaster Recovery Plan Link
- Drug Free Workplace Policy
- Forms
- InComm - Technical Proposal
- Insurance GENFARE
- Program Management Plan
- Schedule
- Test Plan Farebox Factory Acceptance
- Test Plan Farebox System Acceptance
- Training Fast Fare Data System
- Training FastFare Driver
- Training FastFare Maintenance

Excluding:

The following documents are deleted in their entirety from CONTRACTOR'S proposal and replaced with Exhibit C to this Contract consisting of the Genfare Subscription and Services Attachment, the Genfare Link Services Attachment and the Mobile Link Services Attachment as provided in Article 47 of the Contract.

- Sample Subscription and License Agreement
- Sample Support Agreement

(Consisting of **183** Pages)



GENFARE 

PROPOSAL
PALM BEACH COUNTY
BOARD OF COUNTY COMMISSIONERS
FARE PAYMENT & COLLECTION SYSTEM
MAY 17, 2019

PROPOSAL

TO



PALM BEACH COUNTY BOARD OF COUNTY COMMISSIONERS

FOR A

FARE PAYMENT & COLLECTION SYSTEM

RFP No. F-19-056/SS

Prepared and Submitted
By

GENFARE

Genfare, a Division of SPX Corporation
800 Arthur Avenue
Elk Grove Village, IL 60007
Phone: 847-593-8855 – Fax: 847-758-4997

Contact:
Roy Purnell
Director of Sales, Southeastern Region
336-273-0454 | roy.purnell@spx.com

July 17, 2019

July 17, 2019

Sandy Shea
Senior Buyer -- Purchasing Department
Palm Beach County Board of County Commissioners
50 South Military Trail, Suite 110
West Palm Beach, FL 33415

RE: RFP No. F-19-056/SS -- Fare Payment & Collection System

Dear Ms. Shea:

Genfare, a division of SPX Corporation, is pleased to present the Palm Beach County Board of County Commissioners (the County) and Palm Tran, Inc. (Palm Tran) with this proposal for a fare payment and collection system. As requested in the RFP, we are providing one unbound original, eight bound copies, and one electronic copy in PDF format on flash drive. As specified in the RFP, our price proposal has been attached as an Excel file on the Vendor Self-Service website.

The following information was requested in the RFP:

- *Identification of Proposer.* Genfare, a division of SPX Corporation, 800 Arthur Avenue, Elk Grove Village, IL 60007, 847-593-8855.
- *Proposed Working Relationship between Proposer and Subcontractors.* ESP Enterprises and Perez Project Consulting
- *Proposer's Contact Information.* Genfare's contact person during the proposal evaluation period is Roy Purnell, Director of Sales -- Eastern Region, Genfare, 800 Arthur Avenue, Elk Grove Village, IL 60007, 336-273-0454, roy.purnell@spx.com.
- *Authorized Signer.* The undersigned, Eric Kaled, Genfare president, is authorized to enter into binding contracts on behalf of Genfare.

The Genfare solution offers many advantages:

- Its centerpiece is Genfare Link, our cloud-hosted central data system, which provides the ideal platform for account-based fare processing and open payments acceptance as envisioned in your RFP. Genfare Link also offers a path to seamless transfer between South Florida transit systems. Nine deployments of Genfare Link are currently in service or in various stages of implementation. Our first two account-based systems are now in operation and a third is undergoing agency testing. As explained in this submittal, we believe our approach to account-based processing is technically superior and offers reliable, secure, user-friendly operation unmatched by any other vendor.
- We have laid a firm foundation for open payments acceptance, with all necessary field hardware and our Genfare Link back end in current service.

Genfare

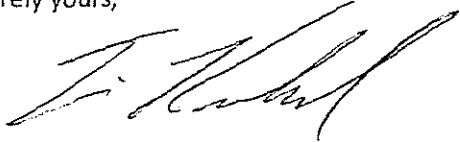
800 Arthur Avenue, Elk Grove Village, IL 60007

www.genfare.com

- We offer a complete solution providing all capabilities requested in the RFP and more. All proposed systems and devices were developed by Genfare and are service proven. All were designed from the outset to work together as part of an integrated solution; there will be no need to match disparate systems from multiple vendors with different design philosophies.
- We plan to establish local support in Florida to assist the Project Manager and work closely with Palm Tran project team.
- As Palm Tran's current fare collection provider, we are optimally to ensure a smooth transition between systems. The proposed vaulting and probing systems are upgraded versions of Palm Tran's existing equipment, have the same footprint, and use the same procedures. No modification of facilities is needed, and staff retraining will be minimal. As described in this proposal, all issues with the current system identified in the RFP have been addressed. We are happy to make any desired demonstrations prior to contract award, and will present all solutions for agency approval during design review.

The Genfare solution represents a quantum leap over previous technology and we are confident it will meet or exceed your expectations. We appreciate the opportunity to bid and look forward to further discussion.

Sincerely yours,



Eric Kaled
President

CONFIDENTIALITY NOTICE

This document contains proprietary information whose disclosure to unauthorized parties would be materially damaging to Genfare. Distribution of such information should be limited to those involved in the review and evaluation of this proposal. Access to this document by others should be restricted to the extent permitted by law. If you receive a request to produce this document under FOIA or similar statute, we ask that you notify us immediately so that we may provide a redacted version suitable for public disclosure.

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY5

1.1 Key Elements of the Genfare Solution8

1.2 Why Genfare Is The Best Choice for the County.....9

2. EXPERIENCE/QUALIFICATIONS/BACKGROUND/REFERENCES INFORMATION.....11

2.1 Background and Qualifications11

2.1.1 Profile of the Proposer.....11

2.1.2 History of Firm’s Experience13

2.2 Experience.....14

2.2.1 Status of Comparable Projects.....15

2.3 References.....15

2.3.1 Genfare Smart Card Implementations.....21

3. TECHNICAL RESPONSE/PROJECT APPROACH/UNDERSTANDING INFORMATION.....23

3.1 Proposer’s Understanding of Project Requirements23

3.2 Proposed System Architecture.....24

3.3 Hardware Implementation.....28

3.4 Approach to Account-Based Fare Processing28

3.4.1 Fare Media28

3.4.2 Data Transfer Methods29

3.4.3 Transaction Processing29

3.4.4 Master Status List30

3.4.5 Other Fare Transactions30

3.4.6 Price-Based Capped Fare30

3.4.7 Privileged (Reduced Fare) Accounts31

3.4.8 Integrated Mobile Ticketing.....31

3.4.9 Software-as-a-Service (SaaS) Model.....31

3.4.10 Implementing Account-Based Processing31

3.5 Approach to Open Payments Acceptance.....32

3.5.1 Implementing Open Payments Acceptance34

3.6 How the Genfare Solution Will Address Issues with the Current System.....34

3.7 How the Genfare Solution Will Meet the County’s Project Goals37

3.8 Fast Fare™ Farebox.....40

3.8.1 Features Summary41

3.8.2 General Performance Characteristics42

3.8.3 Environmental Conditions42

3.8.4 Accuracy and Acceptance44

3.8.5 Reliability and Maintainability44

3.8.6 Coin Acceptor.....45

3.8.7 Bill Validator.....45

3.8.8 Vehicle Area Network (VAN).....46

3.8.9 CAD/AVL Interface48

3.8.10 Operator Control Unit.....48

3.8.11	Cash Fare Processing.....	50
3.8.12	Magnetic Swipe Reader	50
3.8.13	Smart Card Processor.....	51
3.8.14	Bar Code Reader	51
3.8.15	Electronic Fare Media Processing.....	52
3.8.16	Passenger Indications	55
3.8.17	Logic Board.....	56
3.8.18	Fare Registration.....	57
3.8.19	Transactional Database.....	57
3.8.20	Fare Table	57
3.8.21	Event Records	59
3.8.22	Log-On Entry Process	59
3.8.23	Data Probing	60
3.8.24	Cashbox.....	60
3.8.25	Electronic Cashbox Identification	61
3.8.26	Cashbox Door and Electronic Lock.....	61
3.8.27	Electronic Key.....	62
3.8.28	Equipment Construction.....	62
3.9	Revenue Collection and Garage Probing System	63
3.9.1	Garage Data Probing Process.....	64
3.10	Vendstar-4 Ticket Vending Machine	66
3.10.1	Overview	66
3.10.2	Options.....	68
3.10.3	Environmental Requirements	68
3.10.4	Site Requirements.....	68
3.10.5	Patron Interface.....	69
3.10.6	Cabinet Construction	73
3.10.7	Security	74
3.10.8	Bill Acceptance.....	77
3.10.9	Coin Acceptance	78
3.10.10	Bank Cards	80
3.10.11	Receipt Printer	81
3.10.12	Ticket Dispensers	81
3.10.13	Smart Card Processor.....	81
3.10.14	Electronic Control Unit.....	81
3.10.15	Fare Table	82
3.10.16	Data Reporting.....	82
3.10.17	Vendstar Information Processor.....	83
3.11	Administrative Point of Sale Terminal (APOS)	85
3.11.1	Portable APOS (Option)	89
3.12	Desktop Bulk Smart Card Encoder	89
3.13	Security.....	89
3.14	Genfare Link Cloud-Hosted Central Data System	91
3.14.1	Overview.....	91
3.14.2	Provisions for Reliability, Security and Data Integrity	95

- 3.14.3 Genfare Link Modules 97
- 3.15 Web Ticketing Application 112
 - 3.15.1 Operation 114
 - 3.15.2 Functionality 115
- 3.16 Online Partner Portal 116
- 3.17 Retail Network..... 117
- 3.18 Mobile Payment System 117
 - 3.18.1 Mobile Ticketing Operation 119
 - 3.18.2 Features 120
 - 3.18.3 Safeguards Against Fraud 121
 - 3.18.4 Payment Processing and Settlement 122
 - 3.18.5 PCI Compliance 122
- 3.19 Systems Integration and Open Architecture..... 122
- 3.20 Enterprise Resource Planning (ERP) Solution..... 123
- 3.21 Testing, Training, Implementation, Operations and Maintenance 124
 - 3.21.1 Testing..... 124
 - 3.21.2 Training 126
 - 3.21.3 Implementation/Transition 129
 - 3.21.4 Maintenance 129
- 3.22 Proposer’s Understanding of Needs of County and Palm Tran 133
- 3.23 Compatibility with Other Regional Transportation Providers..... 134
- 3.24 Proposer’s Ability to Meet Project Milestones 134
- 3.25 Extent of Compliance with Technical Specification Requirements..... 134
 - 3.25.1 New Work to Be Provided 134
 - 3.25.2 Exceptions and Clarifications 138
 - 3.25.3 Information and Materials Requested in the RFP 141
- 3.26 County Resources Required to Facilitate Implementation 146
 - 3.26.1 Tasks to Be Accomplished by Genfare..... 146
 - 3.26.2 Tasks to Be Accomplished by Authority..... 147
- 3.27 Detailed Timeline for Required Services 147
- 4. PROJECT MANAGEMENT, KEY PERSONNEL AND OPERATIONS INFORMATION 148**
 - 4.1 Organization Chart 148
 - 4.2 Key Personnel..... 148
 - 4.2.1 Project Manager 149
 - 4.2.2 Genfare Link Development Team 149
 - 4.2.3 Other Genfare Project Personnel 150
 - 4.3 Resumes 150
 - 4.4 Roles of Staff Members Responsible for Handling and Monitoring Contract..... 150
 - 4.4.1 Project Manager Responsibilities 150
 - 4.5 Cross-Reference of Key Resources to Project References 151
 - 4.6 Approach to Project Management, Scheduling and Quality Assurance 152
 - 4.6.1 Overview 152
 - 4.6.2 Project Management Process 152
 - 4.6.3 Staffing..... 154
 - 4.6.4 Master Program Schedule 154

4.6.5 Progress Reports 154

4.6.6 Project Meetings 154

4.6.7 Genfare Software Development Process..... 156

4.6.8 Change Orders 158

4.6.9 Correspondence Control..... 158

4.6.10 Quality Assurance 158

4.7 Resume of Proposed Quality Assurance Manager..... 159

5. FINANCIAL/BUSINESS STABILITY 160

6. PRICING AND DBE 161

7. REQUIRED APPENDICES AND EXHIBITS 162

Resumes of Other Important Personnel 170

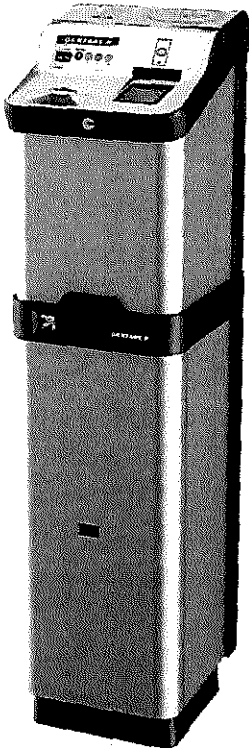
Terms and Conditions..... 172

1. EXECUTIVE SUMMARY

Genfare is pleased to present the Palm Beach County Board of County Commissioners (the County) and Palm Tran, Inc. (Palm Tran) with this proposal for a fare payment and collection system. We are industry leaders in the wide range of technologies needed to meet your requirements.

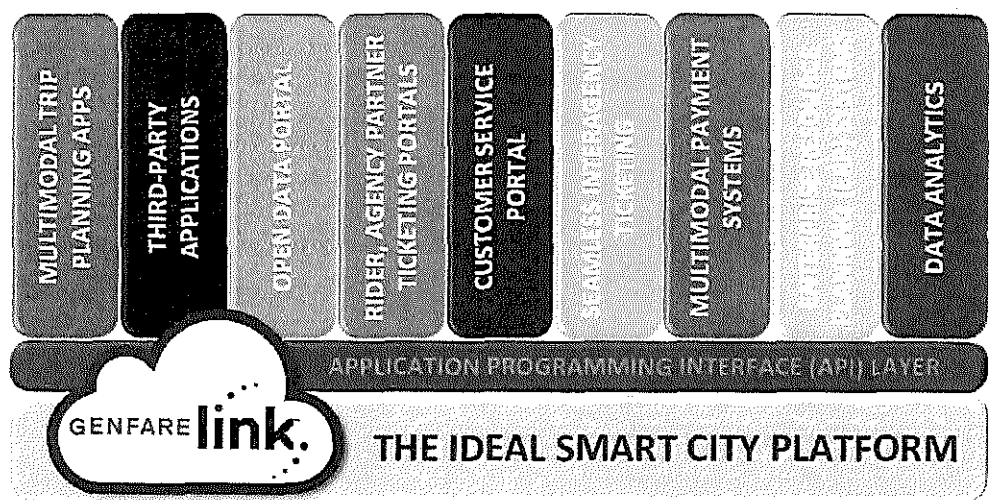
The Genfare solution includes the following important elements:

- **Account-based processing in the cloud.** All fare transactions will be recorded in a central database, and all fare media presented for payment will validated against that database in real/near-real time, ensuring centralized management and control of all fare activity.
- **Acceptance of open-payments media.** Contactless bank cards and selected phone-based fare media (Apple Pay and Google Pay) will be accepted at the farebox and other fare devices, providing riders with a level of convenience not previously possible.
- **Wide array of fare media and distribution channels to serve today’s diverse ridership.** The Genfare solution supports the broadest variety of fare media we have ever offered, from cash to smart cards, mobile tickets, bank cards and more.
- **State-of-the-art hardware and software platforms.** On buses, fares will be collected by our award-winning Fast Fare farebox, whose attractive styling, bold use of color and intuitive operation will please both riders and operators. Back end support is provided by our Genfare Link central data system, hosted in the Amazon cloud, which offers reliability and flexibility impossible to achieve with traditional local hardware.
- **Local project support.** Genfare plans to establish local support in Florida to assist the Project Manager and work closely with Palm Tran project team.



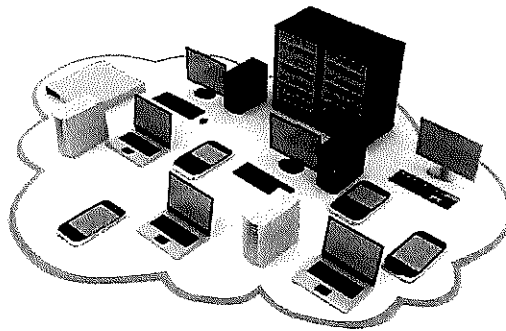
The Genfare solution takes fare collection to the next level, offering advanced capabilities at an affordable price. Its many advantages include:

- **Best-in-class cloud-hosted central data system.** A key component of our solution is Genfare Link, a multi-tenant central data system hosted in the Amazon cloud. Link’s best-in-class technology makes it the ideal foundation for the account-based system envisioned in the RFP, offering availability and maintainability far beyond what can be achieved using local hardware or a proprietary data center. Genfare Link was built by Genfare from the ground up and is in daily operation at multiple agencies. Its superior features include dual-region disaster recovery, standards-based message brokering to ensure loss-free data distribution among system components, an elegantly simple cellular probing approach, robust data visualization capabilities, and the exceptional support offered by Amazon cloud infrastructure, including automatic backup and failover, dynamic scaling, elastic load balancing and many other services.



- **Ideal “smart city” platform.** Genfare Link provides Palm Tran with an optimal platform for existing and future “smart city” initiatives that will facilitate collaboration and engagement, enabling you to leverage your fare collection investment for the benefit of the agency, riders, and the public. We do this through open architecture tools such as application programming interfaces (APIs) that facilitate sharing of the rich data collected by the Genfare solution. Possible applications include:
 - Seamless interagency ticketing systems, such as the one anticipated in the RFP involving South Florida Regional Transportation Authority (SFRTA), Broward County Transit (BCT), Miami-Dade Transit (MDT), and Brightline.
 - Developers’ center, enabling local transportation providers and tech entrepreneurs to develop mobility applications that will enrich the transit experience. For example, our tools will make it possible to create an app enabling riders to book trips combining transit with “last mile” services such as ride- and bike sharing.
 - Open data portal to make agency-selected ridership data publicly available for citizen analysis and planning initiatives.
- **Service-proven approach to account-based processing.** We are one of only a handful of vendors to have successfully implemented account-based fare processing involving both smart cards and mobile ticketing in a bus environment. Two of our account-based systems are currently in revenue service and a third is undergoing user acceptance testing; we expect to bring additional systems online during the coming year. We believe our approach to account-based processing is technically superior, offering reliability, security and user-friendliness unmatched by competing products.

- **Comprehensive, integrated solution.** Genfare offers a complete, tightly integrated system meeting RFP requirements, in which all elements were designed from the outset to work together. All reporting and other management functionality is accessed through a single administrative portal – it is not necessary to access multiple interfaces to collect data, monitor operations or configure the system.
- **Frictionless fare payment.** The turnkey Genfare solution supports a broad array of fare media and payment methods suited to riders of all types, from first-time visitors to daily commuters. We make fare payment virtually effortless, eliminating the need to wait in line, fumble for cash, or wonder when the next bus is coming.
- **Reliability, maintainability, ease of use, and security of our digital products equivalent to that of our hardware.** Our electronic fare technology has been designed to reflect the strengths for which our hardware has long been known. For example, Genfare Link provides high reliability and features automatic failover, backup, and archiving plus provisioning for load spikes and disaster recovery. Our Vendstar TVM has been certified as compliant with Payment Card Industry (PCI) standards, and PCI certification of the balance of our product line is in an advanced stage. We make extensive use of encryption and related security technology, and have hardened the operating system used by our vending products to deter hacking. Additional measures are described in our technical narrative below.
- **Provision for unbanked and low-income riders.** The Genfare solution will encourage migration from cash fare payment to electronic media, reducing expense, increasing customer loyalty, and speeding boarding. At the same time, we recognize that the new system will serve a diverse audience and must not disadvantage unbanked or low-income patrons. Our ticket vending equipment includes robust provisions for cash payment, including change-making capability, and enables unbanked riders to manage their transit accounts and deposit cash, allowing them to share in the benefits of electronic fare media. We offer multiple options for distribution of low-cost fare media to clients of social-service agencies. Our systems provide multilingual support, for this procurement including English, Spanish, and Creole.
- **Reliable long-term partnership.** We have been in the fare collection business for nearly 40 years. In an era of continual vendor churn, we are the County's best bet for long-term support.
- **Deep ties to Florida.** We provide the current fare collection equipment to your South Florida neighbors, Miami-Dade and Broward County. In addition, we have systems deployed in Orlando, Tampa and surrounding region, Jacksonville, and Ft. Myers. With an extensive customer base in Florida, Genfare is fully committed and plans to provide enhanced local project and technical support.

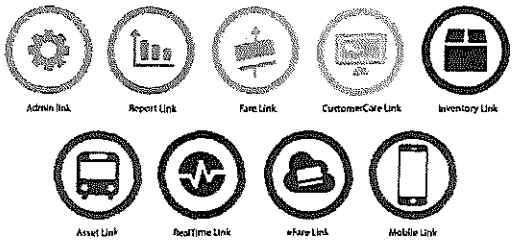


Our solution will meet your current needs and provide an optimal platform for future “smart city” initiatives. We look forward to the opportunity to demonstrate how our smart city platform aligns with the City’s vision.

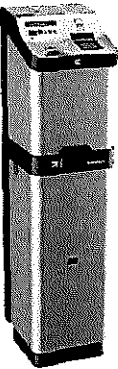
1.1 KEY ELEMENTS OF THE GENFARE SOLUTION

Genfare Link™ Central Data System

Genfare Link is a cloud-based central data system that provides smart card validation, processing of third-party cards, a high-availability database, web-based reporting, and many other features and benefits. Genfare Link is a multi-tenant solution intended for agencies of all sizes and can readily meet the County’s needs now and in the future.



Genfare Link modules



Fast Fare™ Validating Farebox

The Fast Fare farebox is the latest addition to Genfare’s industry-leading line of fare collection products. The Fast Fare is a full-service device that can process all fare media now in mainstream use, ranging from coins and bills to smart cards, magnetic media, and barcoded documents including limited-use media (LUM cards) and “virtual tickets” displayed on a mobile device. The proposal describes the complete capability of the farebox including smart card reader and barcode reader. It provides the processing power, memory and communications capability needed to support account-based fare processing. The Fast Fare can issue magnetic tickets and LUM cards from an optional internal dispenser.

Account-Based Fare Processing

All fare transactions will be validated in real/near-real time against a central account database, as specified in the RFP. Genfare’s account-based solution is in current service at multiple agencies and provides exceptional security, flexibility and convenience.

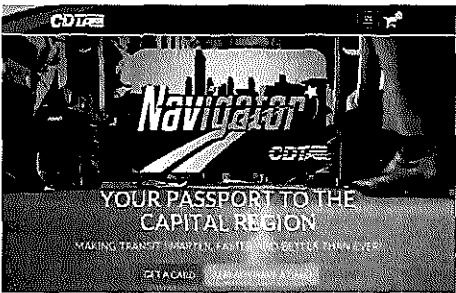


Mobile Link – Mobile Ticketing Application

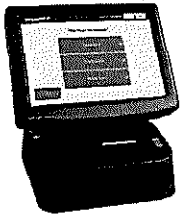
The Mobile Link ticketing application enables riders to purchase and display barcoded “virtual tickets” using their mobile devices. Mobile tickets are automatically read and validated by the bar code scanner on the Fast Fare-e validator without driver intervention.

eFare™ Link Online Ticketing Portal

eFare Link, a component of Genfare Link, is an agency-branded web portal that enables riders to purchase and manage smart fare media using any web-enabled device. We will also provide (a) an institutional partner portal to allow administrators for agency partners such as schools and businesses to manage the fare programs offered to their constituents, and (b) an administrative/customer service portal permitting agency staff to offer customer service, establish user groups with specific permission levels, and perform other administrative tasks.



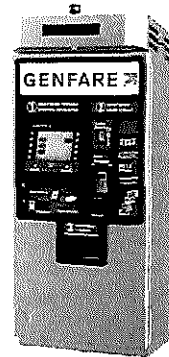
Administrative Point-Of-Sale Terminal (APOS)



To meet the County’s requirement for a ticket office terminal (TOT), we offer our administrative point-of-sale terminal (APOS), which enables agency ticket-office staff to sell or recharge electronic fare media, accept cash or bank cards as payment, and handle customer service inquiries. This versatile device also facilitates inventory control and card order fulfillment, and can be equipped with a camera and card printer to enable reduced-fare and employee ID badge production.

Vendstar Ticket Vending Machines (TVMs)

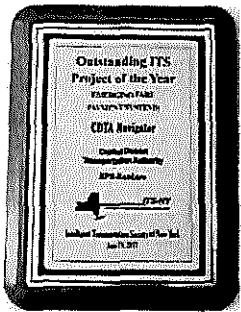
Genfare offers two self-service vending solutions. Our Vendstar-4 TVM is a full-service unit that accepts both cash and electronic payments. It has a robust ticket reader/issuer machine (TRiM), a powerful processor, a bill validator/stacker (with optional bill recirculator) and a bank card reader that can accept EMV chip cards. We can also provide our Vendstar-e cashless TVM, a compact unit that accepts bank card payments only. The two units have many parts in common, simplifying spare parts inventory.



1.2 WHY GENFARE IS THE BEST CHOICE FOR THE COUNTY

- **Reliable long-term partnership.** We have been in the fare collection business for nearly 40 years. In an era of continual vendor churn, we are the County’s best bet for long-term support. We are the leading provider of bus fare collection systems in the U.S. and Canada. More than 50,000 Genfare fareboxes are in revenue service at some 400 agencies – more than all other vendors combined.
- **Quantum leap in technology.** The proposed solution is a vast improvement over previous generation technology. The system will support all mainstream electronic fare media now available or on the horizon, including barcoded documents, mobile ticketing, and smart fare media, encouraging a shift from cash to electronic fare payment that will greatly reduce agency costs. Long known as a manufacturer of high-quality hardware, we have focused our attention in recent years on the development of advanced software solutions. We believe our cloud-hosted fare-processing-as-a-service model will become the dominant industry approach.
- **Best tech team in the industry.** Having installed systems of all types at 400 agencies, our experienced staff of professionals has unequaled knowledge of the transit industry and fare collection technology. Over 40 percent of our employees are engineering and technical/field support personnel. We have upgraded our customer service process to ensure better tracking of parts orders and support requests and provide automatic escalation of unresolved inquiries.
- **Assured long-term support.** We are your best guarantee of on-time delivery and installation, reliable performance at system startup and long-term availability of parts and support. We stand behind our products to an exceptional degree – we only recently discontinued support for our CENTSaBILL registering farebox, which was initially installed in 1982.
- **Improved customer service and tech support process.** We have upgraded our customer service process to ensure better tracking of parts orders and support requests and provide automatic escalation of unresolved inquiries.

- **Strong corporate backer.** Genfare is a division of SPX Corporation, an NYSE-listed company, providing us with access to a wealth of corporate resources, including personnel, professional services, financial and technology support, and benefits programs that help us to retain staff.
- **Extended warranty and software service agreements.** We can provide any desired level of hardware and software support, including extended hardware warranties and software support agreements.
- **Nationally recognized technology leader.** Genfare was recognized in the 10th Annual Red Hat Innovation Awards for the development of the Genfare Link cloud-based central data system – see www.redhat.com/en/about/press-releases/10th-annual-red-hat-innovation-awards-recognize-achievements-open-source. Genfare and the Capital District Transportation Authority (Albany, NY) were given a Project of the Year Award by the Intelligent Transportation Society of New York for CDTA Navigator, the agency’s new electronic fare system, which is powered by Genfare Link – see photo at right. Genfare has been awarded more than 50 patents for its contributions to fare collection technology.



We believe we are the most qualified partner for Palm Tran and the County, capable of bringing the project to a successful conclusion in the shortest time with the greatest return on investment and the least risk. We invite you to review our credentials, examine our equipment and services, and contact our other customers – we are confident they will confirm their satisfaction with our products and support. We are grateful for the opportunity to participate in this pioneering procurement and look forward to providing Palm Tran and its riders with many additional years of reliable service.

2. EXPERIENCE/QUALIFICATIONS/BACKGROUND/REFERENCES INFORMATION

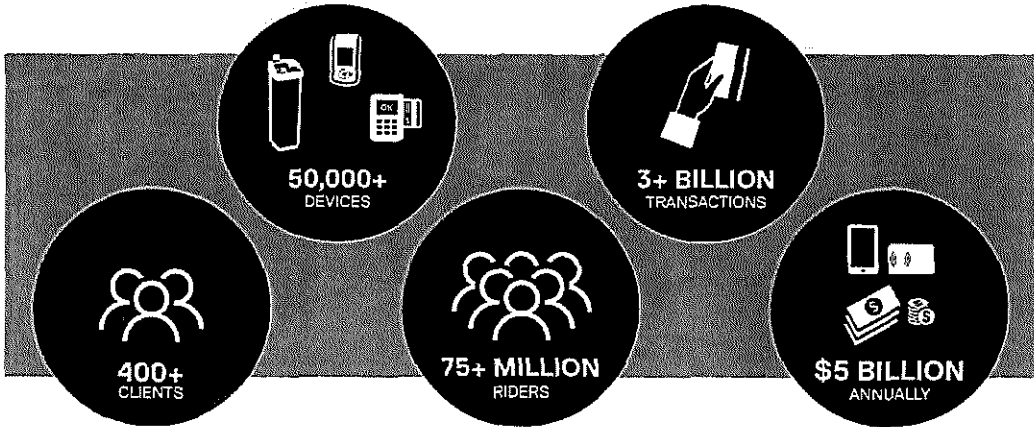
Each Proposer shall submit a detailed statement of their experience, qualifications, and background for providing Regional Account-Based Transportation Fare Payment and Collection Systems (FARE SYSTEM), which are based on open architecture principals with open Application Programming Interfaces (APIs), as well as systems that facilitate integration with third party hardware and software as the systems age. Proposers must be familiar with, have delivered and implemented successfully similar systems over the past three (3) years

We have provided our response in two parts. Sec. 2.1 describes Genfare’s background and qualifications. Sec. 2.3 provides references.

2.1 BACKGROUND AND QUALIFICATIONS

2.1.1 Profile of the Proposer

- Principal line of business. Genfare is the leading provider of bus fare collection in North America, with more than 50,000 fareboxes currently in service. We have provided fare collection systems to approximately 400 agencies throughout the U.S. and Canada and built more than 80% of the fareboxes currently in use in these countries. We estimate that every year more than 3 billion transactions worth over \$5 billion are processed using Genfare equipment and systems.
- Year founded. 1980.
- Form of organization. Genfare is a division of SPX Corporation, an NYSE-listed company with \$1.5 billion in revenue in 2018. SPX specializes in engineered solutions to global infrastructure needs.
- Number and location of branch and home offices. Except for several satellite maintenance facilities, all Genfare activities are conducted at the company’s headquarters at 800 Arthur Ave., Elk Grove Village, IL 60007, a short distance from Chicago’s O’Hare airport. See description of this facility below.



Genfare is the leading U.S. provider of bus fare collection systems

- *Proposer's financial condition.* For SPX annual reports and other financial information, visit <http://www.spx.com/en/investor-relations/financial-information/>.
- *Proposer's financial institution.* Bank contact information is as follows:

Bank of America
Lockbox #277399
600 Feldwood Road
College Park, GA 30349
Susy Acosta
888-715-1000 x 51307
dedicatedcentralone@bankofamerica.com
- *Conditions such as bankruptcy, merger, litigation, etc., that may affect Proposer's ability to perform.*
None.



Genfare's major North American customers

2.1.2 History of Firm's Experience

Genfare was founded as General Farebox, Inc., in 1980 and for many years was known as GFI Genfare. Genfare earned its reputation by developing innovative solutions using the latest technology to reduce fare processing costs, increase convenience, and advance the transit mission. Genfare "firsts" in the industry include:

- Electronic registering farebox
- Magnetic card reader for the farebox
- Read/write magnetic card processing unit (TRiM)
- Fully validating farebox
- Limited-use smart card dispenser for the farebox
- Integrated onboard 2D barcode functionality.

Genfare is ISO 9001 and ISO 14001 certified, indicating that it complies with international quality control and environmental practices in all aspects of its business. Copies of both certifications are available upon request.

In recent years we have expanded our product line to accommodate the fare processing advances made possible by the Internet and innovative payment media. Today's fare systems now include a wide range of support devices and capabilities in addition to fareboxes and vaults.

Genfare has taken a leadership role in helping the transit industry prepare for the future. We have been a sponsoring member of the American Public Transportation Association since 1980 and have chaired or served on many APTA committees and initiatives. Helping shape industry standards is critical as we develop the cost-effective solutions transit agencies and their riders will need in the years ahead.



Genfare's plant near Chicago's O'Hare airport

Major engineering, program management and manufacturing/assembly are conducted at Genfare’s plant in Elk Grove Village, IL, a short distance from Chicago’s O’Hare International Airport. Genfare moved all its operations into a newly renovated facility at 800 Arthur Avenue in 2014. An advantage of the new location is that all technical personnel are located in a large “open office” environment to facilitate interaction between the various engineering disciplines and support functions such as documentation, training, quality assurance and field support.

More than 40 percent of our employees are engineers and other technical personnel. Software programming is performed by a staff of full-time programmers supplemented by specialized software consultants as needed. We also employ technicians to support remote maintenance sites.

Genfare can deliver a multitude of advanced fare products, from fareboxes, TVMs and validators to completely new systems. Genfare has the capacity to manufacture 4,000 fare boxes in a year in single-shift operation and has often exceeded that quantity by going to double-shift production. We provide rigorous program management to ensure specification and schedule compliance and conduct 100% inspection testing. Genfare’s facility includes a complete model shop, CAD/CAM drafting, software and system test labs, and a modern production line. Several of our suppliers including DBEs are located close to our facility allowing close collaboration with our technical staff, providing quality equipment and materials.

2.2 EXPERIENCE

The following shall be demonstrated as part of each Proposer’s experience:

a. Public sector transit systems

Genfare is the leading manufacturer of bus fare collection equipment in the U.S. Since the founding of our company in 1980, almost all of our clients have been public sector transit systems. We are thoroughly familiar with the industry’s requirements and constraints.

b. Central Management System hosting

A complete listing of our cloud-hosted central data systems may be found in the table below.

c. Mobile Ticketing Application systems

A complete listing of mobile ticketing systems we currently support may be found in the table below.

d. Retail Network Program Development and Management

We have had extensive discussions with InComm, a leading provider of retail network services, and are confident a network meeting Palm Tran’s needs can be readily established. A description of InComm’s services may be found among the exhibits at the end of this proposal.

e. Performing on-site training programs.

Virtually all of our implementations involve on-site training.

f. Hardware and software support.

Every Genfare implementation involves on-site training and long-term hardware and software support – indeed, this is a core component of our business. We typically support our customers’ systems for decades – in the extreme case, for more than 35 years.

2.2.1 Status of Comparable Projects

Genfare has multiple instances of cloud hosting, account-based processing and mobile ticketing in current service – see chart below. Genfare is the leader in account-based smart card solutions in the U.S. Complex systems in current service or in various stages of implementation are shown below.

GENFARE CLIENTS WITH COMPLEX SYSTEMS – STATUS					
Agency	Genfare Link	Mobile Link	Acct-Based	AFC Devices	TVM
COTA (Columbus)	In service	In service	In service	FF, FFe	Yes
CDTA (Albany)	In service	In service	In limited service (school use)	FF	No
TARC (Louisville)	In service	No	Pending	FF	No
Trinity Metro (Fort Worth)	In UTA	No	Pending	HHV	Yes
GRTC (Richmond)	In UTA	In service	Pending	FF, FFe	No
Porterville (CA) Transit	In service	In service	No	FF	Yes
CATS (Charlotte)	In service	No	No	FF, HHV	Yes
Wichita Transit	Pending	Yes	Pending	FF, APOS	Yes
Belleville (ON) Transit	No	Pending	No	ODY	No
C-TRAN (Elmira, NY)	In service	No	No	FF	Yes
DART (Dallas)	No	No	No	ODY	Yes
Sun Metro (El Paso)	No	No	No	ODY	Yes
Broward County	No	In UAT	No	FF	No
Fresno	No	No	No	FF, HHV, platform validator	Yes
Sun Tran (Tucson, AZ)	No	No	No	FF, HHV	Yes
FF = Fast Fare farebox. FFe = Fast Fare-e validator. HHV = handheld validator. APOS = admin POS terminal. ODY = Odyssey farebox					

2.3 REFERENCES

Proposers shall have at least 10 years of experience in providing similar systems (components, size and nature). Each Proposer should submit at least three (3) but no more than five (5) references demonstrating the successful provision of similar regional account-based FARE SYSTEM(s) procured within the last three (3) to five (5) years

The following is a sample of Genfare projects involving capabilities comparable to those proposed for this procurement.

Broward County

3201 W. Copans Road
Fort Lauderdale, FL 33302-4740



CONTACT: Mr. Jackie Fernandez, JAFERNANDEZ@broward.org, 954-357-8323

AWARD: February 2018

DELIVERY: March 2018

VALUE: \$6.2M

DESCRIPTION OF SYSTEM DELIVERED:

- 415 Fast Fare fareboxes
- Genfare Link
- Mobile Ticketing

Capital District Transportation Authority (CDTA) – Albany, New York

110 Watervliet Avenue
Albany, NY 1220



CONTACT: Thomas Guggisberg, thomas@cdta.org, 518-437-8326

AWARD: December 2013

DELIVERY DATE: March 2014

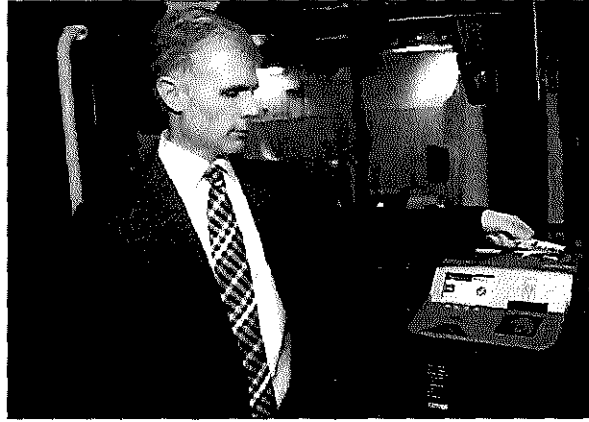
VALUE: \$6.3M

STATUS: Substantially complete

DESCRIPTION OF SYSTEM DELIVERED:

- Genfare Link with account-based validation
- Mobile ticketing
- eFare Web ticketing portal
- 240 Fast Fare fareboxes
- 5 garage data systems
- 7 mobile vaults
- 1 network manager
- 1 PEM printer/encoder machine
- 2 portable data units (PDUs)
- 5 APOS terminals
- 40 RPOS terminals.

The CDTA fare collection program, now in revenue service and substantially complete, was one of the most complex projects Genfare has undertaken. We provided Fast Fare fareboxes plus all infrastructures needed for CDTA's Navigator electronic fare system, which includes smart cards and mobile ticketing. Notable features include:



CDTA Director of IT Thomas Guggisberg demonstrates Navigator fare card made possible by Genfare technology

- Genfare Link cloud-based central data system. This state-of-the-art system resides in a virtual computing environment hosted by Amazon Web Services and managed by Genfare. Developed from the ground up over a two-year period, Genfare Link offers 99.99% availability, web-based reporting, and centralized management and control of numerous subsystems and devices, including online ticketing, mobile ticketing, and administrative and retail point of sale (APOS and RPOS) terminals in addition to the farebox.
- Real-time data transmission. Fast Fare fareboxes exchange data with the central office at short intervals while en route via cellular modem using a third-party onboard router.
- eFare online ticketing portal. Riders use the CDTA-branded online portal to purchase and recharge smart fare media.
- Mobile ticketing. Riders purchase mobile tickets using a CDTA-branded application downloaded to their smart phone and then present the barcoded mobile ticket to the scanner on the Fast Fare farebox for validation.
- Administrative and retail point of sale (APOS and RPOS) systems. CDTA staff uses the APOS terminal and Link functionality to inventory newly-delivered smart fare media, sell and recharge smart cards, answer customer inquiries, and produce photo ID cards for reduced-fare riders. Retail sales agents issue and recharge riders' smart cards using the RPOS, a compact countertop unit.

The Intelligent Transportation Society of New York bestowed its "Outstanding ITS Project of the Year" award on CDTA and Genfare for the Navigator electronic ticketing program in 2017.

"We worked closely with Genfare to ensure we had developed and implemented a fare payment system that was so easy to use, our passengers would not even have to think about it when they board our vehicles. With our Navigator program, we have achieved exactly that, and our passengers have truly embraced it." – Thomas Guggisberg, Director of Information Technology, CDTA

Central Ohio Transportation Authority (COTA) – Columbus, Ohio33 North High Street
Columbus, OH 43215

CONTACT: Micheal Carroll, 614-275-5801, carrollMD@cota.com

AWARD: June 2017

DELIVERY DATE: June 2017

VALUE: \$6.8M

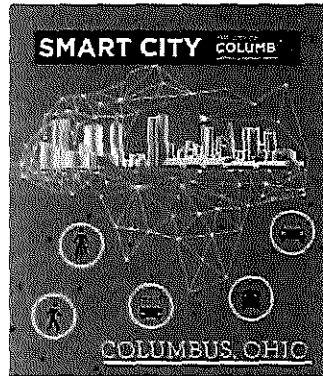
STATUS: Open

DESCRIPTION OF SYSTEM DELIVERED:

- Genfare Link with account-based validation
- Mobile ticketing
- 367 Fast Fare fareboxes with J1708 interface
- 80 Fast Fare-e validators
- 3 stationary vaults
- 5 Vendstar-e ticket vending machines
- 5 APOS terminals
- 1 network manager
- 2 garage data systems

COTA's Genfare fare collection system is a critical component in the Smart Columbus initiative, an ambitious USDOT-funded demonstration program that seeks to develop a platform for seamless multimodal travel involving transit, rideshare, bikeshare, taxis and other mobility options as components of a single trip.

An innovative feature of the COTA fare collection program made possible through Genfare technology is the agency's Downtown C-Pass, offered in cooperation with the Mid-Ohio Regional Planning Commission (MORPC) and the Capital Crossroads Special Improvement District. The C-Pass enables employees of participating downtown Columbus businesses to use COTA services at no charge – costs are covered by district property owners with additional funding from MORPC. An API enables MORPC to enter details about businesses newly enrolled in the C-Pass program into the Genfare Link database. The C-Pass can be implemented in one of several forms, depending on employer preference:



- Mobile ticketing application – the company registers the cell phone number of eligible employees through the COTA online partner portal. The app generates a bar-coded “virtual ticket” read by the Fast Fare’s bar code scanner.
- Company-issued magnetic stripe card – the card must have a farebox-readable magnetic stripe encoded with an employer-determined ID number uploaded through the partner portal. The card is read by the Fast Fare’s magnetic swipe reader.
- DESFire smart card sticker on company-issued ID card – the business registers the numbers of stickers it places on employee IDs through the partner portal. The card is read by the Fast Fare’s smart card processor.

- COTA-issued photo ID. This is an account-based smart card. COTA records the card numbers in the central account database on issuance.

Valid C-Pass numbers are added to a card list to facilitate acceptance of valid cards. Transaction records containing the number are uploaded to the Genfare Link data system.

The C-Pass program has significantly boosted COTA ridership. Since launch in June 2018 through November, employees at participating businesses had taken 460,000 rides. In November, COTA recorded 9,242 rush hour boardings, a 26 percent increase over November 2017. The number of companies enrolled in C-Pass has grown from 230 to 378, about 45 percent of those eligible, including large employers like Huntington and Nationwide. Overall, more than 13,500 employees are registered for the program, with C-Pass users accounting for more than 22,000 COTA rides per week.

In a recent interview, COTA CEO Joanna Pinkerton touted the success of the program and its impact on ridership. “We have employers coming to us in droves saying, ‘How do we get in?’” she said, adding that an expansion of the program, either within downtown or to other neighborhoods or commercial districts, will be a topic of discussion for COTA “in the very near term.”

Transit Authority of River City (TARC) – Louisville, Kentucky

1000 W. Broadway
Louisville, KY 40203



CONTACT: Geoffrey Hobin, ghobin@ridetarc.org, 502-561-5111

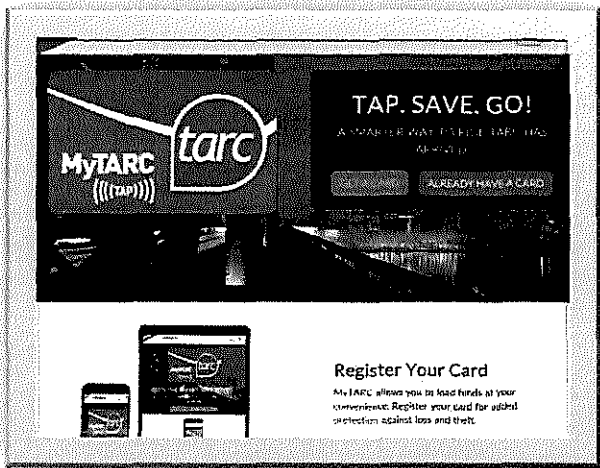
AWARD: March 2017
VALUE: \$4.6M

DELIVERY DATE: June 2017
STATUS: Open – system in service

DESCRIPTION OF SYSTEM DELIVERED:

- Genfare Link central data system
- 235 Fast Fare fareboxes – J1708 Interface with Trapeze
- 6 APOS terminals
- 8 RPOS terminals
- eFare online ticketing portal
- 4 mobile vaults
- Garage data system/network manager
- Portable data unit (PDU).

The new system is built around the cloud-hosted Genfare Link data processing platform and includes 235 Fast Fare fareboxes (including a J1708/1587 interface with a Trapeze CAD/AVL system), smart cards, APOS and RPOS terminals, and an eFare online ticketing portal. The Fast Fare farebox uses the same electronic ticket



TARC online ticketing home page

processing technology as the Fast Fare-e validator proposed for Valley Metro. TARC uses the APOS to generate photo IDs for reduced-fare riders. System startup was uneventful and the system is currently in daily service.

“By and large we’ve had a very good transition ... Today I am a very happy man.” – Geoffrey Hobin, Director of Grants and Capital Programs, TARC

GRTC Transit System – Richmond, Virginia

301 E. Belt Boulevard
Richmond, VA 23224



CONTACT: Rob Taggart, rob.taggart@ridegrtc.com, 804-474-9315

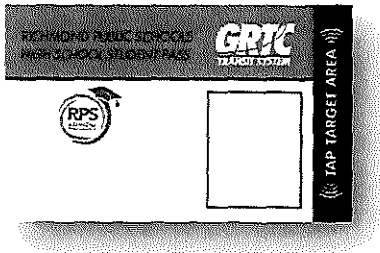
AWARDS: 2014, 2018 (paratransit)
VALUE: \$3.8M

DELIVERY DATE: 2015 fixed route, 2018 paratransit
STATUS: Open

DESCRIPTION OF SYSTEM DELIVERED:

- 175 Fast Fare fareboxes
- 4 stationary vaults
- Genfare Link
- Mobile ticketing
- 100 Fast Fare-e validators (90 installed, 10 spares – delivery 2018)
- PDU
- PEM

Genfare has provided a variety of systems and devices to GRTC over the years, including Fast Fare fareboxes using smart cards. In 2018, we were awarded a contract to provide a fare collection solution for the agency’s specialized transportation (paratransit) fleet, consisting of Genfare Link, Fast Fare-e validators, and mobile ticketing. Implementation is currently in progress. It is anticipated that the fixed-route fare collection system will eventually be incorporated into Link.



In the meantime, GRTC has been migrating the magnetic card-based fare products used on its fixed-route fleet to smart cards – for example, its E-Pass and U-Pass programs, conducted in partnership with local schools and businesses. See http://ridegrtc.com/media/main/New_Pass_Guide_generic.pdf for information on these programs and <http://ridegrtc.com/fares/new-fare-pass-frequently-asked-questions> for a FAQ on electronic fare media use. GRTC required minimal technical assistance from Genfare to implement its smart card programs, demonstrating the ease of administration and use for which our electronic ticketing products are known.

2.3.1 Genfare Smart Card Implementations

Genfare built or participated in the majority of bus-based smart card implementations currently in service in North America, as evidenced in the list below.

GENFARE SMART CARD IMPLEMENTATIONS IN REVENUE SERVICE						
Customer	City	State	DESFire	Classic	Ultralight	Ultralight "C"
Municipality of Anchorage	Anchorage	AK		X		
City of Montgomery	Montgomery	AL		X		
Suntran	Tucson	AZ	X		X	
Butte County Assoc of Govts	Chico	CA		X		
Clovis Transit	Clovis	CA				X
Fresno Area Express (pending)	Fresno	CA	X			
Kings County Area Public	Hanford	CA		X		
Monterey Salinas Transit	Monterey	CA		X		
City of Porterville	Porterville	CA	X	X		
City of San Luis Obispo Transit Division	San Luis Obispo	CA		X		
Santa Cruz Metro Transit Dist	Santa Cruz	CA		X		
Santa Clara Valley Transportation Authority	San Jose	CA			X	
City of Santa Maria	Santa Maria	CA	X			
Tahoe Area Regional Transit	Tahoe City	CA		X		
City of Visalia	Visalia	CA		X		
City of Winnipeg Transit	Winnipeg	MB	X			X
City of Glenwood Springs	Glenwood Springs	CO		X		
Mesa County	Grand Junction	CO		X		
City of Greeley Transit	Greeley	CO		X (sticker)		
Delaware Transit Corporation	Dover	DE		X		
Jacksonville Transit Authority	Jacksonville	FL	X		X	
Albany Transit System	Albany	GA		X		
Consol Govt of Columbus, GA	Columbus	GA		X		
Chatham Area Transit	Savannah	GA		X	X	
Coralville Transit System	Coralville	IA		X		
Iowa City Transit	Iowa City	IA		X		
Danville Mass Transit	Danville	IL		X		
Topeka Metropolitan Transit	Topeka	KS		X		
Transit Authority of Lexington, KY	Lexington	KY		X		
Pioneer Valley Transit Authority	Springfield	MA	X		X	
Kalamazoo Dept. of Transportation	Kalamazoo	MI		X		

GENFARE SMART CARD IMPLEMENTATIONS IN REVENUE SERVICE						
Customer	City	State	DESFire	Classic	Ultralight	Ultralight "C"
Lake Erie Transit	Monroe	MI		X		
Bay Area Transportation Authority	Traverse City	MI		X		
City of Moorhead	Moorhead	MN		X		
City of Concord	Concord	NC		X		
City of Greensboro	Greensboro	NC		X		
City of Bismarck	Bismarck	ND		X		
Fargo Metro Area Transit	Fargo	ND		X		
Cities Area Transit	Grand Forks	ND		X		
Transit Authority of the City of Omaha	Omaha	NE		X		
Capital District Transp. Authority	Albany	NY	X			X
Rochester City School District	Rochester	NY	X			
Metro Regional Transit Authority	Akron	OH	X	X		
Laketran	Grand River	OH		X		
Butler County Regional Transportation Authority	Hamilton	OH	X			
Sioux Area Metro	Sioux Falls	SD		X		
Beaumont Municipal Transit System	Beaumont	TX		X		
Williamsburg Area Transit Auth.	Williamsburg	VA		X		
Whatcom Transportation Authority	Bellingham	WA	X			X

GENFARE PARTNER SMARTCARD SYSTEMS			
Customer	City	State	Partner
Los Angeles County Metropolitan Transportation Authority + regional partners	Los Angeles	CA	Cubic Transportation Systems
San Diego Metropolitan Transit System	San Diego	CA	Cubic Transportation Systems
Washington Metropolitan Area Transit Authority + regional partners	Washington	DC	Cubic Transportation Systems
Miami-Dade Transit	Miami	FL	Cubic Transportation Systems
Metropolitan Atlanta Rapid Transit Authority + regional partners	Atlanta	GA	Cubic Transportation Systems
Maryland Transit Administration	Baltimore	MD	Cubic Transportation Systems
Greater Cleveland Regional Transit Authority	Cleveland	OH	Xerox
Société de transport de Montréal	Montreal	QC	Xerox

3. TECHNICAL RESPONSE/PROJECT APPROACH/UNDERSTANDING INFORMATION

3.1 PROPOSER'S UNDERSTANDING OF PROJECT REQUIREMENTS

[Detail] the Proposer's understanding of the project requirements and steps to complete the Technical Specification as evidenced by proposed concept and service-proven design.

The technical narrative below provides a detailed description of our system's capabilities and how it meets RFP requirements. We are happy to review our solution with you if invited to make a presentation. We believe our demonstrated command of the technologies needed to meet your requirements makes us the best choice for this procurement.



Our base-bid solution will replace your existing Odyssey fare collection system with new Fast Fare fareboxes and the latest version of our service-proven System 7 data collection and reporting system. Ticket vending machine, ticket office equipment, and interface to retail network provides new capabilities for Palm Tran to issue and process new fare media. We will upgrade your vault and probing equipment to work with the new fareboxes. We will also provide the capabilities requested in the RFP, including account-based processing, mobile ticketing, and smart cards. Account-based processing is made possible by Genfare Link, our cloud-hosted central data system.

The Fast Fare farebox offers many advanced capabilities, including a smart card processor, barcode scanner, and greatly increased processing power and memory, and will provide many years of reliable service. To take full advantage of the Fast Fare, we propose Genfare Link, which provides the ideal platform for electronic fare media such as smart cards, limited-use media (LUM cards) and mobile tickets.

Genfare Link combined with electronic ticketing offers many advantages:

- *Reduced cost.* By offering a range of convenient ticketing options, Palm Tran will encourage riders to shift from cash to electronic media, reducing its cash handling costs and speeding boarding.
- *Increased rider loyalty.* The Genfare solution offers loyalty programs such as fare capping that encourage regular use of transit.
- *Fully integrated solution.* All elements of the system were designed from the outset to work together. It will not be necessary to mesh capabilities from multiple vendors with different design approaches, a common cause of delays and reduced functionality.
- *Paves the way for open-payments media.* Genfare Link plus the Fast Fare farebox provide essential infrastructure for acceptance of NFC devices and EMV cards.
- *Lower life-cycle costs.* Local hardware and software will eventually become obsolete and require replacement. In the Genfare cloud solution, most hardware is virtualized, and hardware and operating system updates require no agency involvement. Daily backup, archiving, and disaster recovery are handled automatically or by Genfare staff.

- *24/365 monitoring for failsafe operation.* Cloud data system operations are automatically monitored at all times and problems are immediately resolved, in most cases without local intervention or awareness. Multiple copies of the database are maintained in geographically separate data centers – if the primary instance fails or falters, connectivity is immediately transferred to a backup and a new instance is automatically created and placed in service.
- *Common code base for lower cost and faster upgrades.* Cloud tenants share a common code base that undergoes continuous improvement. Software updates are released quarterly and are immediately available to all at no additional charge. Agency IT personnel are no longer required to install software updates on local hardware.

We would be happy to provide a demonstration of Genfare Link and our complete electronic ticketing product line at any time.

3.2 PROPOSED SYSTEM ARCHITECTURE

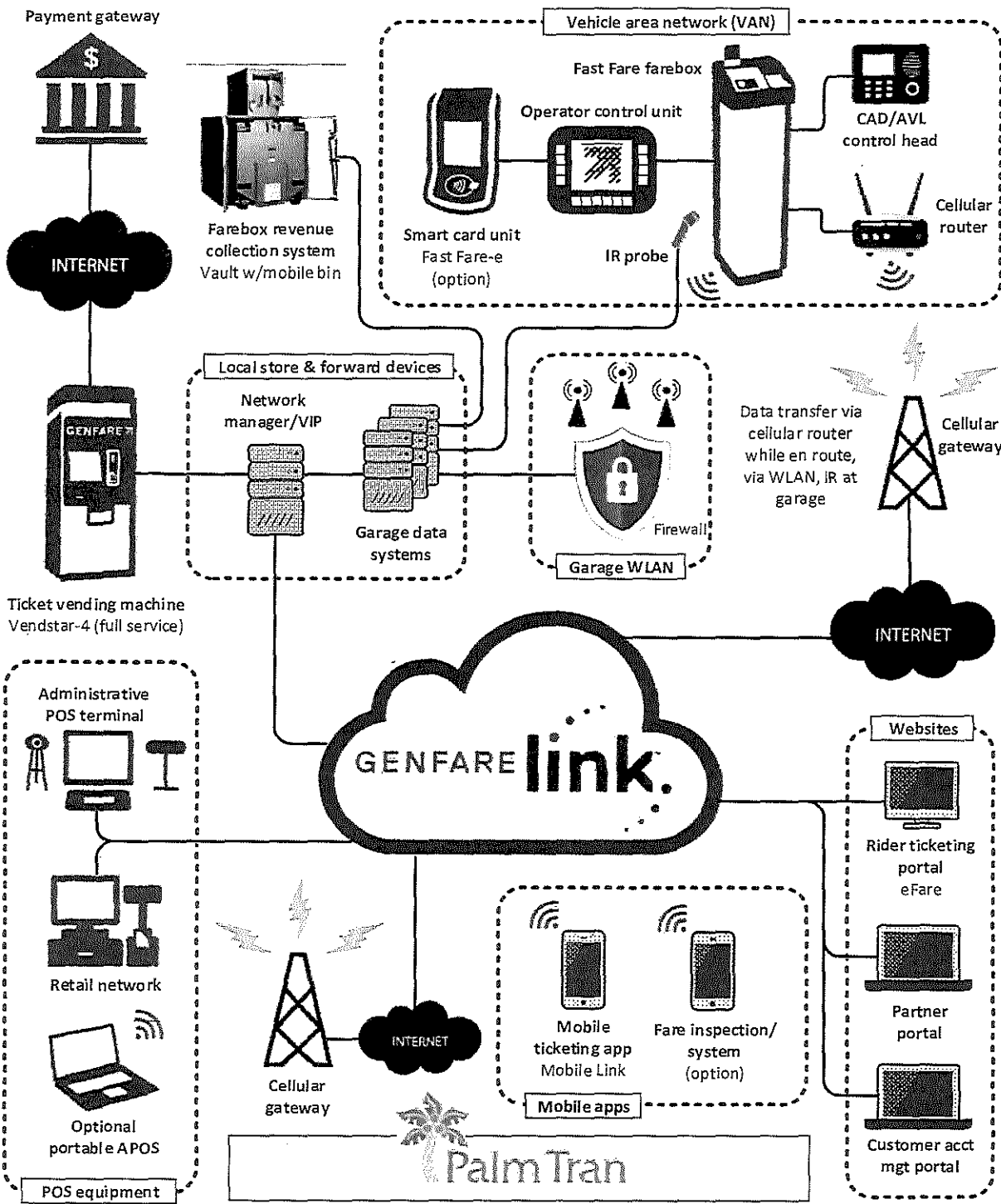
A system architecture diagram showing the base-bid solution plus optional elements is shown on the following page. Major components include:

- **Vehicle area network (VAN)** consisting of:
 - **Fast Fare farebox.** The Fast Fare will be used to process all fares, including cash, magnetic cards, and, if the relevant options are exercised, smart cards and barcoded documents, including LUM cards and “virtual tickets” displayed on a mobile device.
 - **Operator control unit (OCU).** The OCU will be used to monitor and control the Fast Fare, as is currently done with EMTA’s Odyssey fareboxes.
 - **CAD/AVL control head.** The OCU will be connected to the CAD/AVL system control head via a J1708/1587 interface. This will enable single-point logon via the Avail system and allow the farebox to obtain location data to permit geotagging of farebox transaction and event records.
 - **Onboard cellular modem.** The farebox will be connected to the agency-provided cellular router to enable real/near-real time communication with the central data system via the commercial cellular network (cellular probing) while the vehicle is en route.

For further discussion of the VAN, see Sec. 3.8.8.

- **Genfare Link cloud-hosted Central data system.** To support account-based processing and open payments acceptance, we will provide Genfare Link, our cloud-hosted central data system. Link will provide the central account database against which all fare transactions are validated plus reporting and management functionality for the complete system, including base and optional elements. Palm Tran’s existing data system will be upgraded and integrated into Genfare Link. All historical data will be retained and remain accessible, something no other vendor can offer with certainty. Important components of Link are:

PALM TRAN PROPOSED SYSTEM ARCHITECTURE



- **Administrative portal.** This portal provides agency staff with all functionality needed to configure, monitor and control the system and its components. A robust security function makes it possible for system administrators to create a hierarchy of permissions, in which individual users or groups of users are given the subset of permissions needed to do their jobs.
- **Customer service portal.** The customer service portal is a limited version of the administrative portal. Customer service representatives (CSRs) responding to customer inquiries can review and update accounts, issues credits, transfer balances from lost cards to new ones, etc.
- **Institutional partner portal.** The partner portal is a limited version of the administrative portal. Administrators for the agency's business and institutional partners can perform many of the same tasks as agency CSRs, but only for participants in the partner's fare program.
- **eFare Internet ticketing portal.** eFare enables riders to buy or recharge electronic fare media, including both smart cards and mobile tickets – few vendors offer this convenient capability. It also provides riders with a window into their account in the central database. They can view the status and history of their fare media, register cards, recharge previously purchased media, buy new, manage their account details, and perform other account-related tasks.
- **Mobile ticketing system.** The Genfare mobile ticketing solution is fully integrated with Genfare Link. It consists of two elements:
 - **Agency-branded mobile ticketing application.** Riders download the app from the app store for their mobile device. They use the app to purchase and display mobile tickets on their phones.
 - **Mobile Link.** This is a component of Genfare Link and hosts the server-side functionality needed to support mobile ticketing – the rider app communicates with Mobile Link. Mobile ticketing accounts created with the app reside in the central account database.
- **Administrative point of sale terminal (APOS).** The APOS enables agency ticket-office staff to sell and recharge smart fare media and perform other fare-related tasks. The APOS will be equipped to enable production of personalized smart cards for reduced-fare patrons and agency staff. We also recommend our administrative point-of-sale terminal (APOS), which enables agency ticket office personnel to sell and recharge smart fare media, accept bank cards or cash as payment, and issue receipts.
- **Bulk smart card encoder.** The APOS equipped with the needed card printer fulfills this function.

The Genfare solution has been designed with the following concepts in mind:

- *Integrated solution encompassing all fare media.* The Genfare solution will process all media accepted for fare payment, including coins and bills in addition to smart cards, mobile tickets and magnetic media. Detailed information for all transactions will be consolidated into the same database, simplifying reporting and administration and making it easy to spot trends. No other vendor can offer the same degree of integration. While databases from multiple vendors can be made to talk to each other, we know from experience that differences in design approach often complicate the development of multi-vendor solutions and limit flexibility. All elements of the

Genfare solution, including both legacy and new systems and devices, were designed from the outset to work together, eliminating compatibility problems and facilitating deployment.

- *One account for all electronic fare media.* In the Genfare solution, registered riders can link all electronic fare media from all members of their household or affinity group to the same account. They can buy, recharge and manage smart cards and mobile tickets for all associated users during the same session.
- *Common purse for registered accounts.* A novel feature of the Genfare approach is that all funds registered users deposit to their accounts are credited to a common purse available as a backup to all linked media. Example: a registered rider adds her child to her account, buys the child a floating-period pass (validity clock starts on first use), and also deposits \$10 in stored value. The child uses the pass till it expires, then attempts to ride again. Detecting that the pass is expired, the system deducts the fare from the common purse and admits the child. Account holders need not worry that household members will be stranded for lack of sufficient fare.
- *Validation technology and speed.* The Genfare CDS supports real-time fare validation against the central account database when feasible, backed up with local validation against a frequently updated master card list when communication conditions are less than ideal. The result is an optimal combination of security and speed, ensuring that only valid fare media presented by eligible riders are accepted.
- *Web-based reporting and administration.* All monitoring, control and reporting functionality can be accessed via the web from any computer with the proper login credentials, providing flexibility and convenience and reducing cost.

In addition to coins and bills, the Genfare solution will support the following fare media:

- The proposed extended-use smart card is the DESFire EV1 256B, which is ideal for account-based fare processing due to its low cost, durability, and support for AES and 3DES encryption. Long-term cards will be preprinted with agency-approved graphics in multiple colors and can be personalized with photos for employee and reduced-fare use. All smart cards will be ISO 14443 compliant.

NOTE: Smart cards can be encoded at the time of issuance with a final expiration date. The final expiration is an agency-settable parameter selected from a previously established range of values.

- *Limited-use media.* As an option we can configure fare devices to issue limited-use media for single-ride or other short-term use.
- *Barcoded "virtual tickets" displayed on a mobile device.* The Fast Fare farebox can automatically scan and validate bar coded tickets, including virtual tickets displayed using our mobile app.
- *Transfers and daypasses.* An optional TRiM can issue transfers, daypasses, and if desired change cards, which are printed, encoded, and verified immediately prior to issuance. Each document has a unique serial number, which is incremented by one for each document issued.

- *Change cards.* With the optional TRiM, if a passenger inserts more cash than is required to pay the fare, the driver can issue a change card encoded with the amount of overpayment. A change card functions as a nonrenewable stored-value card on subsequent use.

3.3 HARDWARE IMPLEMENTATION

To ensure a smooth transition, we propose to implement our solution in multiple phases. In the first phase, we will replace your existing fare collection equipment with new Fast Fare fareboxes, and probing equipment plus the latest version of our service-proven System 7 data collection and reporting system. The vault would be upgraded to work with the new system. We can also install the Vendstar-4 TVMs. In the first phase, we will replicate your current fare collection operations to the extent practical.

In subsequent phases we will implement our Genfare Link cloud-hosted central data system, account-based processing, APOS customer service terminal, online ticketing portals for riders and agency partners, and mobile ticketing.

Fare processing will be card-based in the first phase but will be migrated to account-based processing once Link is implemented. A unique feature of the Genfare solution is that card-based and account-based fare media can circulate simultaneously, enabling a gradual transition between the two types. If desired, the agency can keep selected types of card-based fare media in circulation indefinitely.

When Link is implemented, all electronic fare transactions, including both sales and acceptance, will be validated against – and recorded in – a central account database. The garage data system and network manager will be retained but will be reconfigured to function as store-and-forward devices consolidating data from field devices and transferring it to Genfare Link. All legacy data will be retained and remain available for reporting purposes.

3.4 APPROACH TO ACCOUNT-BASED FARE PROCESSING

Account-based fare processing will be implemented once all field hardware and the cloud-hosted central data system have been fully installed and optimized.

The Genfare approach to account-based fare processing is intended to accommodate a broad range of connectivity. This section highlights the advantages of the Genfare design and the steps we have taken to future-proof the account-based system we provide.

3.4.1 Fare Media

Genfare account-based processing supports the following types of fare media:

- Agency-issued (closed loop) smart cards purchased or recharged through a variety of channels, including our eFare web ticketing portal, Vendstar ticket vending machine, agency ticket offices using the APOS, or a third-party retail network.
- Mobile tickets purchased using Genfare’s mobile ticket app.
- Agreed-upon third-party media, such as school or employee IDs, which are typically managed by authorized third-party administrators using our partner portal.
- Open payments media such as contactless bank cards, as discussed in Sec. 3.5.

3.4.2 Data Transfer Methods

Frequent data exchange between the farebox and the central office is the key to robust account-based processing. The Genfare solution makes use of multiple methods:

- Wi-Fi/infrared probing at agency garages. Genfare’s proven dual probing methodology, which combines the speed of Wi-Fi with the security of IR, is used to upload lists and other configuration parameters to the farebox prior to morning pullout and on return of vehicles to the garage at the end of the day. Dual probing is discussed in Sec. 3.9.1.
- Periodic data exchange via agency-provided onboard cellular router while vehicles are en route. Palm Tran’s existing Cradlepoint IBR1000 router will be used for this purpose.
- Real-time validation of closed-loop fare transactions. Real-time validation is conducted simultaneously with validation against the master status list (MSL). If real-time validation times out (no accept/reject decision received within a predetermined time, typically 750ms), acceptance is based on the MSL. These lists can be updated by the central day system as often as every few minutes. The more frequently probing takes place, the more current the card lists are and the lower the likelihood of accepting an invalid card.

3.4.3 Transaction Processing

All information pertaining to accounts and media linked to accounts resides on the back end. Multiple media, including both smart cards and smart phone-based mobile wallets, can be linked to the same account.

When a fare instrument is presented for payment, the farebox reads the media ID (e.g., the smart card ID) and stores the transaction along with relevant information such as time/date stamp, bus number, current route and run, and location information.

Transactions stored by the farebox are uploaded to the back end during probing via onboard cellular router (cellular probing), Wi-Fi or wired infrared probe. Cellular probing is the primary method of data exchange while the bus is en route. A combination of Wi-Fi and IR is used to upload any remaining transactions when the bus returns to the garage. In case of network failure on the bus, due either to onboard router malfunction or cellular network outage, the bus can upload all transactions to the GDS via Wi-Fi and/or IR.

All transactions are initially uploaded to the garage data system (GDS), which functions as a store-and-forward device. Transactions are not deleted from farebox non-volatile memory until the GDS confirms receipt. They are then forwarded from the GDS to the cloud back end. As a fail-safe mechanism, a backup copy of the transactions is retained on the GDS.

All transactions are recorded in the central account database residing in the cloud-hosted back end. A card record is maintained for each fare instrument showing transaction history and current balance where appropriate.

The fare engine, which also resides in the back end, is responsible for performing any necessary fare calculations and, where required, deducting the appropriate amount (rides or value) from the current balance based on the information included with the transaction, e.g., regular route vs. express route.

The fare engine consults the fare structure to determine the correct amount. Fare engine rules can be added as desired to implement agency policies such as fare capping.

3.4.4 Master Status List

Genfare account-based processing relies on a master status list (MSL) for account validation. An updated MSL is generated periodically by the back end and consists of two parts:

- A closed-loop card list showing the ID number and status of all closed-loop media known to the system.
- A deny (bad) list showing the ID token of all bank cards determined to be unacceptable for fare payment. See Sec. 3.5 for details on how cards are added to the deny list.

Accounts in good standing are those having stored value exceeding an agency-defined threshold. Accounts not in good standing are those in which the account balance has dropped below the threshold, which may be a negative number, positive number, or zero. The threshold can be different for various groups of accounts as defined by the agency.

The MSL is updated at frequent intervals and downloaded to the farebox. Before processing any transaction, the farebox consults the MSL to determine whether card is valid or invalid and accepts or rejects the card accordingly.

The MSL design is consistent with industry best practices for managing large numbers of accounts and enables offline transaction processing.

Depending on the agency's communications infrastructure and preference, MSL updates can be downloaded to the farebox as often as every few seconds to enable near-real-time processing.

3.4.5 Other Fare Transactions

Genfare account-based processing supports onboard payment for services other than the account holder's own ride. For example, the account holder can pay for a child, senior, or personal companion.

The farebox can be programmed to automatically bring up the services available for the account type when a fare instrument is presented for payment. This feature facilitates quick processing of paratransit account holders who customarily travel with a companion, reducing dwell time.

In the Genfare system, accounts can be charged for rides or services performed by third parties such as paratransit or last-mile mobility providers. APIs are available to charge the account programmatically.

3.4.6 Price-Based Capped Fare

Genfare account-based processing supports three tiers of capped fares – daily cap, 7-day cap, and 31-day cap. Fare capping ensures that riders pay the "fairest fare" regardless of their daily riding routine. The fare processing engine stops charging for rides for the remainder of the day after the rider has made fare payments equaling or exceeding the price of a 1-day pass. The same applies when the rider has spent an amount equivalent to the price of a 7-day pass or a 31-day pass. Subsequent rides will be free for 7 days or 31 days from the day the first paid ride accruing toward the cap was recorded.

The system can be configured to promote the cap from daily to 7-day to 31-day. In other words, the amount accrued toward the daily cap can be rolled over to the 7-day cap, and the amount accrued toward the 7-day cap can be rolled over to the 31-day cap.

3.4.7 Privileged (Reduced Fare) Accounts

Genfare account-based processing supports privileged accounts, which are used to provide discounted fares for eligible riders, e.g., senior, student, veteran, etc. The system validates the eligibility of discounted riders and provides the ability to issue account-based media personalized with a photo of the eligible rider. A virtual ID is available for a discounted rider using a smart phone-based mobile wallet.

3.4.8 Integrated Mobile Ticketing

Mobile ticketing is managed from the same back end used for smart cards. The Genfare solution is comprehensive and provides all features on the Mobile platform as well.

3.4.9 Software-as-a-Service (SaaS) Model

Genfare account-based processing is offered using a software-as-a-service (SaaS) model, in which the agency pays a periodic fee. Genfare maintains a common code base for all tenants. This allows Genfare to provide built-once features to all clients, enabling them to benefit from ongoing feature development. Genfare account-based processing is scalable, taking advantage of the flexibility of the AWS cloud to accommodate any increase in load.

3.4.10 Implementing Account-Based Processing

The Genfare solution is designed to ensure easy implementation of account-based processing. The key is that our system allows card- and account-based media to be in circulation at the same time. Here's how our approach works:

- We will replace all fareboxes and related hardware during the first phase of the project. We will replicate your current operations to the extent practical. Processing of agency-issued fare cards during this time will be card-based as at present – all information needed for the validation decision will be encoded on the card or stored locally at the farebox (fare table and bad list).
- Genfare Link is a prerequisite for account-based processing and will be installed during the second phase or as otherwise directed by the agency.
- Once Link has been fully implemented and staff training and familiarization has concluded, introduction of account-based fare cards can begin. We recommend that account-based cards have different branding from the card-based media they replace. For any given type of card (for example, a 30-day pass), sales of the card-based version should be discontinued when the account-based version is introduced.
- Card-based media can continue to be accepted until they expire. It is not necessary to set a cutoff date.
- If desired, some card-based fare media can remain in circulation indefinitely. We are happy to review scenarios with the agency.

3.5 APPROACH TO OPEN PAYMENTS ACCEPTANCE

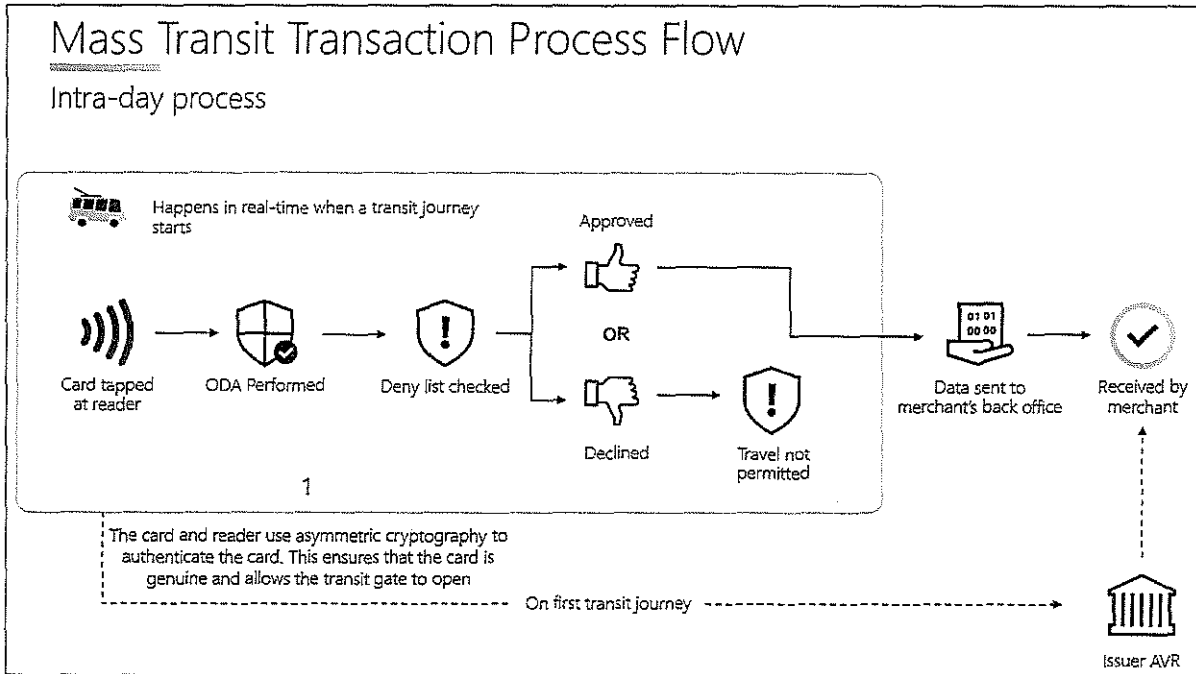
Genfare’s approach to open payments acceptance is in an advanced stage of development and is set for production rollout in Q1 2020. Although open payments acceptance is a new capability, most of the underlying functionality is already in service and implementation of the remaining elements is straightforward. The following is a high-level description of how the process will work for bank cards such as Visa payWave and Mastercard PayPass, phone-based payment such as Apple Pay and Google Pay, and the phone-based “closed-loop virtual card” referred to in the RFP.

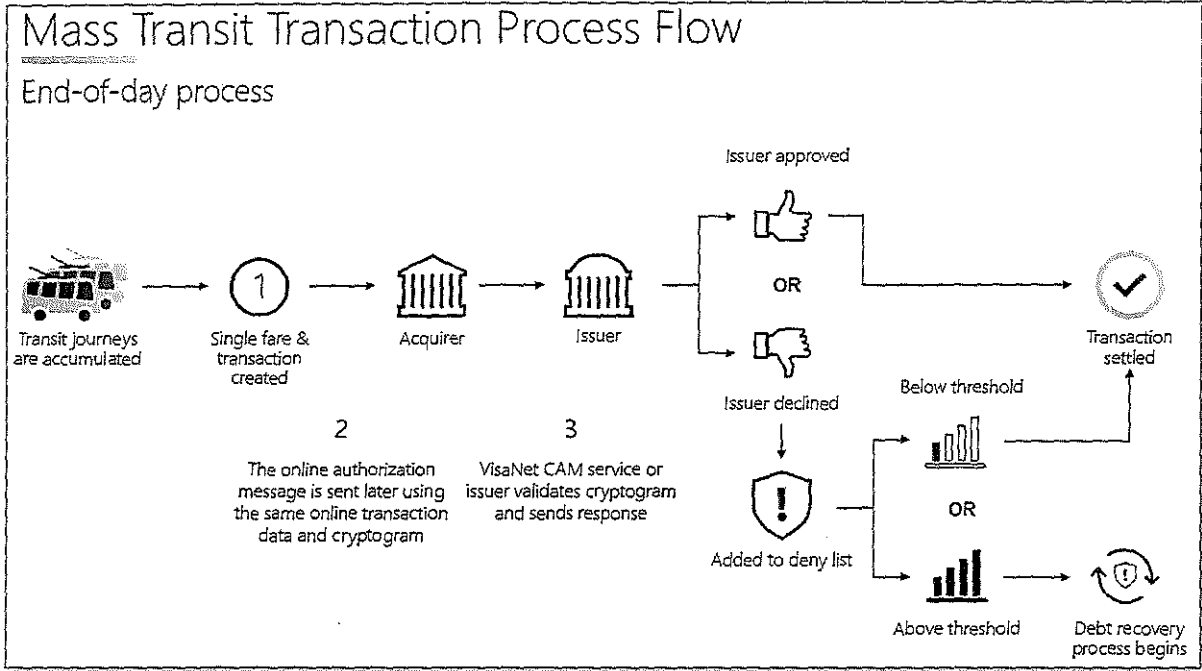
Contactless Bank Card Acceptance

The farebox and other fare devices will be capable of accepting contactless EMV chip cards, now in wide use. The cards have an embedded microchip that communicates wirelessly with a card reader that is compliant with the ISO 18092 (NFC), ISO 14443, and contactless EMV standard. We are currently incorporating the card reader into all fare collection devices including the farebox.

The bank card industry can’t process EMV cards fast enough to permit real-time authorization of transit fare payments. Instead, it recommends a two-part process, as illustrated in the two diagrams below. Here’s how the process will work in the Genfare solution:

- When a contactless bank card is brought within range of the farebox card reader, the reader automatically reads it and creates a unique cryptographic code (cryptogram) containing the card number and other relevant information. The reader application that creates the cryptogram is isolated from the farebox; the unencrypted bank card number is never visible to or obtainable by Genfare or any other party.





The diagrams above show the payment card industry’s recommended two-step process for bank card acceptance

- The code is a meaningless numerical string that can only be decrypted by the payment processor. However, a given card will always cause the same string to be generated. The cryptogram thus serves as a token for the bank card.
- The farebox checks the locally-stored master status list (MSL) to determine if the card token is on the “deny” list. If so, the card is refused. If not, the farebox accepts the card and generates a transaction record containing the fare amount, the card token and other details. The record is sent to Link during the next cellular probing session.
- The farebox transmits the cryptogram to the payment processor via Genfare Link during the next cellular probing session. The processor decrypts the cryptogram and verifies that the card is valid. If the card is not valid, the processor notifies Link, which places the card’s token on the “deny” list. The processor does not attempt to authorize fare card transactions at this time.
- Periodically Link generates a new MSL, which contains all bank card tokens on the “deny” list, and transmits it to the farebox. If any further attempts are made to use a card on the deny list, the card is refused.
- At the end of the transit day, Genfare Link aggregates the accumulated usage of each bank card accepted that day. In other words, if a bank card was used for three \$2 fare payments, Link aggregates them into one \$6 transaction that it sends to the payment processor for posting to the cardholder’s account.

- If the payment processor is not able to post a transaction – for example, because the transaction would cause the card balance to exceed the credit limit – it notifies Link, which places the card token on the MSL’s “deny” list. Once the updated MSL is downloaded to the fareboxes, further attempts to use a listed card will result in its being refused.

Given the procedure above, it is possible for an invalid or “maxed out” credit card to obtain a limited number of free rides. Such cards will eventually be placed on the deny list. How soon this occurs is a function of how frequently cellular probing occurs.

Frequent cellular probing reduces free rides. Genfare believes an initial cellular probing interval of 4 to 10 minutes will provide a reasonable cost/benefit balance but experience will be the agency’s best guide.

Phone-Based Fare Media

The Genfare solution will also support fare payment using phone-based payment media such as Apple Pay and Google Pay. Acceptance of phone-based payment media is similar to EMV card acceptance. However, each phone payment brand has its own resource-intensive certification process. Accordingly, the Genfare solution at the outset will accept Apply Pay and Google Pay only. We will add additional phone-based payment media once they gain marketplace acceptance.

Closed-Loop Virtual Cards

The RFP includes a requirement for closed-loop virtual cards, which are to be generated by the contractor’s mobile ticketing app. Virtual cards consist of an electronic identifier unique to the rider that the mobile app transmits to the farebox card reader via NFC (ISO 18092) technology. The virtual card thus functions as a substitute – and if desired a replacement – for a smart card.

Genfare is happy to develop virtual cards under mutual agreement with the agency.

3.5.1 Implementing Open Payments Acceptance

Genfare’s approach to open payments acceptance is in an advanced stage of development. We expect to place the system in production in Q1 2020. We will determine the appropriate rollout date at Palm Tram following discussion with the agency. The open payments media initially accepted will be major label contactless EMV cards and selected phone-based fare media, namely Apple Pay and Google Pay. Introduction of additional open payments media will be determined in consultation with the agency.

3.6 HOW THE GENFARE SOLUTION WILL ADDRESS ISSUES WITH THE CURRENT SYSTEM

Here’s how the system we propose will address the limitations of the current fare system as identified in RFP Sec. 4.1.5 and subsequent:

Lacks robust and comprehensive data reporting which is required to reconcile sales, make decisions on fare policy and planning, provide good customer service, and evaluate system performance. The existing GFI data system and reports do not provide this capability.

The Genfare solution provides significantly improved data reporting and data visualization tools. For details on how specific issues will be resolved, please see the last four items of this section.

Several of the backend systems (GFI, Trapeze, Avail) are not integrated and staff must use multiple systems and manual processes to collect and analyze the information available.

We will interface the Fast Fare farebox to the Avail CAD/AVL control head via a J1708/1587 interface. As discussed elsewhere in this submittal, we have successfully implemented more J1708/1587 interfaces than any other vendor, involving systems from Avail and all other major providers. The Avail interface will enable single-point logon, geotagging of farebox transactions and events, and reporting of farebox alarms to the CAD/AVL system.

We are happy to explore an interface to the Trapeze paratransit system if the agency is interested. We have successfully worked with Trapeze on many prior interface projects, including the STAR paratransit program in Albany (CDTA).

If desired, Genfare Link could serve as the central reporting system for all three vendors, with Trapeze and Avail exporting data to our platform via a Genfare-provided API. We are happy to discuss this future option with the agency.

The existing GFI hardware is aging and certain parts are becoming obsolete.

The proposed Fast Fare farebox and Vendstar-4 ticket vending machine are provided with robust processing power, communications infrastructure and storage to accommodate emerging payments technologies and we expect them to remain viable platforms for many years to come.

With payment options limited to cash/magnetic stripe tickets and no retail sales locations or TVMs, customers are forced to pay with cash and Palm Tran must continue to collect and reconcile a high amount of cash.

The proposed solution provides a multitude of fare payment and sales options including retail sales locations and TVMs. It will encourage a substantial reduction in cash payments and enable the elimination of magnetic stripe tickets.

As the other agencies in the region move forward with more automated payment options and expanded fare media distribution channels, Palm Tran, with its existing fare system, will not be able to utilize a common regional payment media.

Our Genfare Link cloud-hosted data system combined with account-based fare processing and open payments acceptance will simplify the establishment of common regional payment media since all processing is handled on the back end. We provided the fare collection systems for a number of South Florida transit agencies, including Broward County Transit and Miami-Dade Transit in addition to Palm Tran, and we have published APIs that can be used to enable interface to the fare processing back ends used by other regional agencies. We are happy to review regional fare payment scenarios with Palm Tran and the County at any time.

The biggest [customer service] issue on fixed route is fare disputes; the lack of good data from the GFI system makes it difficult for Customer Service to resolve customer service issues. In addition, the bus probing records aren't always correct and may be assigned to the wrong day, so the CSR is unable to match these up properly during an inquiry.

The Genfare system generates time based transaction records for cash and media that are available for detailed analysis. Genfare Link with account-based processing and intraday probing provides frequent data updates that are available for Customer Service purpose. Genfare Link allows multiple ways to analyze and report the data, Genfare is confident and committed to working together with Palm Tran to resolve this concern.

Palm Tran records all cash as sales, but the funds available on a fare card are valid until the funds on the fare card is used. The reports provided from the GFI system are not clear as to what revenue has actually been collected by the Farebox versus what the Farebox expects based on the driver key counts. Additionally, the monies from each Farebox are comingled in the vault when the bus is probed and vaulted, so it is difficult to audit what actually came from each Farebox. This is important to insure the integrity of the data and monitor for any fraudulent activity. Palm Tran performs random Farebox audits, but not too frequently; therefore, reconciliation issues cannot be tied to an overall system-wide issue or an individual incident. However, there is a plan to begin a Farebox audit process soon.

In older card-based technology, value/rides are decremented on the card. It's complex to synchronize sales and usage, outstanding balances and electronic "cash flow" can only be inferred. In an account-based system, the central account database is the "single source of truth," making it easy to track all sales and collection activity for each card and precisely determine overall cash position. Genfare is happy to discuss this concern with Palm Tran.

The GFI depot computers at each garage have a hot standby in case they need to be swapped out. The PCMCIA cards used for the depot computers are becoming obsolete and may soon cause an issue with spares.

The PCMCIA card use to load farebox software has indeed become obsolete – this technology has been significantly upgraded. With the Genfare Link system, software updates are downloaded to the farebox and other field devices via network from central. As a backup, updates can be loaded locally at the device using a microSD card for the farebox.

It is currently a challenge for Palm Tran staff to analyze the GFI revenue and ridership data for accuracy. There are some operational procedures in place for the drivers that can skew the data (e.g. issuing tickets without collecting money and overriding fares), and it is not clear what some of the fields on the GFI reports are tied to. This makes it difficult to know whether the overall revenue and ridership is being overstated.

We will work with you to ascertain the root cause of these problems – and suggest procedural changes if needed. A strength of the new system is that tracking and reporting of fare sales and collection data is well integrated and more transparent than in the past. It is easy to trace all activity for any card or subset of cards from initial acquisition to distribution, use, and recharge to final expiration. Fare table configuration has been made more user friendly and data visualization tools provide improved explanation of information.

We are happy to review all of the above issues with Palm Tran prior to contract award if desired.

3.7 HOW THE GENFARE SOLUTION WILL MEET THE COUNTY’S PROJECT GOALS

Here’s how the proposed system will meet the fare system goals stated in Sec. 5 of the County’s technical specification:

1. A true regional fare payment system with easy integration within the region BCT, MDT, SFRTA, Brightline, and/or Sun Pass.

Genfare Link, our cloud-hosted central data system, is the ideal platform for a regional fare system. All fare media regardless of issuer function as tokens identifying the rider to the system – all fare processing is done on the back end. We provided fare collection system to Broward County, and have published APIs that can be used to enable interface to the fare processing back ends used by other regional agencies such as MDT, SFRTA, Brightline, and SunPass.

2. Commonly acceptable payment methods within the region.

The Genfare solution supports all mainstream fare media, from cash to smart cards and mobile tickets, and for this procurement will be enhanced to support open payments, including virtually all widely used third-party media, including bank cards and phone-based payment applications such as Apple Pay, etc.

3. Faster transactions speeds for efficient onboarding and reduced dwell time.

Electronic fare transactions typically require less than one second, much faster than cash, speeding boarding and reducing dwell time.

4. Reduce the dependency on cash and increase cost savings via reduced cash handling.

Electronic ticketing makes fare payment almost effortless, encouraging most riders to shift from cash to cards. Many agencies using electronic fare media find that cash acceptance drops significantly.

5. More fare payment and account management options (smart cards, contactless bank cards, mobile payments, open payments, account-based payments, online account management).

The solution we propose for Palm Tran will accept virtually all forms of fare payment now in use or on the horizon, ranging from cash to smart cards, mobile tickets, and all types of open payment.

6. Better distribution network providing more access to fare media and products (retail relationships, Ticket Vending Machines (TVMs), websites, call centers, etc.).

Our solution will make it easy for riders to obtain fare media via online ticketing portal, TVM, retail network, ticket-office agents using the APOS, calls to agency staff using the customer service interface, and our mobile ticketing app. Third-party media ranging from bank cards to phone-based payment applications can be accepted. Cash-paying riders will continue to be accommodated.

7. Allow for partnerships with colleges/universities, social service agencies, businesses (commuter benefits), hotels/resorts (tourists) and the ability to manage accounts and fare media through an institutional website.

Our online partner portal makes it easy for administrators for partner organizations such as schools, businesses and social service agencies to manage the fare programs offered to their members.

8. Easy fare enforcement with minimal driver interaction.

All adult fares are automatically validated by the fare equipment – no driver intervention is necessary.

9. Allow for flexible fare policy configuration for a variety of fare rules (i.e., may need to change fare structure and prices – e.g., 3-hour window to transfer for free).

All fare payment is handled on the back end using our fare processing engine, which may be configured as desired. New fare rules may be developed as agency needs and payment practices evolve.

10. Modular equipment with easily replaceable components and onboard diagnostics.

All Genfare equipment is modular to facilitate component replacement and provides built-in diagnostics. Health status is continually reported to the central office by all devices including the farebox, making it easy to identify problems and mobilize resources to address them.

11. Enhanced security of fare revenue and back-office data.

Genfare's ability to secure cash revenue is well known and unsurpassed. We have adopted an equally rigorous approach to ensure secure acceptance of electronic payments. Extensive use of encryption is made in processing fare media and transmitting data between system nodes. The Genfare solution is PCI compliant. We adhere to industry best practices to ensure maximum protection of back end data, including two-factor authentication, regular security audits, configurable options to ensure strong passwords, and more.

12. Increased customer convenience to promote choice riders.

The convenience, reliability and ease of use of the Genfare solution will increase transit's attractiveness to riders with multiple options. For example, visitors and occasional riders will easily be able to download our mobile application, plan trips, purchase tickets, determine bus arrival times, and board in minimal time. Regular riders using smart cards, particularly if autoreplenishment is enabled, will find the speed, low cost and convenience of transit compares favorably with auto use.

13. Enhanced analytics and reporting for better insight into operational efficiencies and system effectiveness.

Genfare Link provides vastly improved reporting and data visualization capabilities that excel at providing actionable business insight. We provide a wide range of metrics covering all aspects of system performance, including well over a hundred of standard reports. See Sec. 3.14.3.9 for a description of Genfare Link reporting.

14. Integration between fixed route and paratransit.

We are happy to discuss options for integrating fare payment on the fixed route and paratransit fleets, such as the integration with Trapeze for the STAR program in CDTA.

Additionally, the FARE SYSTEM should provide solutions that:

- Automate and are scalable for recording and processing of passes associated with programs; e.g., Employer, University.

As indicated, our partner portal greatly facilitates processing of fare media in connection with transit benefits and similar programs. Automated processes such as bulk uploads of member eligibility lists make it possible for organizational administrators to efficiently manage fare programs of any scale.

- Eliminate magnetic ticket media.

We will provide a range of contactless media making it possible to eliminate magnetic media. For applications where low cost is a priority, limited-use smart media such as the Ultralight and Ultralight Nano represent good options.

- Enable adoption of emerging fare payment technologies.

As indicated, open payments acceptance, which encompasses virtually all emerging fare payment technologies currently identified, will be implemented for this procurement.

- Align with capital and operating budget resources.

We believe the Genfare solution is the most cost effective choice and is readily affordable.

- Improve fare collection equipment reliability and data security.

See response to item 11 above.

- Encourage the use of fare media over cash.

See response to item 4 above.

- Provide an enhanced user experience for customers and operators.

The award-winning design of the Fast Fare farebox enhances the user experience for both riders and drivers through attractive styling, easy-to-read color displays, multi-color LED lighting to direct attention and signal transaction and device status, and optional voice messaging. The Vendstar-4 TVM provides a sensitive touchscreen display that significantly speeds the input process compared to previous generation technology.

Automate fare collection to:

- Reduce human error and fare disputes.

Virtually all adult fares will be processed automatically without driver intervention, reducing the incidence of fare disputes.

- Improve data collection/reporting capabilities.

See response to item 13 above – enhanced reporting is one of the great strengths of Genfare Link.

- Realize operational efficiencies and reduce overall cost of operations.

Migration from cash to electronic media will speed boarding and reduce cash handling costs. Contactless media will decrease reliance on electromechanical devices, lowering maintenance expense. Mobile ticketing and acceptance of open payments media will lower demand for agency-issued media, resulting in additional cost savings.

- Provide fare media that can be used to determine eligibility and/or provide fare payment for unlimited access (i.e., employer/school pass) programs, reduced fare programs, and if desired, Paratransit service.

The Genfare solution will support all fare payment needs, including passes, reduced fare programs, paratransit, and more. For this procurement we will implement a reduced-fare rider enrollment process that will make it easy for agency staff to obtain all documentation and other data needed to determine reduced-fare rider eligibility, take photos, securely store all materials online, and generate personalized ID cards on a while-you-wait basis.

Accommodate fare policy objectives, such as:

- Fare structure simplification

Fare structure modification in the Genfare solution is far more intuitive than in the past, making it easy for agency staff to review fare offerings, experiment with “what if” scenarios, and optimize and simplify agency fare products and policies.

- Alternative mix of fare products

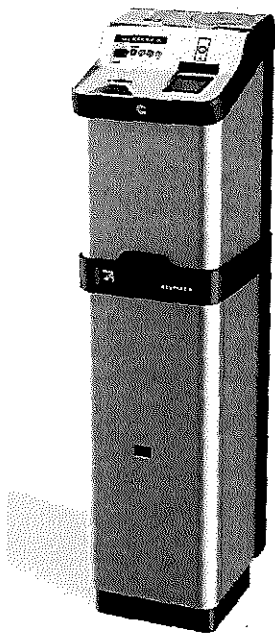
As indicated, we support a wide range of fare media and products addressing all needs and market segments.

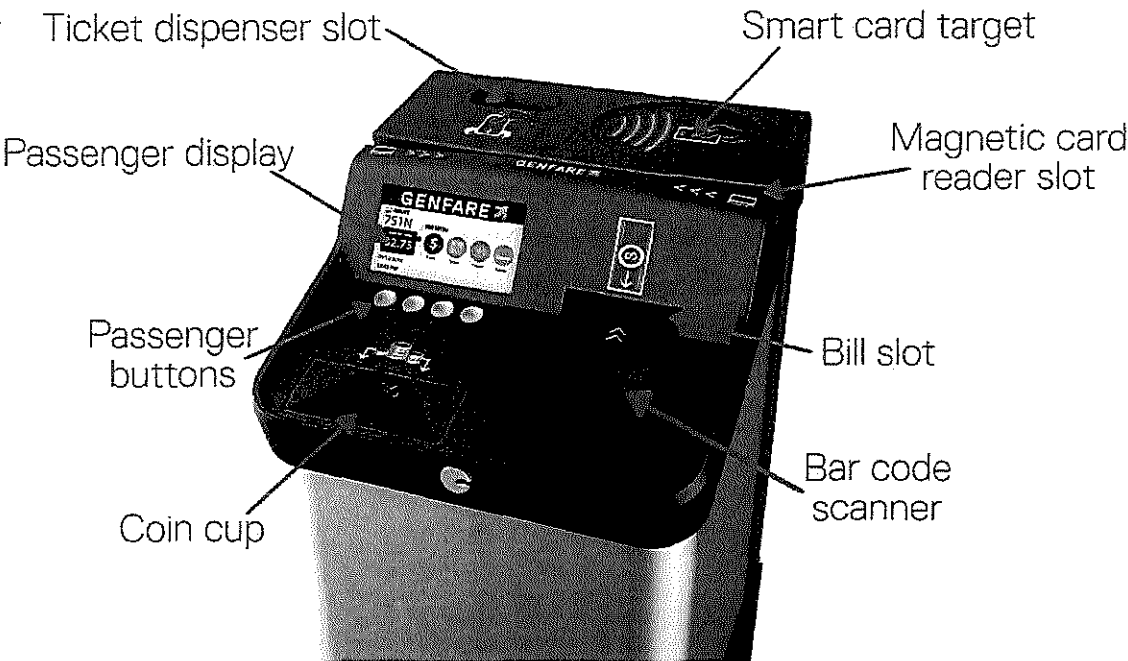
- Loyalty programs (e.g., fare accumulators, ride bonuses)

We currently offer loyalty program options such as fare capping and will provide enhancements as specified in the RFP.

3.8 FAST FARE™ FAREBOX

The Fast Fare farebox, the newest addition to Genfare’s line of advanced fare collection products, can process cash, smart fare media, magnetic cards, and barcoded documents, including “virtual tickets” displayed on a mobile device. The Fast Fare will be provided with a swipe reader to permit processing of read-only magnetic cards such as passes. To enhance the customer experience and facilitate use, the Fast Fare features a full-color passenger display, eye-catching visual indicators, and attractive contemporary styling. The Fast Fare also provides a powerful processor, ample memory and multiple communication ports to support today’s data-intensive fare handling needs and prepare for those of the future.





Fast Fare passenger interfaces

3.8.1 Features Summary

Features of the Fast Fare farebox are summarized in the chart below.

FAST FARE™ FAREBOX FEATURES	
COIN HANDLING	
Validation Capacity	Up to 32 types of coins and tokens
Validation Speed	Up to 5 coins per second
Validation Profile Updates	Software configurable internally
BILL HANDLING	
Bill Validation	Processing time <2 secs/bill
Validation Profile Updates	Flash update
MAGNETIC CARD HANDLING	
Read-only documents	Via optional bidirectional swipe reader
SMART CARD PROCESSING	
ISO 14443-compliant smart media	Processed in 500 milliseconds or less
BARCODE MEDIA	
“Virtual ticket” on mobile device, paper transfer issued using optional barcode printer	Common 2D barcode formats supported

FAST FARE™ FAREBOX FEATURES	
PASSENGER INTERFACE	
Passenger Display	4.3" full-color TFT (thin film transistor) high-resolution graphical display
Language Support	Multi-lingual capability including Spanish, French, European, Asian, and Arabic
Character Capacity	Unlimited simultaneous multi-font/language
Audio Response	Multilingual voice and sound
CASHBOX	
Cashbox ID	Infrared using battery-free design
COMMUNICATIONS	
Network	Ethernet, Wi-Fi (802.11 b/g/n), J1708/1587, spare RS-232 and 485
Infrared	Up to 230 kilobits per second
Data probing	Dual wireless/infrared – transaction and event detail sent via wireless; lock code sent via IR
ELECTRONICS	
Processor and Operating System	Field proven design
Backup Power	SuperCap capacitor technology for graceful shutdown of transaction in progress if external power lost
Removable Storage	microSD card slot

3.8.2 General Performance Characteristics

The farebox will be installed in accordance with RFP requirements in the front of the bus adjacent to the driver and will enable passengers to easily and rapidly insert or present the required fare. It automatically validates electronic fare media, and validates and counts inserted cash and displays the total, all without operator intervention. Invalid coins, bills and electronic fare media are rejected and, where appropriate, returned to the passenger. The farebox is provided with a separately-mounted operator control unit (OCU) to permit the driver to easily register reduced and other special fares using a keypad. The farebox allows for easy and unrestricted access to the cashbox door and maintenance openings by maintenance and revenue service personnel. The farebox's top lid can be opened and the upper farebox shroud removed without providing access to revenue. The farebox is ADA compliant and complies with RFP requirements with respect to accessibility and ease of operation. The farebox reports operational data to the central data system in accordance with RFP requirements. The farebox is readily configurable.

3.8.3 Environmental Conditions

The farebox operates on a 12 or 24 VDC power supply from the bus battery. It will operate satisfactorily under the following conditions:

Storage Temperature	–25° to +140° F
Operating Temperature	+32° to +132° F, plus solar load from direct sunlight through bus windows
Thermal Shock	1° F per minute drop in temperature over 15° F range between 132° and 32° F
Relative Humidity Range	20% to 95% including condensation. The equipment will function properly in all humidity conditions experienced in buses in typical revenue service.
Vibration	0.3g (rms), 5 to 200 Hz
Shock	4g peak (instantaneous)
Airborne dust	Up to 180 micrograms per cubic meter, with iron and salt particles
Inclination	0° to 10° off vertical. Operation at extreme inclination is to be of short duration.
Water/solvents	Water spray on equipment from cleaning floors and walls; industrial cleaning solvents; wet fare media, rain, mud, snow and slush from passengers' clothing or possessions. For cleaning using cyclone or high-pressure air devices, use of waterproof covers over the fareboxes is recommended.
Primary voltage	12 or 24 volts DC nominal; operating range 10-60 VDC. The farebox can withstand higher voltages for short duration — up to 1000V spikes for 50 microseconds.
Electromagnetic interference	Conducted and radiated electromagnetic energy in the bus, including 300V arcs from heater and air conditioning controls
Grounding/Lightning	Good ground available. Protected against 1000V spikes from lightning

The farebox is not affected by airborne particles, moisture, greases, oils, or other contaminants accumulated on coins, tokens, bills and tickets, including bent and mutilated "street money."

3.8.3.1 Electrical Power

Farebox electrical power is compliant with RFP requirements and has the following characteristics:

Power source	12 or 24 VDC nominal (bus battery)
Operating range	10 to 60 VDC

Maximum current draw	15 amps for brief duration (msecs) during thermal print
Idle current draw	~1.2 amps idle (ready state), 850 mA sleep mode
Power consumption	180W peak, 58W typical (bill transaction), 14W idle.

The farebox is protected against damage or loss or modification of data caused by:

- Lower or higher voltage in the range of zero (0) to fifty (50) volts
- Reverse polarity of the input voltage (short duration)
- Temporary voltage drops associated with starting of coaches
- Fluctuating voltages between 10 and 60 VDC.

The farebox power supply includes filters and other components to regulate the coach-supplied voltage and eliminate power spikes and noise. The power supply incorporates sensors that switch off the farebox if the input voltage is above or below tolerable levels. Operation resumes immediately when proper voltage is restored. The farebox notes resumption of normal operation in memory.

NOTE: In contrast to previous generation technology, the Fast Fare is provided with capacitor-based backup power to ensure completion of the transaction in progress in the event external power fails.

EMI and RFI. The farebox is unaffected by electromagnetic interference (EMI) or radio frequency interference (RFI) from coach equipment, including radio, lights, electronic destination signs, air conditioners, and generators. The farebox does not emit measurable EMI or RFI that produces harmful interference with any other on-board electronic device or system.

Rain, moisture, and humidity. The farebox is unaffected by rain, moisture, and humidity, as demonstrated by its long history of reliable service in a wide range of environments. The farebox functions normally in conditions typical of transit, including wet or damp fare media due to rain or humidity or an accumulation of moisture, salt, or mud at the base.

3.8.4 Accuracy and Acceptance

The farebox will provide the following minimum levels of accuracy and acceptance:

- Cash counting accuracy of ±1% for amounts greater than \$300, assuming valid cash, proper operation, and environmental conditions within the specified range.
- Successful smart card acceptance of 99% on first proper presentment, assuming undamaged valid cards.

3.8.5 Reliability and Maintainability

The farebox will provide the following minimum levels of reliability and maintainability:

- Mean time between failures (MTBF) – 60 days for essential functions and safe operation
- Mean time to repair (MTTR) – 10 minutes for diagnosis and replacement of malfunctioning components.

Modular construction is used throughout the farebox. Fare acceptance modules and the logic board can be replaced without the use of tools. The farebox's electronic boards in the farebox can operate for an average of 10,000 hours between failures if maintained in accordance with Genfare instructions.

3.8.6 Coin Acceptor

The farebox is provided with a coin acceptor to validate and count inserted coins and tokens, direct valid items to the cashbox, and return rejected items to a coin cup, all without driver intervention. The acceptor can process up to five (5) coins and tokens per second. As each coin is accepted, its value is immediately added to the total shown on the driver and passenger digital displays.

The acceptor validates inserted items based on their metallic content. Up to twelve (12) different coins or tokens can be distinguished, including U.S. pennies, nickels, dimes, quarters, and Susan B. Anthony and Sacajawea dollar coins. The validator can also count tokens having a diameter between 0.650" and one inch. The coin slot admits no coin larger than a Susan B. Anthony or Sacagawea dollar coin (1.043").

The acceptor can be reprogrammed to accept new types of coins without hardware modification. Multiple coins can be associated with a single denomination in the event a new series of coin is introduced.

Rejected coins are returned to a coin cup for easy retrieval by the passenger. The cup illuminates when an item is returned to facilitate this process. All detected instances of invalid coins are recorded for subsequent uploading to the data system.

The total value of coins inserted is shown on the display for a programmable period, typically 15 seconds. The farebox records total coins and tokens processed as well as total items detected and rejected and sends this information to the data system during probing.

3.8.6.1 Coin Bypass

The Fast Fare coin acceptor has a minimal number of moving parts and jams are rare. However, should a jam occur – for example, due to a passenger inserting foreign material – the driver may activate the coin bypass mechanism, which permits the passage of coins directly to the cashbox.

Activating the coin bypass requires deliberate action on the part of the driver. The security of the farebox and the collected revenue is not diminished. Bills and electronic fare media continue to be accepted, registered and processed normally. Once a farebox has been put into bypass it is not possible for the driver to reset it from outside the farebox. Resetting of the mechanism requires access to the farebox interior by authorized personnel.

The farebox reports to the data system the exact times when the bypass was activated and deactivated and creates a route/run record. When probed, a farebox that has been placed in bypass emits a sound noticeably different from the normal probe sound.

3.8.7 Bill Validator

The farebox is provided with a bill validator and transport mechanism compliant with to accept, validate, and count paper currency and convey it to the cashbox. A green light above the bill slot means the validator is ready to accept bills; a red light means it is not ready. The bill slot is provided with a guide

plate to facilitate insertion of bills while deterring accidental insertion of coins. The validator grips an inserted bill in a positive manner and does not require precise insertion by the passenger.

The validator can accept an inserted bill in any one of four orientations: face up, face down, either end first. The inserted bill is positively identified based on internal characteristics; bills that cannot be so identified are rejected as invalid. The validator can process the following U.S. banknotes in “street” condition, including wrinkled, torn, taped, or damp currency:

- One-dollar bills (\$1);
- Five-dollar bills (\$5), old and new style;
- Ten-dollar bills (\$10), old and new style;
- Twenty-dollar bills (\$20), old and new style.

The farebox may be programmed to reject any of the above bills for policy reasons. The farebox also automatically rejects:

- All counterfeit bills, foreign currency, photocopies of valid currency, and badly damaged bills.
- Any inserted paper other than currency, including magnetic or other tickets.

If a bill is rejected, the transport mechanism reverses and the item is returned to the passenger via the bill slot. Processing time is less than two seconds per bill.

If new bill designs are introduced, the bill validator firmware can be readily updated by agency personnel using a memory stick.

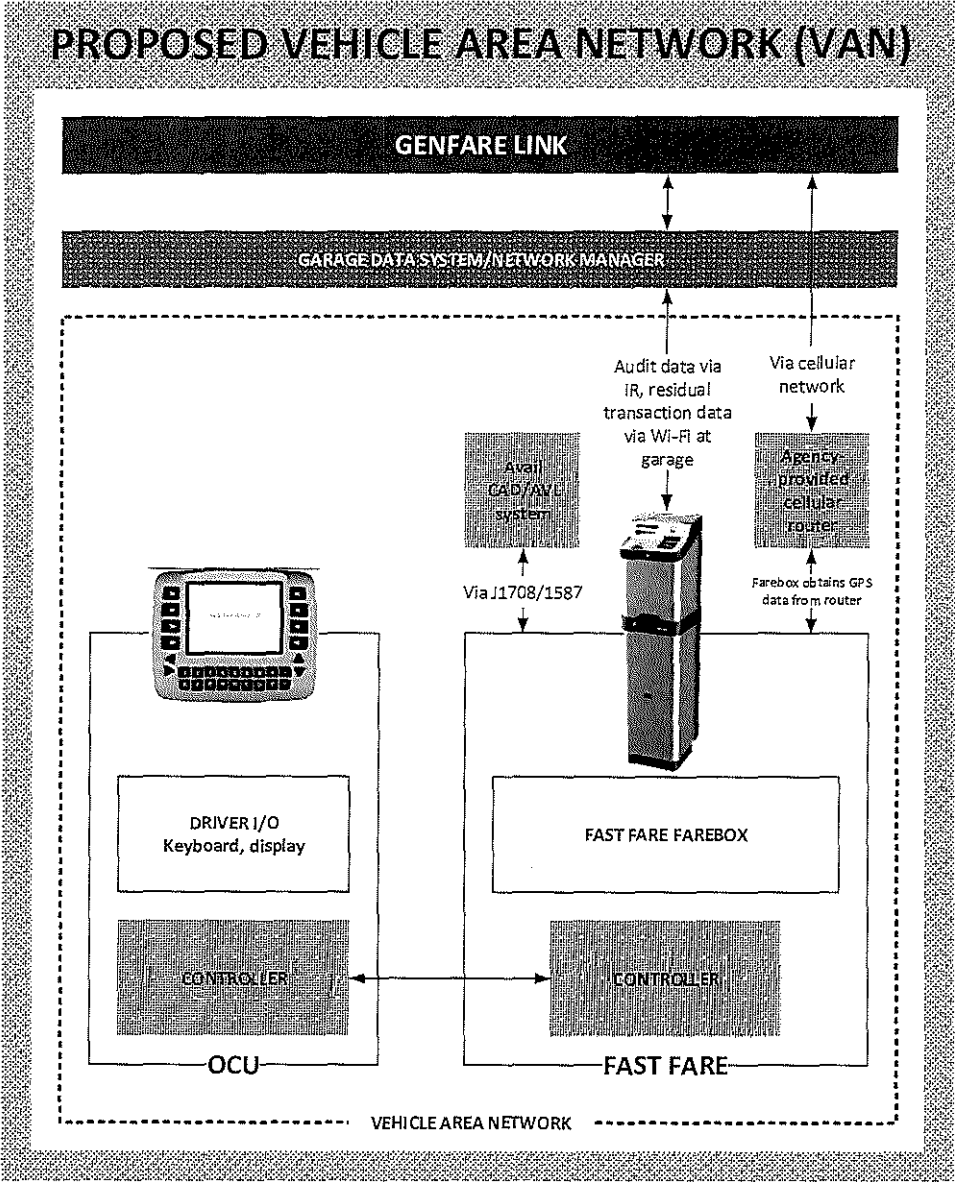
The farebox has an “accept next bill” (override) function that allows the operator to manually accept a bill rejected by the validator but which on visual inspection is found to be valid. The “accept next bill” feature can be limited to certain denominations or disabled. All uses of the feature are recorded by the farebox and uploaded to the data system during probing.

3.8.8 Vehicle Area Network (VAN)

The Fast Fare farebox, operator control unit and agency-provided cellular modem will be configured into a vehicle area network (VAN) connected to the Avail CAD/AVL system via a J1708/1587 interface – see diagram below.

The VAN will support the following functions:

- Single-point logon using the CAD/AVL control head. As specified in the RFP, the Fast Fare operator control unit (OCU) will serve as primary logon device, with the CAD/AVL control head as backup.
- Geotagging of transactions and events while the Fast Fare is in service. Location information will be continuously accepted from the CAD/AVL system via the J1708/1587 interface.



- Monitoring and control of validator activity via the OCU.
- Cellular probing while the vehicle is en route via the agency-provided cellular modem.
- Wireless probing via Wi-Fi when the vehicle comes within range of an agency-provided WLAN access point at a Palm Tran garage.

The farebox will obtain location data from the agency-provided Cradlepoint IBR1100 cellular router, which is equipped with a GPS receiver. This is an alternative to the RFP requirement that the farebox be provided with a GPS receiver.

3.8.9 CAD/AVL Interface

The farebox can support numerous external interfaces, including:

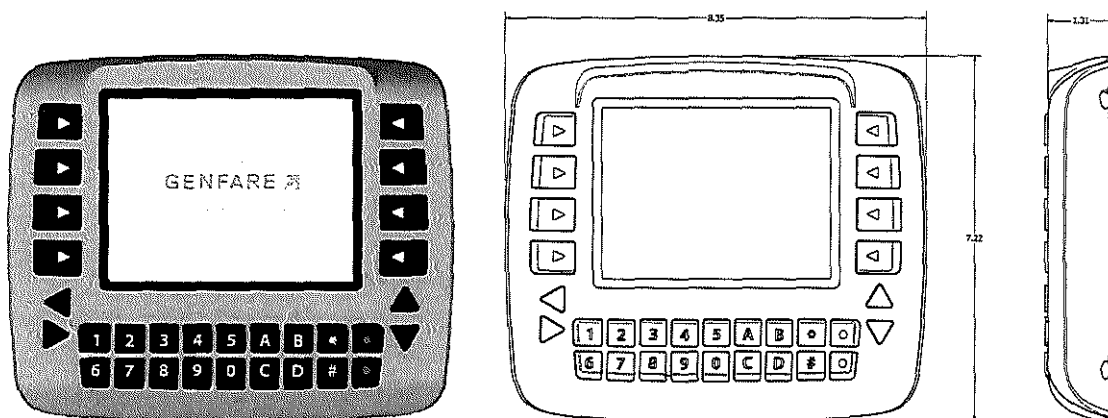
- Infrared data probing
- Wi-Fi (802.11 b/g/n)
- Ethernet
- J1708/1587
- Spare RS-232 and 485.

For this procurement, the Fast Fare will be interfaced to the Avail CAD/AVL control head via a J1708/1587 interface. The interface will support single-point logon, reporting of bus stop and lat/long data from the CAD/AVL system to the farebox, and reporting of maintenance alarms from the farebox to the CAD/AVL system as specified.

We have successfully interfaced our equipment to more CAD/AVL systems provided by Avail and other major vendors than any other fare collection provider. If desired, we can provide a list of such implementations as well as the interface document we provided to Avail and the other vendors we work with. The Genfare-developed J1587 extensions described in the interface document have become the de facto industry standard.

3.8.10 Operator Control Unit

The Fast Fare-e is provided with an operator control unit (OCU) that enables the driver to monitor and control validator operation – see illustration below. The OCU is equipped with a keypad and display and is housed in a separate compact console constructed of high-impact plastic. The OCU can be mounted on the bus dashboard or a stanchion as desired. The OCU can be quickly adjusted by each operator to the optimal viewing angle. The OCU is connected to the validator by cable, which permits mounting up to ten feet from the farebox. The OCU can be removed and replaced in less than a minute.



Operator control unit (OCU)

The OCU is provided with a backlit color liquid crystal display (LCD) measuring approximately 4.5" by 3.4" (5.7" diagonal) capable of displaying graphics and text. Display brightness is adjustable via the driver keypad. The display shows all information needed to operate the farebox.

The OCU has 30 pushbuttons, consisting of the digits 0 through 9, "#," "*", the letters A through D, four cursor arrows, a green button, a blue button, and eight function keys with dynamically assignable electronic labels. The keys use a durable silicon rubber actuator and have hot-molded markings that will not wear off with use. The keys provide tactile and audio feedback and are sealed against moisture.

The eight function keys are placed on either side of the display. Different "labels" for the function keys are shown on the OCU display depending on the task to be performed, similar to an ATM. The function keys typically are used to accept reduced fares and are labeled accordingly.

Once the vehicle is underway, most fare transactions involving the Fast Fare-e are processed automatically and require no operator involvement. In such cases the OCU will display the fare card type and the fare amount if relevant. The OCU can be configured to signal a reduced-fare transaction by means of visual and/or audio indicators. In such cases the driver inspects the rider's photo ID and presses the appropriate button on the OCU keypad to accept a valid fare.

The most commonly used fare types are shown on the default OCU screen. For electronic transactions, the display can show the amount paid, amount remaining (on a stored ride/value card), and other relevant information

The display shows all information needed to operate the farebox, including:

- The amount of money inserted in the form of coins and bills. For driver convenience, cash amounts are displayed in a large, easy to read type font.
- The status of any fare card transaction
- The current assignment of each function key
- Operator logon and logoff prompts.

3.8.10.1 OCU Installation

The OCU as described above (the new OCU) is a redesign of the OCU used to control Palm Tran's existing Odyssey fareboxes (the old OCU). Currently in the late stages of development, the new OCU is scheduled to be available for shipping in Q2 2020. To avoid implementation delays while providing Palm Tran with the latest technology, we propose as follows:

- We will deliver the Fast Fare and related fare collection equipment in December 2019, to be installed after the holidays.
- As initially installed, the Fast Fare will be controlled by the old OCU – the old and new units are functionally equivalent and use similar cabling and mounting hardware.
- When the new OCU becomes available, we will ship Palm Tran a sufficient quantity to replace all old OCUs. Replacement is a simple swap out procedure taking less than a minute. It is not necessary to replace all OCUs at one time. No driver retraining is needed. Operation of the old and new OCUs is identical – same screen and button layout, procedures, etc.

3.8.11 Cash Fare Processing

3.8.11.1 Processing of Base Fare

The base (adult) fare is the default fare unless overridden by keypad entry. Initially the driver's digital display indicates "0.00". As coins and bills are inserted, the display counts upward, reflecting the amount of money inserted. When an amount equal to a full fare has been deposited, a "beep" sounds, the farebox registers the fare in memory, and the display resets to "0.00."

3.8.11.2 Processing of Reduced Fare

Each of the OCU function keys (and, if desired, the buttons 1-9 and A-D) can be programmed as follows:

- *Reflect a preset value from \$0.01 to \$99.99.* In this case pushing the button registers the reduced fare and decrements the value on the passenger display by the amount assigned to the button. It is possible to "preset" the farebox for a special fare by pushing the button before the money is deposited. When the full amount of special fare is deposited, a tone will sound, the appropriate data register will be incremented, and the digital display will reset to "0.00."
- *Operate as a zero-value tally counter.* In this case the button will cause the appropriate register to increment by one, regardless of whether value is shown on the display. The display and underlying money count are unaffected.
- *Tally, dump, and clear.* Pushing the button will cause the appropriate register to increment by one and all value shown on the display will be cleared.

The values and functionality assigned to the keypad buttons may be controlled via the data system and are updated at probing time.

Preset buttons may be pressed before, during or after insertion of money. It is not necessary to insert money to obtain a count with a tally button. Each time a pushbutton is depressed and the correct amount of money is deposited, a tone sounds, indicating that the fare has been registered. Pushing a disabled button has no effect on the farebox.

3.8.11.3 Processing of Overpayment or Incomplete Transactions

An overpayment may be applied to the next fare, whether full or reduced. As an option, the Fast Fare can issue a "change card" good for subsequent fare payment. Alternatively, the driver may press the "dump" (green) button to clear the display and add the amount of overpayment to the farebox's "unclassified revenue" register. If an overpayment is made and no action is taken for a predetermined time, typically 15 seconds, the display clears automatically and the amount is added to the "unclassified revenue" register. Reset can be delayed by pressing a designated "hold" button (typically the zero key).

3.8.12 Magnetic Swipe Reader

Subject to approval by the agency, the Fast Fare will be provided with a swipe card reader to process magnetic documents. This can be useful for processing some third-party cards as well as legacy media during the transition.

The swipe reader is bidirectional – cards can be swiped from right to left or vice versa, with the stripe facing forward or backward. The card reader is mounted flush with the top surface of the farebox near the coin and bill slots. Operation of the swipe reader is fast and reliable.

The reader reads the magnetic encoding and determines if the card is valid. A valid card triggers a "beep," the relevant data registers are incremented, and the farebox records card detail such as serial number. If the card is invalid, a spoken announcement or "warble" sounds, a status message appears on the displays, and an appropriate "transaction fail" event is recorded in memory.

The swipe reader has no moving parts and is capable of 100,000 MCBF. Processing time is one-half second or less. The reader process cards 6 to 30 mils thick.

3.8.13 Smart Card Processor

The farebox is provided with an integral smart card processor (SCP) to read and encode contactless smart cards compliant with the ISO 14443 standards. The farebox SCP is fully integrated with the farebox electronics and is capable of exchanging data with the fare collection system to process and record smart card transactions.

The SCP antenna is located in the farebox lid near the coin slot and is indicated by a "target" symbol. Boarding riders place their smart cards in proximity to the target, at which point the antenna detects the presence of the card and processing begins. Successful conclusion of processing is indicated by a beep; a failed transaction is indicated by a warble. Processing is normally complete within one-half second. The SCP requires little preventive or routine maintenance except for exterior cleaning as required for appearance.

The smart card may be configured as a pass (daily, weekly, monthly, rolling period, employee), permit, stored ride or stored value ticket, zone check or other fare type as agreed upon during design review. The SCP can reload smart cards configured as stored ride/value tickets with additional rides or value upon receipt of acceptable payment from the passenger.

The SCP is provided with the following safeguards:

- The SCP will not accidentally process two cards presented simultaneously.
- Data on a smart card is not corrupted if it is withdrawn before processing is complete. The transaction in progress is canceled.
- Once processing of a given smart card transaction is complete, the SCP will not initiate another transaction involving the card unless the card is withdrawn and re-presented to the target.

3.8.14 Bar Code Reader

The farebox is provided with a bar code reader to permit processing of bar coded tickets, including paper fare documents and virtual tickets displayed on mobile devices. High density bar code formats such as QR, Data Matrix, and Aztec are used because more data can be encoded and a superior error correction scheme can be employed, providing more reliable reading. Riders present their barcoded fare media so that the code faces the reader lens; processing then takes place in a manner similar to that of smart cards except that barcoded documents are read-only.

The bar code reader enables mobile tickets to be automatically validated without driver intervention. Mobile tickets can also be configured for visual validation, in which drivers manually register tickets upon inspection of visual cues.

3.8.15 Electronic Fare Media Processing

3.8.15.1 Overview

This section applies to all electronic fare media, including mobile tickets and smart cards.

The proposed fare collection system can process a wide variety of electronic fare media, which may be configured as passes, stored ride/value cards, transfers, and other types of fare document. With account-based processing implemented, most processing will be done on the back end. (Exceptions: the agency code and fare category such as student, senior, etc., are encoded in read-only format on the card and checked by the farebox.) When an electronic fare document is presented, the farebox reads its serial number and simultaneously (a) transmits it to the CDS and (b) checks it against the locally-stored master status list (MSL) – the validation decision is based on the response received first. The farebox then signals the vehicle operator and patron as appropriate and creates and stores a detailed record of the transaction (including document serial number) for uploading to the CDS during the next probing.

Acceptance of farecards may be subject to control by the OCU and may require the insertion of money in the farebox.

Typical processing of electronic fare media takes place in the manner indicated below. “System” as used here means all elements of the fare collection system involved in the processing of a fare, including the farebox logic, CDS, and MSL.

When a fare document is inserted into or presented to the fare device, the driver's information display indicates the type of document being read. Valid documents are indicated with a beep. Invalid, misread, or expired passes are indicated with a message on the display, and the fare device emits a warble easily distinguished from the beep of a valid fare. Passes rejected due to passback will also cause a warble to be emitted.

Documents that can be processed by the fare device include:

- Passes. Time or date limited documents, including monthly, weekly, special event, holiday, peak only, off peak only, etc.
- Transfers, both magnetic and embedded on smart cards
- Stored ride/value cards
- Unlimited. For employees, police, etc.
- Reduced fare permits
- Employer subsidy cards
- Zone checks.

Operating characteristics may be separately defined for each type of fare document, including conditions of issue and acceptance, validity period, printing format, etc.

Acceptance of a fare document is recorded in memory for subsequent transmission to the data system. There are separate registers for each type of document issued and received. The following data may be checked for validity:

- Expiration date
- Validity period
- Issuing agency
- Document type
- Fare category
- Remaining value/rides
- Transfer information
- Valid zones
- Passback
- Bad number list.

If a fare document is determined to be invalid, the displays so indicate.

Passes and tickets processed by the fare device are preprinted and pre-encoded off the vehicle. Each document is electronically encoded with data that can be read by the fare device upon presentation. When a stored ride/value ticket is processed, the system deducts one ride or the proper amount from the account.

Bad Number List. The system checks whether the serial number of a card being processed is on the bad-number list (cards reported lost or stolen). If the card is on the bad list, the display will indicate BAD PASS or similar message and the card will be rejected.

Passback. For passes, the system checks whether the document was previously presented on the same bus within a configurable time, typically 30 minutes – this indicates attempted fraudulent use by multiple riders (passback). If so, the display indicates PASSBACK or similar and a warble sounds, indicating the pass has been rejected. The passback list automatically clears when the driver begins a new trip.

Order of Precedence. The farebox permits simultaneous processing of cash and electronic card transactions. The OCU display can show cash and electronic status messages at the same time. If desired, a designated “hold” button can be pressed to retain messages on the display. The farebox software is such that data collisions are avoided and all transactions are appropriately registered.

Challenges. In the event of fare document challenge, the driver may press a button on the OCU keypad to retain the information on the displays.

Data Storage. The fare device stores detailed data on each farecard transaction as well as aggregate counts of each type of farecard processed and uploads this data periodically to the data system.

3.8.15.2 Card Acceptance Process

Once an electronic fare document is presented for fare payment, the fare device does the following:

- Attempts to read the document. If a misread occurs, it is indicated on the displays and a warble sounds.
- Determines if the card is valid for use on this system. An invalid card triggers an indication on the farebox displays and causes a warble to sound.
- If so configured, requires driver keypress to accept reduced fare cards such as STUDENT or SENIOR.
- Attempts to validate the card against the central account via the cellular modem. If communication within a predetermined time is successful, the CDS determines whether the card has sufficient value or rides or is otherwise acceptable as fare payment for this trip, returns notification of acceptance or rejection plus any agreed-on ancillary data (e.g., remaining card value or validity), and updates the central account as appropriate.
- Simultaneously validates the card against the locally-stored master status list. Based on whatever subsystem reports a validation decision first, the fare device signals acceptance or rejection, and creates a transaction record for transmission to the CDS at the next opportunity.
- Displays transaction status (valid/invalid) and such additional information as may be agreed on, e.g., remaining rides/value; stores the transaction details in memory; increments the aggregate fare acceptance counts; and causes the appropriate tone to sound.

3.8.15.3 Stored Ride/Value Tickets

The system can accept and process stored ride and stored value cards. When a stored ride/value card is presented, the system examines the card to determine that there is adequate value or rides for the required fare, deducts the proper amount from the central account, and causes a tone to sound at the fare device.

3.8.15.4 Adding Value or Rides

The system includes an optional provision for a rider to use cash (at the farebox only) to purchase additional value or rides if desired. This feature can be enabled/disabled at any time. The process entails the following steps:

- On rider request, the driver presses a designated “add rides/value” button and instructs the rider to present the card.
- The system reads the card and displays the quantity of rides/value currently encoded.
- The rider inserts cash and, when finished, presses the indicated button adjacent to the passenger display.
- The farebox validates the inserted cash and causes a corresponding amount to be add to the central account. It records the transaction in memory for uploading to the data system.

3.8.15.5 Transfers

The system can be configured to process transfers in one of two ways:

- Active transfer. The transfer is authorized by driver keypress upon passenger request and payment of the appropriate fee.
- Passive transfer – this is done automatically without intervention by either the driver or passenger. If the card is subsequently presented for fare payment on another vehicle within the validity period for transfers, and the transfer is otherwise valid for use, the system automatically deducts the transfer fee, if any, and registers the fare. If the transfer period has expired, the full fare is deducted.

With account-based processing implemented, all transfers will be recorded and processed in the CDS. No transfer data will be recorded on the card.

3.8.15.6 Passes

Three types of period (limited duration) passes are supported:

- Fixed period passes. The validity of these passes is tied to a calendar interval (e.g., the month of July). The fare device reads the ticket and checks whether it is valid for the current date.
- Rolling period passes. These documents become valid for a specified period, commonly 7 days or 30 days, upon first use. The time and date of first use is recorded in the central account, and the pass expires the specified number of days later. Thus a 30-day rolling period pass first used on June 3 expires on July 3.
- Post billing passes. These passes are used in connection with employee billing programs. They are valid for a specified time, often a year or longer. The card is associated with an employer account number; this number plus the card serial number and other transaction details are recorded in the CDS to permit subsequent invoicing of the employer for transit use by employees.

The system can process conditional use passes such as "off-peak only" and "peak only" in addition to traditional "anytime" passes. Peak hours may be defined through the data system; typically, one peak occurs in the morning and another in the afternoon. "Off-peak only" passes are not valid during peak periods, while "peak only" passes are valid only during these times.

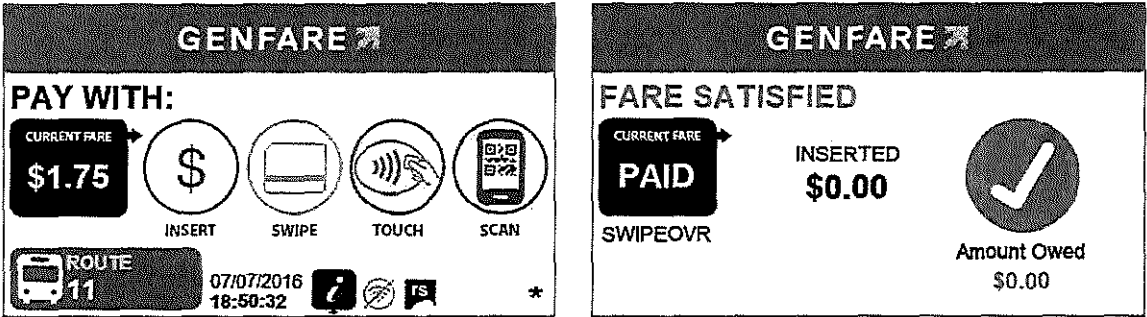
Employee Identification Cards. The fare device can be configured so that certain data routinely input by the driver may be entered using a program card processed by the farebox rather than the driver keypad. Employee identification cards contain the driver's identification number. Once this number is placed in memory, all data records are referenced to it until another driver identification number is entered via the keypad or a card.

3.8.16 Passenger Indications

3.8.16.1 Display

The farebox is provided with a passenger display mounted on top of the farebox near the coin and bill slots. The display has a 4.3" full-color QVGA (320x240 pixels) screen capable of displaying text and graphics using TFT LCD (thin-film transistor liquid crystal display) technology. The display shows transaction status and other messages – see illustrations below.

When a cash transaction is initiated, the display shows the amount deposited and the amount of the fare. When a fare card transaction is initiated, the display shows messages such as remaining value, validity status, etc. These indications are accompanied as appropriate by a “beep,” warble, or, if desired, a voice message.



Typical Fast Fare passenger display screens

3.8.16.2 Audible Signals

The Fast Fare is provided with an audio response system that provides spoken messages to supplement the visual displays. The voice is easily understood in the noisy bus environment, facilitating the fare collection process. Multiple languages can be supported. Spoken messages may be used to indicate fare acceptance or rejection in a manner to be agreed on during design review. The farebox can also generate a variety of tones to signal different farebox events.

3.8.16.3 Indicator Lights

The fare entry slots in the farebox top lid, including the coin slot, bill slot, and card reader slot, are provided with indicator lights to draw the attention of passengers and show device status. The color of the lights is under software control. A green indication (or other color as agreed on during design review) means that the fare device is operational and ready for service. A red indication means that the device is not ready for service. The indicator lights are coordinated with the messages shown on the passenger display – for example, if the coin mechanism is malfunctioning, the coin slot lights will show a red indication and the passenger display will show a message such as BILLS AND TICKETS ONLY.

3.8.17 Logic Board

The farebox is controlled by an enhanced logic board that operates the farebox components, stores data, and communicates with the data system during probing. The board is equipped with a J-1708 port for connection to other on-board devices compliant with the J-1708/1587 standard. The logic board reboots in 2-3 seconds in the event of power interruption. The logic board features a more powerful processor with more memory than previous generation fareboxes and has added communications capability.

The logic board can store many months of transaction and event detail. Nonvolatile memory does not require battery backup – data is retained indefinitely. The logic board is provided with a socket to permit installation of an industry-standard microSD card, which can be used for additional data storage,

software installation, or data backup. The logic board is provided with capacitor-based backup power to permit completion of the transaction in progress in the event external power fails.

The logic board will be provided with a clock that will synchronize periodically with system time.

3.8.18 Fare Registration

As each fare is registered, the farebox records individual transaction detail and increments cumulative registers in accordance with RFP requirements. For example, it records total cash received since last probing and amount received since installation or clearing of farebox memory. A transaction is recorded for each cash fare, electronic fare, or tally (key press).

Failed transactions (badlisted cards, passback, etc.) may be recorded if desired. Each type of failed transaction may be given a unique identifying code to permit later generation of reports. Events such as jams are also recorded. A separate data register records all cash shown on the driver's display but not accounted for through pressing of a keypad button or registration of a full fare. All such revenue is counted in an "unclassified revenue" register.

All accumulated data, including transactions, events, and aggregate counts, are uploaded to the data system during probing. Transaction and event detail is used to generate a transactional database, as discussed below. If desired, both cash and fare card transactions may be included in this database, which may be used to generate a wide variety of management reports.

The CDS keeps a separate tally of uses for each employer-subsidized card account number. It provides a means of collating employee card usage data, generating reports, and exporting data to a billing system or other third-party application not provided as part of this procurement. The data system also provides a means to activate and inactivate individual employee card accounts.

3.8.19 Transactional Database

Transaction and event detail reported by the farebox is used to populate a transactional database at the central data system.

The farebox captures the serial number of each farecard used and reports it to the data system. It is possible to track all uses of a given card, category of card, or school/employer account for any time period, route, etc. This information may be used for audit and security purposes, especially where high-value cards are implemented. For all transactions in the database, it is possible to determine day, time, route, and run for each fare paid.

To ensure the integrity of transactional data, all data uploaded from the farebox is buffered and subjected to a series of validity checks before being used to populate the database. Transactional and aggregate data are stored in the farebox until deletion is ordered by the data system. This guarantees that data is successfully transmitted before the original is erased.

3.8.20 Fare Table

The farebox can have two fare tables programmed into its electronic logic, one active and one pending. With System 7 each fare table will consist of 10 faresets (that is, sets of pre-determined fare values) assigning the value of a full fare plus any special fares (student, elderly, etc.). When Genfare Link is

implemented, 20 faresets will be provided. Each fare may range in amount from \$0.01 and \$99.99. The fareset allows a value and/or function to be assigned to each keypad button. For example, in addition to reduced fares, it is possible to assign a button for non-payment or short payment of fare. The farebox can also record up to 48 non-cash fare transactions with System 7 (240 in Genfare Link) known as TTPs (ticket/token/pass). TTPs are used to record noncash fare transactions such as fare cards, tokens, and transfers accepted.

A different fareset may be assigned for each category of service, e.g., local, express, shuttle, etc. Switching faresets is a simple procedure that can be done using the OCU. The fare table is maintained through the data system and updated during probing.

The pending fare table can be programmed to automatically become active and replace the previous fare table at a predetermined time and date. This simplifies implementation of fare changes – the new fare table can be loaded to all fareboxes in advance and activated simultaneously fleetwide.

3.8.20.1 System Diagnostic and Operational Status

The farebox will provide diagnostics in the following manner:

Indicators. Any failure of a major module detected by the farebox, e.g., a jam of the bill or coin validator, will be shown on the OCU driver display and stored as an event record. The farebox is provided with internal indicator lamps to show that the equipment is operational and that voltage is being supplied to key modules.

Automatic Sequence Testing. The farebox can sequentially exercise the coin validator, bill validator, OCU display, passenger display, TRiM and audio transducer to demonstrate proper operation.

Power Supply Monitoring. The farebox reports the number of times input power has gone to zero (0) volts and back to normal (cold start), indicating an intermittent power line, poor ground, or faulty switches. The farebox also reports the number of times the power supply drops to 75% of normal but not to zero (warm start), an indication of a heavy load.

Security Door Alarm. If the cashbox door is open longer than three minutes (programmable), a silent alarm is generated for uploading to the data system the next time the farebox is probed. The alarm indicates the time of occurrence, the length of time the door was open, and the amount of money then in the cashbox.

Cashbox Security Alarm. If the cashbox is out of the farebox for longer than three minutes (programmable) following probing, an alarm is automatically uploaded to the data system the next time the farebox is probed. The alarm indicates the time of occurrence, the length of time between cashbox removal and probing, and the amount of money then in the cashbox.

Cashbox Full Alarm. When either the coin or bill compartments of the cashbox reaches a predetermined percentage of capacity, a message appears on the OCU display and the farebox disables the coin or bill acceptor, as appropriate. The remaining acceptor will continue to function and electronic transactions may continue to be processed. Once the cashbox is extracted, the coin and bill compartment registers are automatically set back to zero.

Preventive Maintenance Report. The farebox logic tracks the operation of farebox modules requiring preventive maintenance. When the number of operating cycles for a given module reaches an agency-programmable threshold, the farebox generates a maintenance alarm. The alarm is transmitted to the data system on probing for use in generating maintenance reports.

Coin/Bill Totals. The farebox logic provides ongoing counts for each type of coin, token, bill, and fare card processed. These counts may be used for audit purposes and as an indicator of the need for periodic maintenance.

3.8.21 Event Records

Genfare fareboxes have the ability to create event records (formerly known as “route/run records”) that provide summary totals of farebox data at important times to facilitate later reporting. Event records can be created automatically – for example, when the route or run number is changed. They may also be entered manually by the driver.

An event record consists of subtotals for all revenue amounts and event tallies accumulated in the data registers since the last event record was created. The record is tagged with the most recently entered route, run, trip, and driver ID numbers. Event records are useful in generating reports of ridership and revenue per trip, per route, etc.

In general, event records are automatically created whenever any of the following events takes place. The records are stamped with a code to indicate the type of event:

- Midnight
- The farebox is placed in bypass
- The farebox is removed from bypass
- The cashbox is removed
- A cashbox is inserted
- The electronic key is used (key number will be saved)
- The cashbox access door has been opened at other than the time of normal data probing
- The cashbox access door has been closed at other than the time of normal data probing
- The farebox is probed
- The farebox internal clock fails
- The route/record memory capacity or transaction/event record capacity is about to overflow
- Changing from one fare table to another

The agency may elect to have a new event record initiated automatically at set intervals based on the real-time clock in the farebox – for example, every hour. This feature may be set via download from the data system. Event records are stamped with hour, minute, second, and date.

3.8.22 Log-On Entry Process

To initiate service, the driver must first log on. This can be accomplished by the CAD/AVL system via J1708/1587, the following describes log-on through the OCU when needed. The driver presses a button to call up the logon screen and enters driver ID, route, run, trip, and so on. The login is time-stamped and stored in memory as an event record, as described above. Log-on data is used to tag all subsequent farebox transactions and events.

New route, run, trip, and driver ID numbers may be entered into farebox memory at any time via the OCU. Drivers may log off by pressing a prescribed sequence of buttons. Logoff occurs automatically when:

- Another driver logs on
- The farebox is probed
- The farebox is inactive for four hours (user-configurable)

Logoff triggers the creation of an event record. After logoff, the operator must re-enter route and driver ID numbers to reactivate the farebox.

3.8.23 Data Probing

The farebox will exchange data with the central office via Wi-Fi and infrared and, if account-based processing is implemented, via cellular probing as described later in this submittal. The infrared port is mounted on the passenger side of the farebox (facing the aisle) to permit easy access by a vault puller/probe operator. The port has guides to assure proper alignment of the data probe. A warble sounds when probing has been successfully completed.

3.8.24 Cashbox

3.8.24.1 Construction

The farebox is provided with a cashbox to secure storage of coins, tokens, and bills accepted for fare payment. When in service the cashbox is locked in the lower portion of the farebox and is protected by a door of substantial construction. The farebox cannot be operated until a cashbox has been properly locked into place.

The cashbox has separate compartments for coins and bills. Separation is maintained during emptying to facilitate counting in the money room. The cashbox is made of 19-gauge stainless steel. The handle is used as part of the mechanism to open and close the cashbox during emptying and folds away when not in use. An auxiliary handle is provided at the bottom of the cashbox to permit a two-handed grip when carrying the cashbox to the vault.

Opening of the cashbox door to remove the cashbox is normally accomplished only through transmission of the appropriate code over the farebox infrared data port. This is normally done during nightly servicing. The cashbox must be closed and locked before it can be removed from the farebox, and remains locked until it is inserted in a vault for emptying. At no point during revenue transfer is the interior of the cashbox or its contents exposed. A high-security key is required to open the cashbox.

The cashbox is of sturdy welded construction with no exposed fasteners and will withstand years of rough usage. A fully loaded cashbox dropped in the upright position to a hard floor and landing on its bottom or bottom corner from a height of 48 inches will continue to operate normally with no breach of security.

A serial number is permanently stamped on the cashbox handle and remains visible through a small aperture in the door when the cashbox is locked into place.

3.8.24.2 Capacity

The tall cashbox (associated with 42" farebox height) can hold and safely transfer to a vault a minimum of \$600 in mixed coins and 750 bills in unfolded "street money" or the equivalent in tickets.

The farebox monitors the quantity of coins and bills inserted in the cashbox. The OCU display notifies the bus operator when either the coin or bill compartments reaches 80% full (programmable). The "cashbox full" indicator remains visible until the farebox is probed and the cashbox is extracted, at which time the revenue registers are automatically reset to zero.

Should coin or bill capacity be reached before the cashbox can be emptied, the farebox notifies the operator via the display and disables the coin or bill acceptor as appropriate. The farebox continues to process other types of fares and displays a message such as "BILLS AND FARECARDS ONLY" on the passenger display.

3.8.25 Electronic Cashbox Identification

The cashbox and farebox are fitted with infrared devices to enable the farebox to monitor the cashbox on a continuous basis and ensure it has been properly inserted and is ready to receive revenue. These devices consist of a cashbox ID transponder in the cashbox and a transceiver in the farebox.

NOTE: Cashbox ID is self-powered – no battery is required. The farebox provides sufficient power through a non-contact method to energize the CBID microprocessor in the cashbox each time the ID is to be sent. This is an improvement over previous technology that required periodic replacement of batteries, a maintenance item.

When energized by the farebox, the cashbox transmitter automatically sends a four (4) digit serial identification number to the farebox, which reads it and stores it in memory for subsequent data transmission. For security, the farebox will not operate if the cashbox ID number is not transmitted at least once every 5 seconds. Infrared technology eliminates the need for electrical contacts, plugs or other physical connections between the farebox and the cashbox. Reading of the cashbox ID number is automatic and requires no action on the part of the driver or vault puller.

The ID is also read when the cashbox is inserted in the vault to be emptied. The exact time is also noted and matched with the time the farebox was removed from the farebox. This provides positive tracking of revenue from farebox to vault and makes it possible to flag suspicious events, such as an unusually long time to empty a cashbox.

3.8.26 Cashbox Door and Electronic Lock

The farebox is provided with a security door. The door is fitted with an electronic lock that permits the door to open when the correct code has been transmitted to the farebox. The code is transmitted only when the wired infrared data probe or the electronic key described below have been interfaced to the farebox data port. If the code matches the code previously stored in the farebox, the cashbox door unlocks and opens, permitting the cashbox to be removed.

Using the data system, it is possible to configure the cashbox door to either open or remain shut following probing. Closing the door and holding it in the closed position for approximately ½ second

causes the electronic lock mechanism to engage the locking pins and secure the door. If the door is slammed, with rebound, the mechanism will not engage.

3.8.27 Electronic Key

Portable electronic key enables authorized personnel to open the cashbox door in the field in special circumstances. Each time the portable electronic key is used, its unique serial number is recorded by the farebox. The number is transmitted to the data system during probing and reported as a "portable electronic key alarm."

The portable electronic key has two major parts, an infrared probe and a belt-mounted unit containing a battery pack and electronics to store the lock code. The probe is metal and connects to the belt-mounted unit by a coiled telephone cord with quick release plugs at each end.

3.8.28 Equipment Construction

3.8.28.1 Mechanical Details

The highest degree of security has been employed in the design and manufacture of the farebox and the cashbox. All exterior surfaces are smooth with rounded corners and will resist corrosion, abrasion, or scratching. There are no exposed or removable fasteners, cracks or pry points. Both the upper and lower parts of the farebox cabinet are made of 14-gauge stainless steel with a satin finish for security and easy cleaning.

The farebox is provided with a top cover made of durable high-density polyurethane to house the cash entry bezels, swipe reader, smart card target, and slot for the optional smart ticket dispenser unit. The lid swings open to allow maintenance access to the farebox interior. The cover is engraved with easy-to-understand graphics showing proper fare media orientation using pad printing technology for high durability. The top lid is secured by a continuous hinge and a high security lock.

The lower part of the farebox houses the cashbox compartment, which has a door attached by a full-length hinge and secured by a four-point locking bar actuated by a high-security lock. When closed, the cashbox door fits flush with the adjacent surfaces.

The bottom of the farebox has a base plate to permit mounting to the bus floor. The substantial construction of this base plate provides lateral stability for the farebox without the need for secondary anchorages. The base plate is affixed to the floor by means of carriage bolts from the interior of the bus, with the washers and nuts on the underside of the floor. The farebox is attached to the base plate by means of heavy bolts accessible only when the cashbox door is open. This design makes it easy to remove the farebox if desired.

3.8.28.2 Ease of Repair

To facilitate diagnosis and replacement of modules, the stainless steel shroud enclosing the upper portion of the farebox may be readily removed once the farebox top cover is open.

The top half of the farebox, which contains the fare acceptance devices and supporting electronics, is fastened to the lower half by four bolts, which are readily accessible to authorized personnel once the

top lid is unlocked. The top half of the farebox is electrically self-docking and does not require the use of manual connectors. The top half of the farebox can be removed and replaced in less than one minute.

The farebox controller board is enclosed in a removable self-docking aluminum cartridge. Card guides are provided to facilitate insertion and removal of the cartridge. It is not necessary to power down the farebox to swap out the controller board. If equipped the TRiM is also electrically self-docking and does not require powering down of the farebox.

The coin validator, bill validator, and swipe card reader are modular in construction, consisting of self-contained units with polarized quick-connect electrical fittings to facilitate removal and replacement.

The coin validator may be removed for inspection within one minute and replaced within two minutes. The bill validator and bill transport may be removed and replaced within one minute. They are constructed of substantial materials for rigidity and are self-aligning. The design of the coin and bill paths is such as to prevent "fishing" of the cashbox when the coin and bill mechanisms are removed.

The farebox connects to the bus power supply using a polarized self-aligning snap-connect plug in the pedestal. A well-marked master disconnect switch (on-off type) is located inside the farebox. A standard automotive-type fuse is used to protect farebox electrical components.

All onboard equipment has a mean time to repair of 10 minutes, where repair is defined as diagnosis, removal and replacement of major components and restoration of the farebox to working order. (Bench repair of the defective component is not included in mean time to repair.) All major modules, are marked with uniquely serialized bar code labels to facilitate parts tracking.

3.8.28.3 Mechanical Locks and Keys

All locks and keys used on the farebox are of the high security type. The cashbox uses a MIWA rare earth magnetic lock. The key does not resemble a common house key in appearance – it does not use mechanical tumblers but rather relies on the precise alignment of opposing magnetic forces to permit the cashbox to be unlocked. The keys are captive to the farebox and receiver and cannot be removed without damage. Genfare manufactures the keys using magnets provided by MIWA, and only Genfare can duplicate them. Replacement keys are shipped only to duly authorized agency personnel. A high security Medeco key is used for the farebox top lid.

3.9 REVENUE COLLECTION AND GARAGE PROBING SYSTEM

Genfare has predicated its pricing on refurbishment of the existing vaults and probing equipment at Palm Tran garages rather than full replacement. Refurbishment will consist of:

- Replacing the current cashbox receivers with new ones. The new receivers are identical to the old except for the enhancements describe below.
- Replacing the existing handheld infrared data probes and cashbox ID computer. Existing cabling will be retained.
- For security, replacing the magnetic keys used to unlock the cashbox with new keys having a different combination.

The new receivers will incorporate the following improvements:

- *Self-powered cashbox ID.* The new receivers will be equipped with a self-powered electronic cashbox identification (CBID) system that does not require the use of batteries, reducing the need for maintenance.
- *Electronic timer.* In contrast to previous generation receivers, which used vacuum-based timers, the receivers to be supplied for this procurement use an electronic timer to control the minimum amount of time the cashbox receiver remains in the “emptying” position to ensure complete discharge of revenue. The electronic timer allows precise control and does not need to be adjusted based on weather conditions as with the vacuum timer.

Refurbishment offers several advantages:

- Lower cost than full replacement. Replacing only the receiver and controller represents significant saving, the rest of the equipment can be retained and will provide many years of additional service.
- Quicker installation and less disruption to agency operations during the transition. Replacement of the entire vault system – for example, if another vendor were selected – would be a major project involving modification of agency facilities. In contrast, we can simply unbolt the old receivers and replace them with new ones. This is unique advantage of the Genfare solution.

3.9.1 Garage Data Probing Process

As described elsewhere in this submittal, most data exchange between the farebox and central system will be conducted via the onboard cellular router while the bus is en route. Any residual data transfer, and transmission of the cashbox lock code, will be done upon the bus’s return to the garage for servicing at the end of the day.

For this purpose we propose our service-proven dual probing methodology, which combines the speed of Wi-Fi with the security of infrared. Most elements of the system are familiar to the agency but all are described below for clarity:

- *Dual infrared/Wi-Fi probing* when the vehicle is at the garage. The dual probing system consist of (a) an upgraded version of the wired infrared data probe currently used at Palm Tran and (b) a wireless probing subsystem consisting of a Wi-Fi antenna and related electronics on the farebox plus an agency-provided wireless LAN at the garage.
- *Garage computer.* When the vehicle returns to the depot at the end of the day, the garage computer uses the dual probing system to extract accumulated transaction and event data from the farebox and download the current configuration parameters, including the fare table and bad list.
- *Network manager,* a server implemented on local hardware at the agency’s central office. If desired, this can be installed in a virtual machine (VM) environment. The garage computer forwards farebox data to the network manager, which consolidates it into a database. The network manager provides all tools needed to generate reports and administer the fare collection system.

Dual probing works in the following manner:

- At the end of the day, the vehicle returns to the garage. When the farebox comes within range of the wireless LAN, the farebox and data system engage in handshaking and mutual authentication. The farebox then transmits transactions and events accumulated since the last probing.
- When the bus arrives at the vaulting lane, the vault puller enters the bus with the infrared data probe and positions it at the farebox data port. After handshaking, data is exchanged through the IR probe at a maximum rate of 230 kbps. When IR data transfer is completed the farebox security door opens, allowing the cashbox to be removed for vaulting. IR probing is done independently of wireless probing.
- The farebox uses IR to upload the master list (cumulative farebox totals since last probing) and route/run records (subtotals for route, run, trip, etc.) to the data system, and wireless to upload individual transaction and event records. The data system uses IR to download the fare table, configuration parameters, and time/date to the farebox.
- Once IR transfer is complete, the data system sends the farebox an electronic code via the IR probe that causes the cashbox door to unlock. The vault puller opens the cashbox door, removes and empties the cashbox in the vault, then returns the cashbox to the farebox and locks the door. The bus is then driven away from the service island and parked.
- The data system does not require wireless probing to be complete before sending the code to unlock the cashbox door. If necessary, wireless probing can be concluded while the bus is at the fueling island or parked in the yard. Once the data system determines that all wireless data has been received, it tells the farebox to shut off its wireless module to reduce traffic on the network. The farebox activates the module periodically thereafter to determine if the data system has additional information to download, e.g., a new fare table.

Vaulted revenue is counted and deposited in the bank. Using the data system, authorized agency staff may generate reports comparing the revenue total reported by the farebox with the amount as determined by money room count to permit investigation of discrepancies. Headquarters personnel may also generate ridership and revenue reports and query the transactional database.

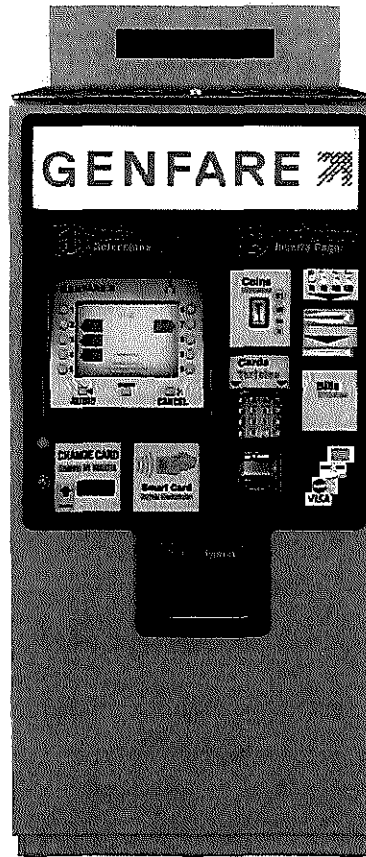
3.10 VENDSTAR-4 TICKET VENDING MACHINE

To meet the County's requirement for a full-service ticket vending machine, Genfare offers its Vendstar-4 ticket vending machine, which was designed to meet the needs of agencies seeking a cost-effective means of selling electronic fare media. The Vendstar-4 TVM is a full-service unit capable of accepting payment in the form of cash (U.S. coins and bills) and bank (credit or debit) cards. It issues coins and bills as change using a recirculating coin mechanism and a bill recycler. It can be equipped with two supplementary coin hoppers to extend the time between service visits. The Vendstar-4 can be equipped with up to three ticket dispensers capable of issuing limited-use smart cards, extended-use (30-mil plastic) smart cards, or a combination of the two.

3.10.1 Overview

The Vendstar TVM can be installed in any location suitable for self-service vending equipment, including indoor and outdoor locations, on or off agency property. The unit was designed with the following principles in mind:

- *Flexibility.* The Vendstar's modular design and exterior "punchout" faceplate make it easy to add functionality as agency needs evolve following initial installation. If fewer than the full complement of ticket dispensers is installed initially, more can be added later if additional capacity, redundancy, or types of card stock are desired.
- *Security.* The cabinet is made of heavy-gauge stainless steel plate with a multi-catch latching door and is highly resistant to assault. A high-decibel alarm sounds if proper ID is not entered upon opening of the TVM door. In the Vendstar-4, independent keying permits separation of revenue service and maintenance functions. All removal and/or insertion of modules is electronically logged and reported to the central data system for audit and accountability.
- *Long-term spare parts availability.* As a standard Genfare product (i.e., not designed for a particular agency or procurement), the Vendstar benefits from Genfare's well-known commitment to long-term product support. Key modules such as the magnetic ticket reader/issuer machine (TRiM) are manufactured by Genfare and are substantially the same as those used in Genfare fareboxes. OEM fare acceptance modules such as the coin acceptor and bill acceptor are made by well-established companies.
- *Easy maintainability.* All modules are plug-connected and can be replaced in minutes, in most cases without the use of tools. Modules are electronically self-registering to eliminate mix-ups. Major modules (ticket processing units, electronic control unit, coin acceptor, coin hoppers, bill acceptor) slide out on heavy-duty rails or shelves for ease of access. Diagnostic routines permit quick determination of system health. Supplementary coin hoppers lengthen the interval between revenue service visits.



Vendstar-4

The Vendstar offers the following features and capabilities:

- Compact cabinet – 72" tall x 31" wide x 21" deep
- Logically laid-out, easy-to-understand passenger interfaces, with screen graphics, audio instructions, and easy-to-upgrade external graphics
- Enhanced 10.75" diagonal color LCD passenger display, visible in high ambient light including direct sunlight with 10 selection buttons and three function buttons
- Bill handling system – accepts and validates \$1, \$2, \$5, \$10, \$20 and optionally \$50. Escrow accepts up to 15 bills for return if transaction cancelled. Cashbox neatly stacks up to 1,400 bills – simplifies handling in the money room. Bill recycler allows \$1 and \$5 bills to be issued as change.
- Coin handling system – accepts 5¢, 10¢, 25¢, and \$1 coins; dispenses 5¢, 10¢, 25¢, and \$1 coins as change; recirculates 5¢, 10¢, and 25¢ coins for subsequent use as change or coin return. Two supplementary coin hoppers are also furnished to provide additional change-making capability.
- Smart card processor
- Bank card reader and PIN pad to permit acceptance of credit and debit cards.
- Receipt printer for bank card transactions, audit tickets, and local reports
- Electronic control unit to monitor and control all aspects of operation
- Data transmission via modem or network connection
- Heavy-duty monocoque (one-piece) cabinet with sloping top
- ADA compliant. All controls are wheelchair-accessible via side reach. All labels are provided with raised letters and Braille equivalents. Ten function keys are numbered 1 through 0
- Uninterruptible power supply (UPS) to enable a transaction in progress to be completed if external AC power is lost
- Alarm module to detect and report access and excessive shock and vibration.

The Vendstar can:

- Accept major debit/credit cards using bank card processing module with encrypted keypad
- Issue both limited-use (paper) and reloadable (plastic) smart cards
- Interface with the customer via:
 - 10 ATM-style selection keys adjacent to a high-visibility 10.75" diagonal color LCD display plus three buttons for AUDIO, LANGUAGE, and CANCEL
 - Easy-to-read graphics and labels with Braille equivalents
 - 12-button ADA-compliant encrypting keypad for debit card PIN entry
 - Customer-selectable audio instructions with socket for optional headphone use.
- Continue operation despite failure of a fare acceptance module
- Store cumulative data on all transactions as well as individual transaction detail for uploading to the data system
- Transmit alarms to the central office in real time via customer-provided network
- Go in or out of service in response to central office command.

The TVM is operated and controlled by an internal microprocessor-based controller and is provided with all necessary software. In normal operation, the TVM is continuously online with a central data system called the Vendstar Information Processor (VIP). All TVM transactions and events are reported in real time to the VIP, which provides centralized monitoring and control of all field units, including the Vendstar-4 and Vendstar-e. See Sec. 3.10.17 for details on the VIP.

Genfare will deliver and install the TVMs and provide all testing, parts, and other necessities to make the equipment ready for service. Genfare will provide parts and support for a minimum of 15 years.

3.10.2 Options

Numerous optional capabilities are available for the Vendstar-4. Our base bid assumes the following but we are happy to amend it following discussion with the agency:

- Standard bill validator (bill recycling unit is available as an option)
- Three ticket dispensers, which may be any combination of the following:
 - Magnetic ticket reader issuer machine (TRiM)
 - LUM bar-coded card dispenser
 - PSCD 30-mil plastic smart card dispenser
- Door-mounted security camera
- Washlight with scrolling display.

3.10.3 Environmental Requirements

The Vendstar is designed to prevent ingress of water and other liquids under normal circumstances, including floor cleaning. Water entering the machine via fare acceptance apertures drains to the exterior. The machine will operate satisfactorily under the following conditions:

- Ambient temperature: 4 degrees F (with heater) to 115 degrees F
- Relative humidity of 10-90% (non-condensing).

3.10.4 Site Requirements

The TVM is intended for installation, indoors or outdoors, on a level floor surface capable of supporting a load of not less than 20 pounds per square inch. Genfare will inspect locations proposed for TVM installation and advise the agency of any required site modifications prior to installation. The agency is responsible for the indicated modifications. The TVM must be positioned so that doors can open fully, providing unimpeded access to the TVM interior. The agency must provide 120 VAC and communications capability, which may be via copper wire or fiber-optic based Ethernet or cellular modem. If desired, multiple TVMs can be positioned side-by-side or back-to back.

The TVM is provided with surge protection and can withstand short duration voltage spikes, including lightning strikes, provided the machine is properly installed and grounded. In extreme cases a surge would trip the overvoltage protection devices, preventing more extensive damage.

The TVM operates on 115 VAC input power, 15 amperes maximum without heater, 30 amps with heater (required for outdoor operation). The TVM is provided with internal power supplies to furnish each component with the voltage required for proper operation.

Power and data communications hookups to the TVM can be provided in a variety of ways, depending on the configuration of a particular site. The preferred installation is one in which the power hookup is concealed, entering either from below or to the rear via conduit. Separate conduits are required for data and AC power.

The TVM is designed to prevent radiation of radio and electrical signals to external equipment and will not affect operation of other equipment (public address, patron information signs, etc. TVM conforms to FCC emission limits (Part 15).

A main disconnect switch, circuit breaker, and 115 VAC convenience outlet are provided within the TVM cabinet.

The TVM is provided with an uninterruptible power supply (UPS) capable of providing sufficient power to complete a transaction in progress in the event of external 120 VAC power loss. The UPS is a modular OEM unit. When external power is restored following an interruption, the TVM automatically reboots and returns to service without manual intervention.

3.10.5 Patron Interface

An advantage of the Vendstar is its easy-to-understand patron interfaces. Using it is as simple as 1-2-3 – see illustration.

Elements of the Vendstar passenger interface include the following:

- Full-color 10.75" passenger display, legible in direct sunlight
- Display keypad consisting of 10 dynamically programmable function keys and three special function keys (LANGUAGE, AUDIO, and CANCEL)
- Coin entry slot
- Separate bill insertion and bill return slots
- Bank card reader and PIN keypad
- Smart card processor
- Dispensing cup for tickets, receipts, and change.

A vending transaction consists of three steps, clearly marked on the TVM's front panel:

1. **SELECT.** The passenger selects from a menu of choices on the passenger display using the adjacent function keys. Subsidiary screens permit the passenger to choose various options, e.g., buying multiple tickets as part of one transaction.
2. **INSERT.** The passenger inserts cash or a bank card.
3. **TAKE.** The passenger retrieves ticket(s) and receipt as appropriate from the dispensing cup.

3.10.5.1 Passenger Display

The ticket vending machine uses a flat-panel LCD color display with a diagonal measurement of 10.75". This display shows idle messages, transaction choices, machine status and current transaction status. The display has the following characteristics:



Vendstar patron interfaces

- Format – SVGA (800x600), 4:3 aspect ratio, 6-bit color
- Technology – advanced TFT – LED backlit with transreflective filter.

The display is positioned approximately 42” off the floor (to bottom edge) on the left side of the cabinet front for ease of viewing during transactions. A one-quarter inch thick polycarbonate window protects the display. A quarter-inch gap is provided between the polycarbonate window and the display to permit the former to deflect and protect the latter from damage in the event of impact.

The passenger display is designed to remain readable in high ambient light including direct sunlight. To further enhance readability, the display is tilted toward the viewer and partially recessed within the TVM cabinet, reducing glare. Nonetheless, in designing the facilities in which the TVMs are to be installed, reasonable precautions should be taken to minimize direct sunlight.

3.10.5.2 Passenger Keypad

The display is provided with 13 buttons for passenger input. Ten selection buttons numbered 1 through 0 are provided, five on each side of the screen. Electronic “labels” for the function buttons are shown on the screen and vary depending on the function to be performed. Three additional buttons are provided beneath the display labeled as follows:

- LANGUAGE. If multilingual capability is enabled, pressing this button switches the passenger display text from English to Spanish. Additional languages are optionally available.
- AUDIO. Provides audible instructions in addition to the on-screen displays as an aid to the visually impaired. Audio instructions issue from a concealed speaker mounted immediately above the passenger display. For passengers desiring privacy, a socket for a headphone jack is provided adjacent to the speaker. A volume control is provided to enable users to adjust the audio as desired. If LANGUAGE and AUDIO are both pressed the spoken instructions will be in Spanish.
- CANCEL. Cancels the transaction in progress if ticket printing has not yet started.

Buttons are circular, $\frac{3}{4}$ ” in diameter. All buttons provide tactile feedback and are protected by sealed silicone rubber membranes to deter intrusion of liquids.

3.10.5.3 Bank Card Processor Interface

A bank card processor is provided, consisting of a swipe magnetic card reader, an insertion reader for EMV chip cards, and a 16-button encrypted keypad for entry of PINs and other verification input. The keypad supports DUKPT. A raised dot is provided on the keypad’s “5” key to aid the visually impaired.

3.10.5.4 Bill Slot

The bill insertion slot is located 47½” above the floor. A shutter is provided to prevent insertion of bills under certain conditions, e.g., when a bank card transaction is in progress. The bill insertion slot provides a small landing platform to facilitate insertion of bills. An indicator light is provided to show when to insert bills. A green indication means that bills can be inserted; a red indication means that bills should not be inserted.

3.10.5.5 Coin Slot

The coin entrance slot is positioned approximately 48” inches from the floor. Oriented vertically, the width of the slot is less than that of two stacked dimes, the thinnest U.S. coin. This prevents two coins from being inserted simultaneously, eliminating a major cause of jams. The coin slot is sized so as not to permit insertion of any coin larger than a post-1978 dollar coin (no half-dollar coins). In the rare event a jam occurs, an automatic detector activates a solenoid that widens the coin validator “clamshell” and allows stuck coins to enter the reject chute and slide into the coin cup.

The coin acceptor does not escrow inserted coins. If a transaction is canceled, coins of like value (but not the same coins) are returned. If a \$1 coin is inserted into a TVM and the transaction is canceled, a dollar coin is returned from a supplemental coin hopper.

The coin slot is equipped with a solenoid-operated pin to prevent insertion of coins when cash acceptance is not enabled.

3.10.5.6 Dispensing Cup

An internally illuminated dispensing cup is provided on the front of the TVM for the dispensing of tickets and receipts. The cup is illuminated when a card, ticket, receipt or coin is directed to it. It has a clear polycarbonate plastic top-hinged door, which, when pushed to the open position, forms a seal to any of the ticket or coin chutes. The cup is made of stainless steel and has an external drain connection for any water accumulation.

3.10.5.7 ADA Compliance

The TVM is compliant with the requirements of the Americans with Disabilities Act (ADA), as follows:

- *Insertion and Controls* – All slots, bezels, pushbuttons and dispensing bins requiring manual manipulation are positioned between 18 inches and 48 inches from the floor.
- *Graphics* – TVM graphics are printed in color on .007-inch clear Lexan polycarbonate and affixed to their backing by full-area high-yield adhesive. The graphics make use of symbols where possible and have ADA Braille raised character equivalents for all words provided.
- *Audio* – It is possible for a patron to press a button to hear spoken instructions. Audio is provided in English and Spanish.

3.10.5.8 Instructional Graphics

Easy-to-understand passenger interfaces are provided on all Genfare fare collection products. The Vendstar features clear, intuitive organization of passenger controls, as follows:

- Controls are divided into three logical groupings, each color-coded and identified with a prominent one-word label and number, indicating the order of steps to be followed:
 1. **SELECT** – This consists of the passenger display and adjacent function buttons. Because the display is in color and can cycle through a series of messages when idle, the eye is drawn to it first.

2. INSERT – Having made a selection, the passenger then inserts cash or bank card
 3. TAKE – Tickets and receipts drop into the dispensing cup, where they may be retrieved by the passenger.
- Each group of controls is visually framed by the TVM’s black ABS plastic faceplate, which contrasts with the TVM’s stainless steel cabinet and the bezels of the fare acceptance modules.
 - Each grouping is further differentiated by the use of distinctive color coding for the bezels around each module.
 - The groups are organized so that the patron’s attention is drawn in a natural manner, starting at eye height and moving clockwise and down. The SELECT functions are at top left, the INSERT functions are at top right, and the TAKE function is at bottom center.
 - The passenger display and fare acceptance bezels each feature easy-to-follow instructional graphics or simple words:
 - Passenger display – LANGUAGE, AUDIO, CANCEL
 - Bill acceptor – graphic of bills showing accepted denominations
 - Bank card acceptor – logos of acceptable cards, graphic showing insertion orientation
 - Coin acceptor – graphic of accepted denominations of coins
 - All controls are marked with Braille.

3.10.5.9 Audible Tones

The TVM is provided with a speaker mounted above the passenger display. This speaker emits audio feedback (a “blip” – very short beep) to indicate a valid key has been pressed. Other sounds can be programmed as desired. The speaker also provides audio instructions when the AUDIO button is pressed.

3.10.5.10 Multilingual Capabilities

As indicated, the Vendstar offer multilingual capability, which is invoked using the LANGUAGE button beneath the passenger display. Pressing this button switches the passenger display text to Spanish; pressing it again reverts to English, or, if optional additional languages are enabled, cycles through the available languages. Standard languages are English and Spanish. If the passenger presses the LANGUAGE button while the transaction is in progress, the TVM switches languages in mid-transaction.

3.10.5.11 Voice Instructions

Upon pressing the AUDIO beneath the passenger display, synthesized voice instructions are played back through the TVM speaker. As with the LANGUAGE button, the AUDIO button can be pressed at any time during the transaction. The audio instructions are context-sensitive and take into account that visually impaired passengers need more detailed instructions, comparable to what would be provided on a telephone-based voice response system. (“The keys next to the display screen are labeled 1 through 10. Press key 1 to select a 5-day pass for five dollars,” etc.)

3.10.5.12 In Service/Out of Service Indicator

In normal operation, the passenger display will cycle through one or more idle messages, indicating that the TVM is ready for operation. In limited mode operation, the display will provide an appropriate message such as BILLS ONLY. If the TVM is unable to perform transactions but the display remains functional, the display will show OUT OF SERVICE – COME BACK LATER.

3.10.5.13 Information Signage Holder

An information signage holder measuring approximately 7½" tall by 28½" wide is provided on the front panel of the Vendstar-4 above the faceplate. A conventionally printed sign may be inserted into the holder by authorized personnel when the TVM door is open. The sign is protected by a clear Lexan polycarbonate panel secured by a metal frame, suitably sealed. It is possible to gain access to the panel and change the sign only when the TVM door is open. Signage is provided by customer.

3.10.6 Cabinet Construction

3.10.6.1 General

The Vendstar cabinet has two main parts:

- The main enclosure, which houses the TVM's internal components, and
- The front outer door, which contains all passenger interfaces and provides access to internal components for servicing.

All corners of the cabinet are rounded; no externally visible fasteners are used. The only access to the machine interior is through the outer door. The top of the cabinet slopes to the rear to shed moisture.

The cabinet is of monocoque design, consisting of a single steel weldment without seams or interior framing. This makes for economical fabrication and high security by reducing the number of possible pry points. The Vendstar cabinet is made of heavy gauge stainless steel with an orbital finish to resist corrosion.

The Vendstar's cabinet door is attached with an external full-length stainless steel hinge for maximum security. The outer door is secured with a four-point locking bar made of ¼"-steel stock operated by a T-handle. A labyrinth seal is provided around the three openable sides of the door to deter prying. Once open, the door is secured with a latching mechanism that holds it open at a 120 degree angle during servicing. When the door is closed and locked, it is not possible to view the TVM's internal components or insert objects into gaps between the door and cabinet. The Vendstar-4 weighs approximately 750 pounds with all components installed.

The Vendstar employs modular construction techniques. All major subsystems are self-contained and capable of being quickly and easily removed and replaced in the field without the use of tools. Support shelves on telescopic slides are provided to permit access to the ticket modules and cash accepting modules. Blank plates are provided to conceal openings when door-mounted modules are omitted from a particular TVM. Notwithstanding the configuration of modules in a given TVM, wiring for the full complement of modules is provided in all TVMs so that no additional wiring is required if modules are

added subsequent to initial installation. All cables are terminated with polarized connectors. Different types of connectors and minimal slack in the harness minimize the possibility of cabling errors.

3.10.6.2 Faceplate

All passenger interfaces are mounted in a faceplate frame of high-durability black ABS plastic that is installed on the TVM’s outer door. The frame has recesses into which plastic decals are fitted to identify modules and provide instructions for use. The faceplate offers numerous advantages:

- Visually organizes passenger interfaces, as previously described.
- Easy to maintain. The black matte surface hides fingerprints, scratches, and smudges. If desired, gouges can be quickly rubbed out with steel wool. Most buttons and bezels are recessed behind the plane of the faceplate, making them less likely to snag passengers’ belongings or become damaged.
- Supports modular design. If a module is unneeded in a particular machine, a blank filler plate can be easily and securely installed to conceal the opening in the face plate.
- Secure. The high-impact phenolic plastic openings are backed with 1/8” steel. The faceplate is strongly resistant to forced entry.
- Flexible. Passenger instruction decals are applied to the module bezels that fit within the faceplate frame. If a decal must be replaced, the module can simply be swapped out rather than having to change the decal in the field. Edges of decals are concealed by the faceplate frame, making them less susceptible to peeling.

3.10.6.3 Marquee Lighting Module

A marquee lighting module is provided to illuminate the front panel of the TVM as well as the interior of the TVM when the outer door is open. The module is mounted at the top of the front panel above the door. The marquee module can be provided with either a backlit sign or, as an extra-cost option, a scrolling high-intensity LED display (e.g., “Purchase passes here”). Backlighting is provided using LED lamps, which also provide wash light (downlighting) to illuminate the Vendstar’s front panel. Wash lighting also provides substantial light to the interior of the machine when the outer door is open, facilitating maintenance and revenue service. If equipped for a backlit sign, e.g., “TICKETS,” the display provides a framed opening protected by 1/8” Lexan. The sign can readily be removed and replaced when the cabinet door is open. The marquee lighting module protrudes from the front surface about three inches, bringing the maximum depth of the machine to 21 inches. Built of the same rugged materials as the TVM cabinet, the marquee display is weatherproof and will not admit dust, insects, etc. Note that the washlight is on at all times; this reduces complexity and entails minimal power draw.

3.10.7 Security

3.10.7.1 General

The Vendstar is protected against vandalism and burglary in the following manner:

- The seamless monocoque design and substantial construction of 1/8” stainless steel plate are strongly resistant to burglary tools. There are no gaps or seams wider than 0.05 inches.

- The multipoint locking bar that latches the TVM front door shut is made of heavy ¼" steel stock. The locking bar secures the door at the top, bottom, and side.
- No external fasteners are used. All modules are held in place with internal fasteners that are concealed when the TVM front door is closed.
- External locks and related hardware are drill resistant and flush-mounted.
- The passenger display is protected by a ¼" UV-resistant polycarbonate plastic shield with a ¼" gap between shield and display to enable the shield to flex and avoid damaging the display in the event of a blow. The shield is independent of the display and can be easily replaced.
- The TVM is equipped with an alarm system.
- The stainless steel cabinet with orbital finish makes it easy to clean off graffiti.
- Decals with instructional graphics can easily replace if damaged. The edges and corners of the decals are concealed behind the black phenolic faceplate, making it more difficult to pull the decals off.

3.10.7.2 Locks

The TVM front door is secured by a high security Medeco lock, which controls the access port for insertion of the T-handle tool. The T-handle tool operates the locking bars that secure the door to the enclosure on the top, bottom and sides. The door hinge is continuous and has a pin cap to prevent removal of the hinge pin. The locking mechanism engages a door switch which is activated whenever the door is unlocked.

Interior locks are provided for the following purposes:

- Keyswitch to silence the alarm
- To lock all ticket tekpaks in place on shelf
- To lock coin tekpak in place
- To lock coin cashbox in place
- To lock the bill tekpak in place
- To lock the bill tekpak cashbox in place
- To lock the supplemental coin hoppers in place.

In addition, the following modules also have their own individual locks:

- Card cassette to secure cassette door
- Coin tekpak to secure coin mechanism within enclosure
- Coin cashbox to secure cover
- Bill tekpak cashbox to secure cover.

Multiple types of keys and locks are used in the Vendstar to provide maintenance technicians, revenue service personnel, and counting room personnel with the level of access appropriate to their jobs. All keys of a given type are keyed alike. All keys are of the high-security type (pick-resistant, multi-tumbler, and not readily duplicated).

3.10.7.3 Alarm

An internal alarm is provided and connected to a switch on the door locking bar. When the bar is opened the alarm circuit is activated. The proper user ID and password must be entered within 30 seconds of opening to prevent the alarm from sounding. Alternatively, a key may be inserted in the alarm keyswitch. This key remains in the switch while the TVM is being serviced. When the key is removed, the TVM must be locked within 30 seconds to prevent the alarm from sounding.

3.10.7.4 Opening the TVM Front Door

Opening the front door of the Genfare TVM involves the following steps:

- A key is inserted into the high-security Medeco lock on the door and turned, opening a steel access port.
- A “T” handle actuator is inserted into the access port and turned 90 degrees. This motion moves the locking bars to the “open” position. This action also starts the internal alarm timer.
- The individual opening the door then has 30 seconds to enter an authorized ID number and a PIN in order to halt the alarm countdown. The ID and PIN are entered manually using the 10 buttons on the front panel.
- The TVM logic checks the ID and PIN against a list of authorized ID and PIN numbers previously downloaded from the central office. If the entered ID and PIN are not on the list, the alarm countdown continues.
- If a valid ID and PIN have not been entered by the time the alarm countdown ends, the alarm sounds and an “unauthorized entry” alarm is sent immediately to the central office.
- All IDs and PINs entered into the TVM are date- and time-stamped and recorded in memory for uploading to the data system, along with an authorized/unauthorized indication.
- The TVM internal alarm module is equipped with a keyswitch to permit manual silencing of the alarm, plus an unlabeled “silent alarm” button that may be pressed after the door is opened. Pressing this switch does not sound an audible alarm locally but rather sends an immediate silent alarm to the central office indicating that assistance is required.

3.10.7.5 Alarm Processing

The Vendstar TVM generates two types of alarms, security alarms and maintenance alarms. It also generates status information.

The following security alarms are sent immediately to the VIP data system. Once received by the VIP, the alarm is then forwarded to designated agency cell phones via text message – it is not necessary for someone to be looking at a computer screen to get the alarm message:

- Unauthorized entry
- Shock and/or vibration sensor activated
- Silent alarm button pressed

- Excessive internal temperature.

The following alarms relate to operational issues and are sent by the TVM during the normal polling process, which typically is less than 5 minutes after occurrence. Note that the TVM sends warnings of impending events before they become critical, e.g., low ticket stock, cashbox almost full:

- Ticket dispenser #1, #2 or #3 low
- Ticket dispenser #1, #2 or #3 empty.
- Coin cashbox 90% full
- Coin cashbox full
- Bill stacker cashbox 90% full
- Bill stacker cashbox full.

3.10.8 Bill Acceptance

As an option, Genfare can provide a recycling bill acceptance unit capable of validating and securely storing U.S. paper currency and recirculating \$1 and \$5 bills as change when needed in subsequent transactions. The bill acceptor, recycling mechanism and stacking bill cashbox are locked into a self-contained bill tekpak. The bill recycler means TVM revenue service visits can be less frequent, reducing maintenance costs.

The TVM accepts valid \$1, \$2, \$5, \$10, and \$20 bills in any one of four orientations: face up or face down, either end first. The acceptance rate is not less than 95% on first insertion of a valid machine-readable bill.

The bill tekpak has a 15-bill internal escrow. Inserted \$1 and \$5 bills are stored in a special cache. When a transaction involving paper currency is successfully completed, \$1 and \$5 bills remain in the cache and all other denominations are deposited in the cashbox. If the transaction is canceled, all escrowed bills are returned. Bill storage has a nominal capacity of 1,400 bills. Accepted bills are not exposed during the revenue transfer process.

The bill tekpak will accept both new and old-style bills. The bill validator is capable of being upgraded to accept future bill designs. Upgrades for designs introduced after the expiration of the warranty period are provided at additional cost unless a service agreement is in place.

Access to the bill tekpak requires opening of the TVM front door. The bill tekpak is removable under secure conditions without the use of tools. The tekpak is mounted on telescopic slides to permit easy access for maintenance.

It is possible to open the tekpak to clear a bill jam without removing the tekpak from the TVM. Access for jam clearing does not provide access to bill storage.

3.10.8.1 Bill Acceptance/Rejection Criteria

Bill validation is based on optical and magnetic sensing of both sides of the bill, the size of the bill, and the magnetic signature of the ink used on currency. The bill validator can accept:

- New, clean, old, worn, damp, or dirty bills within reasonable limits
- Bills that have been folded or crumpled, then flattened out.

The bill validator may reject:

- Bills with torn corners, one side of which corner exceeds $\frac{3}{4}$ " in length.
- Bill with sticky substances on them
- Bills with longitudinal tears exceeding one quarter of bill length or crosswise tears exceeding one half of bill width
- Bills with holes
- Bills with staples or other attached items
- Bills with excessive pen, pencil, or marker lines.

Bill Acceptance Rate. The bill validator accepts 96% of valid bills on first insertion and 98% on second insertion. All counterfeits, photocopies and other duplicates, foreign bills, foreign matter, and valid bills of unacceptable denomination are rejected.

Bill Accuracy. The bill validator identifies acceptable bills with 99.99% accuracy.

3.10.8.2 Bill Cashbox

The bill validator is provided with a stacking cashbox separate from the coin cashbox. Upon completion of a transaction, the bills are transported to the cashbox, where they are placed in a stack held in position by a spring-mounted plate.

Controlled stacking of bills helps to speed bill processing in the counting room. A "two cashbox" approach is used when servicing the Vendstar – the full cashbox is replaced with an empty one and then taken to the money room for emptying.

The bill cashbox cannot be removed from the TVM except when closed and locked. It is not possible to gain access to the interior of the cashbox when it is installed in the TVM. The cashbox has a handle that can comfortably accommodate a gloved hand.

The bill cashbox has a capacity of 1,400 bills. The TVM tracks the number of bills entering the cashbox and generates an alarm when the bill cashbox reaches an "almost full" condition (default 90% of capacity). When the cashbox is full, the TVM will switch to "no bills accepted" mode.

3.10.8.3 Bill Jams

When a bill jam is detected, the bill acceptor automatically attempts to clear it by reversing the transport mechanism. If this fails to clear the jam, the TVM switches to "bank cards only" mode.

3.10.9 Coin Acceptance

3.10.9.1 Coin Tekpak

The TVM is provided with a removable, self-docking, enclosed and locked coin acceptance module ("coin tekpak") which contains a coin validator and recirculating coin storage compartments to provide coins for return and for change for transactions.

The coin tekpak is inserted into guides in the TVM for electrical and mechanical connections. The enclosure has a locked cover to secure access to the coins and an easy-grip handle for carrying. A self-

docking electrical connector is provided for electrical power and data communications. The serial number of the coin tekpak is transmitted to the TVM logic by means of this connector.

The coin validator accepts the following coins: nickel (\$.05), dime (\$.10), quarter (\$.25), and post-1978 one dollar coins (\$1). The TVM does not accept pennies (\$.01), half dollars (\$.50), foreign or bogus coins, tokens or Eisenhower dollars.

3.10.9.2 Coin Cashbox

A coin cashbox with a locked cover is provided to collect all coins not directed to the coin tekpak hoppers. It is locked in place and has an entry aperture that is closed and locked as a condition of removal from the TVM. The cashbox has a nominal capacity of 300 cubic inches and will hold approximately \$1,000 in mixed coins. The cashbox provides the TVM logic with the cashbox ID only when it is locked in place and ready to receive coins.

When the cashbox is inserted into the TVM, a magnetic key automatically engages a lock at the rear of the cashbox. The revenue service technician then inserts a key in a separate lock in the front of the cashbox and turns it. Only when both keys are engaged can the cashbox be opened, permitting it to accept coins. It is not possible to access the coins in the coin cashbox when it is properly installed in the TVM. The cashbox is made of steel and is designed to withstand rough service. It will not open or become inoperative if dropped from a height of three feet onto a concrete floor. The coin cashbox has a handle that will comfortably fit a gloved hand. Once in the money room, the coin cashbox access lid may be opened using a separate Medeco key. The coin cashbox is provided with an electronic ID device that automatically identifies itself to the electronic control unit upon insertion into the TVM.

The TVM tracks the coins entering the cashbox. When the quantity of coins reaches a predetermined value for “nearly full” and “full,” maintenance alarms are generated. When the cashbox becomes full, the TVM switches to exact-fare mode, but continues to dispense change for bill transactions.

3.10.9.3 Coin Jams

The TVM has sensors to identify a coin going into and out of the coin verification section of the tekpak. If a coin goes in and does not come out, a “jam” is determined to have occurred and a solenoid automatically opens the coin mechanism, allowing the jammed coin to fall into the coin return cup.

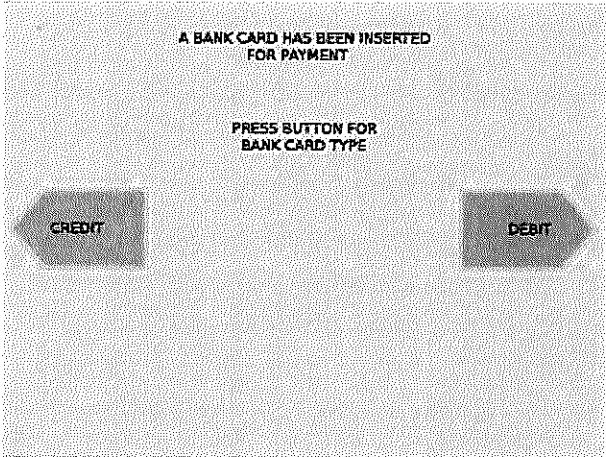
The coin system is designed to permit quick inspection and clearing of jams by maintenance or revenue service personnel if unjamming using the coin release is unsuccessful. Coin channels and guideways use an open design that permits the location of a jam to be easily ascertained. Channels and guideways can be readily removed by authorized personnel to facilitate clearing.

3.10.9.4 Supplemental Coin Hoppers

If desired, supplemental coin hoppers dispensing dollar coins and quarters can be optionally provided to augment the change provided by the coin tekpak.

3.10.10 Bank Cards

The Vendstar is provided with a bank card module that can accept credit or debit cards for payment. The bank card module has a swipe magnetic bank card reader, an insertion reader for EMV-type contact chip cards, a PIN pad and an LCD display.



Typical bank card acceptance screen

The Vendstar screen prompts the user through the steps of paying with a bank card. The rider selects the ticket(s) to be purchased and the TVM indicates the total transaction amount. If bank card communication is enabled and a card is swiped or inserted, processing proceeds in the following manner:

- *Credit card acceptance.* If the user selects “CREDIT” on the bank card acceptance screen, the card number is sent to the gateway/processor for approval via an encrypted communication link and the display indicates authorization is taking place.
- *Debit card acceptance.* If the user selects “DEBIT” on the bank card acceptance screen, the customer is prompted to enter a PIN on the keypad. The PIN and card number are encrypted by the PIN pad and sent to the gateway/processor for approval and the display indicates authorization is taking place.

Upon approval, the tickets are encoded and printed (as appropriate) and the customer is asked if a receipt is desired. If “YES” is selected, a receipt indicating fare media type, transaction amount and other relevant information is printed and dropped into the coin/ticket tray along with the ticket(s). If the transaction is declined, the TVM screen advises the customer to use cash, cash acceptance is enabled, and the process continues as a normal cash transaction.

For security, complete bank card numbers are not stored in the TVM or the central data system. However, authorization codes and the like are stored in such a way that they can be matched to the corresponding transaction for auditing purposes. Encryption meeting financial institution requirements is provided.

PCI compliance. The Vendstar payment application has received certification of compliance with the Payment Application Data Security Standard (PA/DSS) promulgated by the Payment Card Industry Security Standards Council. Genfare’s TVM design employs a hardware security device to handle bank card transactions; no sensitive bank card data is stored in the TVM.

3.10.11 Receipt Printer

A thermal receipt printer is provided to issue proof of payment tickets, receipts for bank card and other transactions, and selected on-site reports. The receipt printer has a thermal print head and integral full-width self-sharpening cutter. The printer uses a 4-inch-diameter paper roll suitable for approximately 2,000 receipts, each two inches long. A low paper sensor and paper feed button are provided. Cut receipts are fed into a chute for presentation in the dispensing cup. The receipt printer is used to print receipts for bank card transactions and maintenance and revenue service audit tickets. The printer can be configured to print receipts for bank cards only (default), all transactions, only if the customer responds affirmatively to a prompt, etc.

3.10.12 Ticket Dispensers

To provide the ability to dispense or print and issue fare documents, the Vendstar can be equipped with up to three ticket dispensers, which may include any combination of the following:

- Magnetic ticket dispenser consisting of our ticket reader issuer machine (TRiM), which can encode, print on and issue a magnetic fare card
- Limited-use media (LUM) card dispenser, which issues bar-coded fare documents.
- Plastic smart card dispenser (PSCD), which can encode and issue a 30-mil ISO-compliant reloadable plastic smart card intended for long-term use.

All fare media issued by the TVM are fully compatible with the agency’s Genfare fare equipment.

3.10.13 Smart Card Processor

The TVM will be provided with an ISO/IEC 14443 compliant smart card processor to permit validation or recharge of previously issued smart cards. The Genfare smart card data format supports a wide variety of fare instruments, including fixed and rolling-period passes and stored ride/value cards in addition to employee passes.

3.10.14 Electronic Control Unit

The TVM has an electronic control unit (ECU) to monitor and control all aspects of TVM operation. The ECU is a single board computer with an Intel microprocessor and solid-state hard drive. The ECU is in constant communication with the central data system and pushes transaction and event records to central as they occur. The ECU notifies the central data system in the event of an alarm and communicates with the bank card gateway server for all bank card transactions.

If a backup memory module is desired, the ECU can be provided with a flash drive inserted in one of its USB ports. Once data has been confirmed as accepted by the VIP, the old data on the flash drive will be overwritten.

3.10.15 Fare Table

Each type of document offered for sale in the TVM has an associated price. The matrix of ticket types and associated values constitutes the fare table. Each fare table indicates the types of documents that may be vended, price, screen layout, etc. Fare tables are downloadable to the TVM by network, modem, or portable memory device.

3.10.16 Data Reporting

3.10.16.1 Data Recording

The TVM records all transactions and events and transmits in real time to the central data system. Data is recorded and reported in two forms, (1) cumulative data and (2) transaction and event detail. Cumulative data consists of totals for various quantities, including coins and bill validated by denomination, tickets dispensed, bank cards read, etc. Transaction detail includes time/date, transaction amount, payment method, type of ticket vended, etc.

The TVM also records events such as locking/unlocking the TVM door; removal or insertion of bill tekpak, cashbox, coin acceptance module, or ticket dispenser; alarms such as low ticket stock, and so on.

3.10.16.2 Data Transmission

The TVM stores all operational and financial data in non-volatile memory and uploads it periodically to the central computer. The TVM can transmit information to the network manager either by network or cell modem, as required by a particular location. Data is transmitted upon request by the network manager. Cumulative registers may be set to zero upon removal of a cashbox or other unit count device.

It is possible to operate the TVM in one of two communication modes, depending on the requirements of a particular location:

- Network connection using TCP/IP over copper wire or fiber optic cable.
- Cellular modem via commercial 4G network.

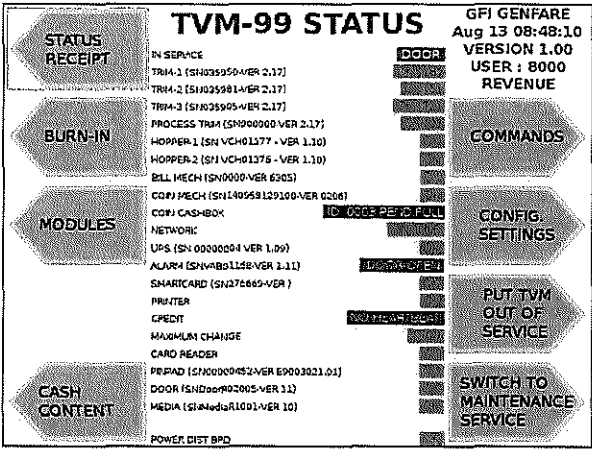
3.10.16.3 Audit Reports

Each TRiM, coin tekpak, coin cashbox, bill tekpak and bill cashbox installed in the TVM is provided with an electronic ID number. Whenever one of these devices is removed an event is recorded in memory indicating the module, ID number, date and time, and the quantity of money or tickets in the module at the time. This information is provided to service personnel in the form of an audit ticket that can accompany the removed module back to the shop. Alternatively, audit data can be shown on the display.

3.10.16.4 Maintenance/Test Mode

The Genfare Vendstar TVM provides a comprehensive maintenance and service display making use of the LCD passenger display whenever the TVM door is in an authorized unlocked position. The TVM makes full use of menus and the 13 selection buttons surrounding the display. To enter test mode, an authorized technician must enter a valid user ID and PIN as previously described.

The initial display is illustrated below. It shows the status of all components within the TVM and indicates whether they are online or offline, full, empty or non-functional. The display then provides a series of selections to further interrogate each of the installed components and perform tests to confirm their status. All this may be done from the front of the machine so that the nature of any problem is known before inspecting the interior of the TVM.



Vendstar maintenance screen

Test functions include a “system health snapshot” of TVM modules, test ticket issuance, exercise of cash acceptance modules, and more.

3.10.16.5 Diagnostics

The Genfare Vendstar TVM displays comprehensive status and diagnostic information on its LCD screen when the door is in an authorized, unlocked position. Messages are shown in either green (indicating ready condition), red (indicating a fault condition), or blue (indicating revenue service needed). The real-time status of all TVMs can also be viewed on the VIP data system. Priority alarms are forwarded to a designated cell phone to facilitate prompt agency response. The TVM also permits service personnel to test each module to determine proper operation.

3.10.17 Vendstar Information Processor

The Vendstar-4 is monitored and controlled by the Vendstar Information Processor (VIP), a service-proven Windows-based application that provides all functionality needed to monitor and manage the Genfare ticket vending solution. The VIP is installed on a server or virtual-machine environment on agency premises, and will interface to the Genfare Link central data system for purposes of report generation. The VIP performs the following functions:

- Monitor and control the TVM, extract transaction and event data, and download fare tables and configuration parameters
- Provide a central repository of system operational data consisting of:
 - Daily summary data for all equipment
 - Database of transaction and event detail for all equipment
- Provide the ability to generate standard and custom reports

- Provide a fare structure manager to permit modification of fare tables and TVM displays and messages.

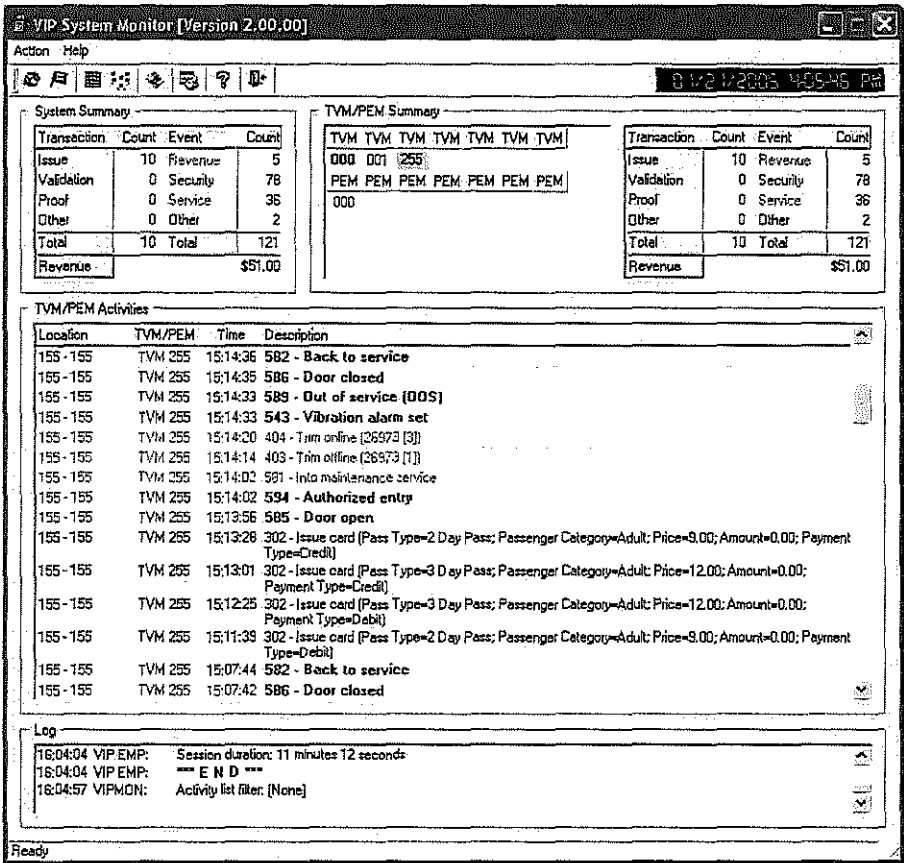
The VIP communicates with:

- The TVM via agency-supplied network (or via public telephone network using modems)
- Reporting workstations via agency-supplied LAN or Internet connection
- Genfare Link via the Internet.

3.10.17.1 System Monitor

The VIP makes it easy to monitor and control station equipment from the central office. VIP functions include:

- Monitor the status of each TVM and its components and detect faults
- Extract transaction and event data and download fare tables and configuration parameters
- Provide a central data repository consisting of daily summary data for all equipment plus a database of transaction and event detail for all equipment
- Provide the ability to generate standard and custom reports



Typical Vendstar VIP data system screen showing system monitor function

- Provide a fare structure manager to permit modification of fare tables and TVM displays and messages.
- Issue commands to all or selected TVMs, including shutting down and restarting units, downloading software, and rebooting the TVM computer.

The VIP provides the following types of information:

- Equipment Status – indicates status of TVMs and their principal components, including cash-containing devices and ticket printers
- Cash on Hand – lists cash contained in each TVM
- Polling Status – indicates last successful polling of each TVM
- Module Location – lists serial numbers of all modules with electronic ID currently in service in each TVM or selected TVMs.

3.10.17.2 Remote Operation

Using the VIP central computer system, it is possible to communicate with a particular TVM and:

- Remove the TVM from service
- Perform a self-test and generate a status report on all modules
- Send a test message to the TVM and receive acknowledgment
- Restore the TVM to service.

3.10.17.3 Alarms

The TVM automatically generates alarms when service conditions arise. Alarms have one of three priority levels:

- *Priority 1.* In the event of a “panic alarm” such as intrusion attempt, the VIP is notified immediately and a message is sent to one or more designated mobile devices and/or security office/police department.
- *Priority 2.* When immediate service is required, e.g., ticket stock is exhausted or a cashbox is full, the VIP is immediately notified and the TVM enters limited or out of service mode.
- *Priority 3.* If service will soon be required, e.g., a consumable is low, an alarm is sent to the VIP but normal operation continues.

The Vendstar provides alarms for conditions such as unauthorized access, shock and vibration, low ticket stock, full cashbox, out of change, and so on.

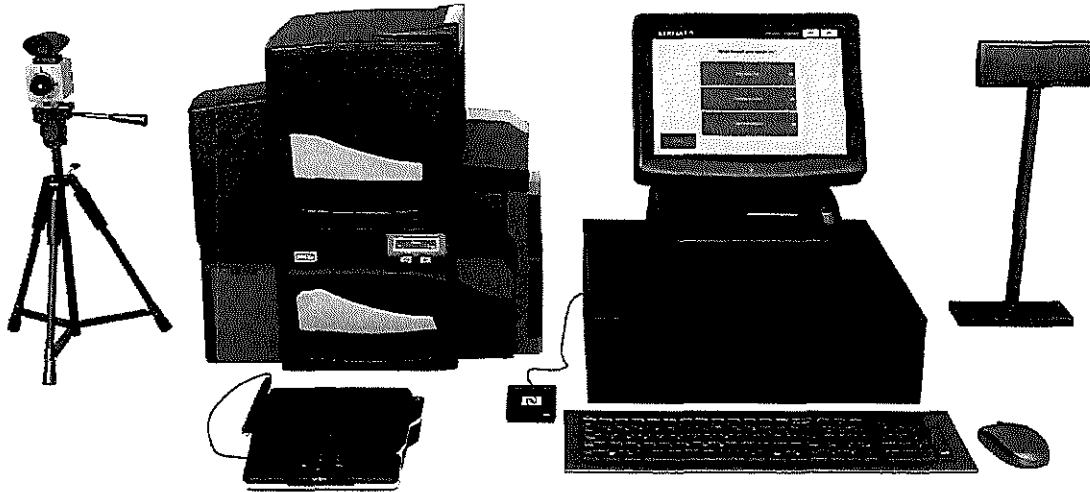
3.11 ADMINISTRATIVE POINT OF SALE TERMINAL (APOS)

To meet the County’s requirement for a ticket office terminal, Genfare proposes its service-proven administrative point-of-sale terminal (APOS), which is available in both countertop and portable versions. The APOS can be configured with off-the-shelf commercial hardware to support a variety of important tasks:

- Inventory control/fulfillment workstation. When new smart media is received from the manufacturer, it must be spot-checked, entered into inventory, and distributed to sales channels.
- Ticket office workstation. The APOS terminal supports agency customer service operations, including sale, account recharge, and inspection of smart cards.
- Card production workstation. The APOS can be equipped with a digital camera and card printer to enable staff to take a photo and generate a personalized card for use as an employed or reduced-fare ID card.
- Administrative/customer service workstation. The APOS can be used to access to Genfare Link's administrative or customer service portals to enable authorized staff to field customer inquiries and manage the system. Link's administrative and customer service portals can also be accessed using any Web-enabled device with appropriate credentials.

The range of devices that can be used with the APOS is illustrated below. The APOS terminal uses a flexible, modular design approach to permit commercially available components to be added as needed to support a particular application. Available devices and peripherals include:

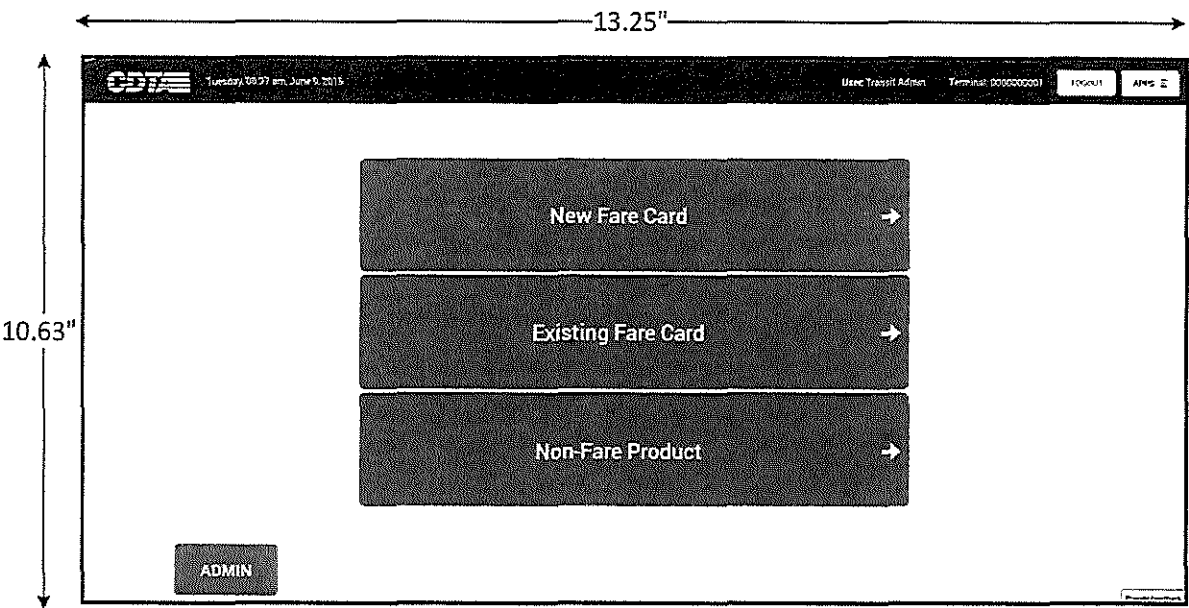
- IBM PC-compatible desktop computer with touch-screen display and pointing device
- IBM PC-compatible laptop computer (for optional portable version)
- Patron display
- Cash drawer
- Bank card authorization device
- Document scanner
- Smart card reader/encoder
- Receipt issuance
- Digital camera with tripod and built-in flash (2 tripod sizes – tabletop, full size)
- Color smart card printer/encoder – suitable for both single card and bulk production
- Uninterruptible power supply (UPS)
- Ethernet communication interface
- Bar code printer.



APOS terminal showing all accessories

Depending on configuration, the APOS terminal supports the following capabilities:

- Sell, read, recharge account, and inspect smart fare media
- Replace lost, stolen/defective cards; for registered cards, transfer account balance from old card
- Create, review and modify customer accounts
- Register fare media
- Create, modify or cancel autoload transactions
- Reauthorize reduced-fare cards
- Review account history and facilitate selected queries of the CDS transaction database
- Provide an online interface to enable agency personnel to answer customer inquiries and send internal messages – single sign-on (SSO) capability in development
- Sell products other than fare media
- Scan reduced-fare eligibility documents
- Accept and securely store cash
- Process bank card transactions in a PCI DSS-compliant manner
- Print and encode photo IDs and other personalized media, including reduced-fare cards and employee IDs, either singly or in bulk
- Print barcoded tickets in bulk
- Generate receipts.



APOS sales screen (dimensioned)

Standard APOS terminal features include:

- Validated user ID and password required for use – operator privileges assignable individually or by user group
- Real-time data exchange with the CDS (preferred) or standalone operation, with data dump to a USB flash drive as needed
- Intuitive, menu-driven operation
- Record transactions and events for transmission to the CDS
- Accept fare tables (active and pending), action lists and operating parameters from the CDS
- Generation of local sales and event reports on demand
- Self-diagnostics.

In normal operation the APOS terminal is online to the Genfare Link CDS via agency-provided LAN or the Internet, and all activity is monitored and recorded in the central database. Operating staff must log on to the APOS with a valid user ID and password.

A variety of management reports are available to track APOS usage. These reports may be filtered by time/date, agent, location, type of activity, and so on.

An APOS configured for photo ID production is provided with a digital camera and a card printer plus software to facilitate image capture, recording of personal information, and card printing.

We recommend that at least one APOS be configured as an inventory control/fulfillment workstation to facilitate (a) entry of newly delivered card stock into inventory; (b) distribution of cards to sales channels; and (c) fulfillment of card orders received via the eFare web ticketing portal and other means.

3.11.1 Portable APOS (Option)

Addendum 2 deleted the requirement for a portable APOS, but we are happy to offer this device as an extra-cost option. The portable APOS is a laptop-based device equipped for photo ID production – this makes it possible to produce cards on a while-you-wait basis at social service agencies, senior citizen facilities, and the like. Software and procedures for the portable APOS are the same as for a comparably-equipped standard APOS. No additional staff training is required.



Portable APOS

3.12 **DESKTOP BULK SMART CARD ENCODER**

We believe the standard card printer offered with the APOS may be sufficient to meet Palm Tran’s needs. If on review the agency determines that a higher capacity unit is needed, we will identify a suitable product in consultation with the agency and amend our bid accordingly.

3.13 **SECURITY**

As payments shift to new platforms, opportunities for exploits by hackers increase. Cloud-based security features include pattern recognition algorithms capable of detecting anomalous activity not always obvious at the agency level but easily detectable across the entire payment stream, permitting quicker response. In addition, the AWS environment has been audited and certified to a level not typically achievable in most local installations.

The Genfare solution provides the highest level of security and is compliant with RFP requirements. Notable features include:

- *Bank card security.* The system is PCI compliant. No sensitive customer data is visible to or stored on Genfare devices or systems. In general, payment processing is offloaded to a PCI-compliant gateway maintained by an agreed-on provider of such services. The Genfare solution has been certified as PCI-compliant by Coalfire, a leading provider of qualified security assessment (QSA) services for electronic payments.

- **PCI – PA DSS Payment application data security standard**
- **PCI DSS – Payment card Industry – Data security Standard (Dec 2017)**
- **EMV – Euro Pay Master card and Visa (Chip and Pin) (Nov 2017)**
- **Highlights:**
 - Store Less data: Encryption and Tokenization of Key data elements
 - Better Access Controls: Control evaluation of code management
 - Established formal written policies and procedures



CALFIRE.

Genfare's solution is PCI compliant – Coalfire is Genfare's qualified security assessor (QSA)

- *PA-DSS and EMV certification for the Vendstar TVM.* We have obtained EMV certification for the Vendstar ticket vending machine, making it possible for us to implement secure chip-and-PIN payment card acceptance on TVMs. The TVM has also been certified as compliant with the Payment Application Data Security Standard (PA/DSS), the component of the Payment Card Industry Data Security Standards applicable to embedded payment acceptance processes.
- *Fare card security.* All Genfare-recommended fare media support encryption and are highly resistant to counterfeiting and other misuse. Genfare recommends DESFire EV1 smart cards, which support AES and 3DES encryption and are most cost effective.
- *System access security.* Access to the data system and field devices is password-protected. Data system users may be assigned permissions and access appropriate to their jobs. Validation of ID against a centrally-maintained list during login is available.
- *Data transfer security.* Data transfer security is assured by various means, depending on the type of communication technology: (1) Wi-Fi probing at garages is encrypted; and (2) infrared probing at the garage is accomplished using a proprietary protocol via short-range (~1cm) directed beam, which is highly resistant to unauthorized "sniffing." We can also implement (3) encrypted data transfer between the farebox and the agency-supplied onboard router during cellular probing.
- *eFare and mobile ticketing security.* The highest degree of security is employed to protect sensitive customer data during fare media purchase. Notable features include: (1) communication between customer devices and Genfare systems is encrypted through the HTTPS protocol using Transport Layer Security (TLS). (2) As indicated, bank card payments are handled by PCI-compliant third-party gateways. (3) As an added measure of security, patrons who choose to register their electronic fare media can have the balance transferred to a new card or device if the old one is lost or stolen.

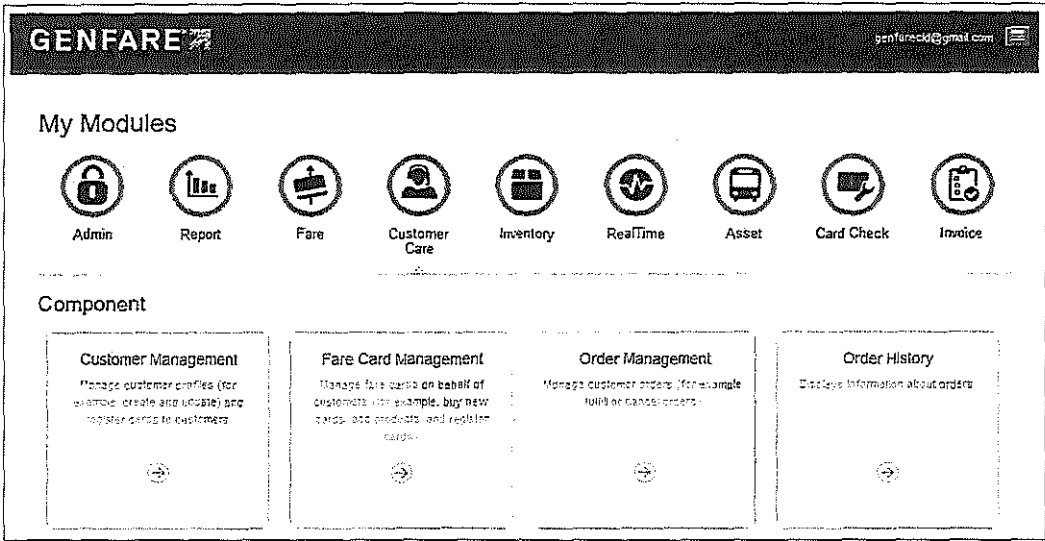
More detailed information about the security provisions of particular Genfare systems is provided in the sections below.

3.14 GENFARE LINK CLOUD-HOSTED CENTRAL DATA SYSTEM

3.14.1 Overview

To implement account-based fare processing, we will provide Genfare Link, our cloud-hosted central data system. Link provides the ideal platform for account-based processing and for efficient administration of electronic fare media. The core of Genfare Link is a fare media database providing end-to-end tracking of activity by all fare media. Genfare Link is powered by a set of applications within which the system’s business rules reside. Genfare Link is the system of record for all activity involving any card or account authorized for use in the fare system, whether open or closed loop. Configuration and back end data processing services will be provided by our Genfare Link central data system, which is hosted in the cloud computing environment maintained by Amazon Web Services (AWS). Cloud-based hosting offers many advantages:

- *Optimal for account-based fare processing.* Genfare Link provides the ideal platform for account-based fare processing. The central account database and fare processing engine reside in the cloud and are readily accessible by any authorized device via a secure Web interface. All fare systems and devices are centrally monitored and maintained, and all fare activity is centrally registered in real/near-real time, enabling us to provide a level of integration, reliability and security never before possible. Malfunctions and anomalous activity can readily be identified and addressed. We believe the elegance and simplicity of our approach make it the best choice for the challenging transit environment.
- *Service proven.* Genfare Link is currently in service in multiple agencies and more are being deployed in coming months.
- *Commitment to open architecture.* As stated earlier in this submittal, we are one of the few vendors offering a complete line of fare collection products meeting all the County’s needs. That said, we are committed to open architecture and will provide the application programming interfaces (APIs) specified in the RFP. These APIs are published versions of the Web-based client/server interfaces we developed to enable communication between our solution’s internal components and provide access to the same functionality. As a result, while we believe an all-Genfare solution is the County’s best bet, we provide the ability to mix and match system elements as desired.



Genfare Link’s web-based interface is easy to navigate

- *Greater reliability and availability.* Genfare Link will provide 99.99% availability exclusive of scheduled downtime as specified in the RFP. As explained later in this submittal, in Genfare Link, multiple database instances are maintained in geographically separate data centers. If the primary instance fails or falters, connectivity is automatically shifted to the backup instance and a new backup is spun up. The result is greater reliability and availability than is achievable through a locally hosted solution.
- *Supports mix of account-based and card-based fare products.* A unique feature of Genfare Link is the ability to accommodate both account-based and card-based fare products within the same media mix. Among other advantages, this enables economical processing of low-cost fare media. For example, the agency can implement account-based processing of smart cards plus card-based processing of single-ride magnetic tickets distributed by social-service agencies to their clients, providing an optimal mix of security and low cost.
- *Dynamic scaling.* When demand spikes, our Genfare Link cloud-based solution can be scaled up much faster than a local system, which requires purchase and installation of servers, network switches, and other IT infrastructure.
- *Reduced maintenance.* Local hardware will eventually become obsolete and require replacement. The same is true of the operating system and software. In the Genfare cloud solution, all hardware and OS updates are handled without agency involvement. We encourage the agencies to test application software updates to confirm proper operation but all other tasks are handled by us.
- *Reduced IT burden.* Link greatly reduces the burden on agency staff, who no longer need to be concerned with routine system maintenance. Link system backup, archiving, troubleshooting, repairs, and the like are performed automatically or by Genfare staff. Chores such as backup and restore that can be labor-intensive when performed locally are effortless in the cloud. Some tasks required in traditional systems can be eliminated entirely if desired. For example, while AWS

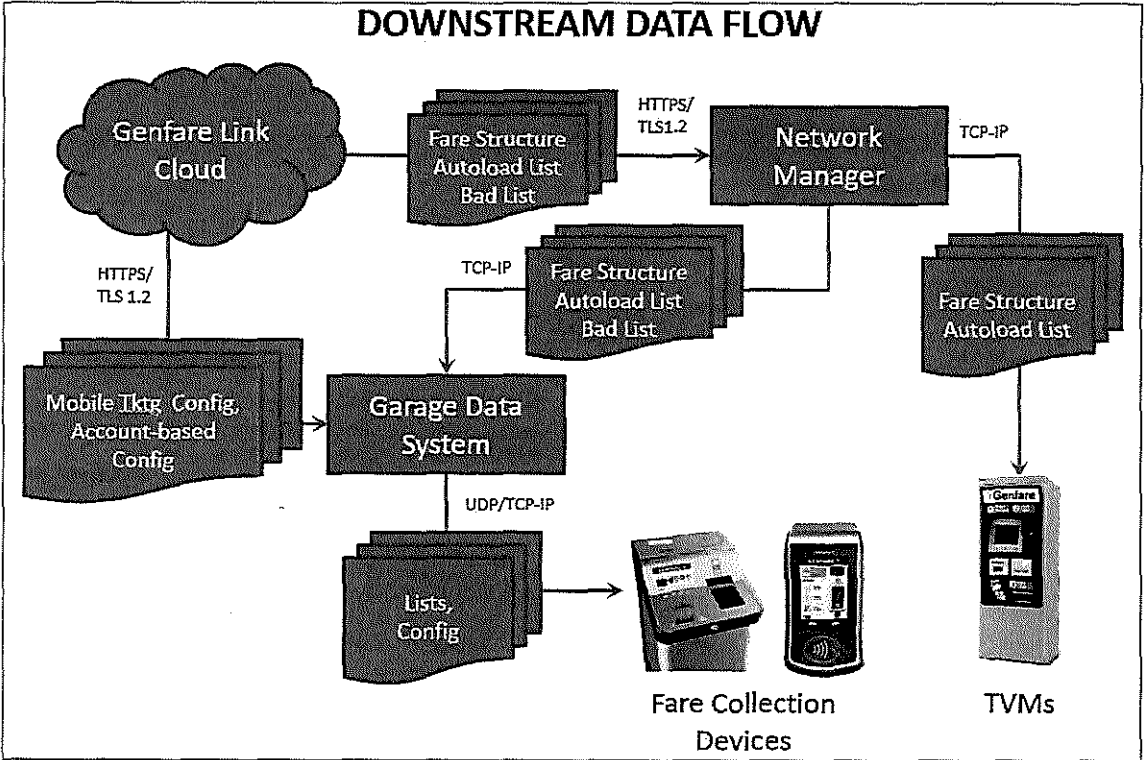
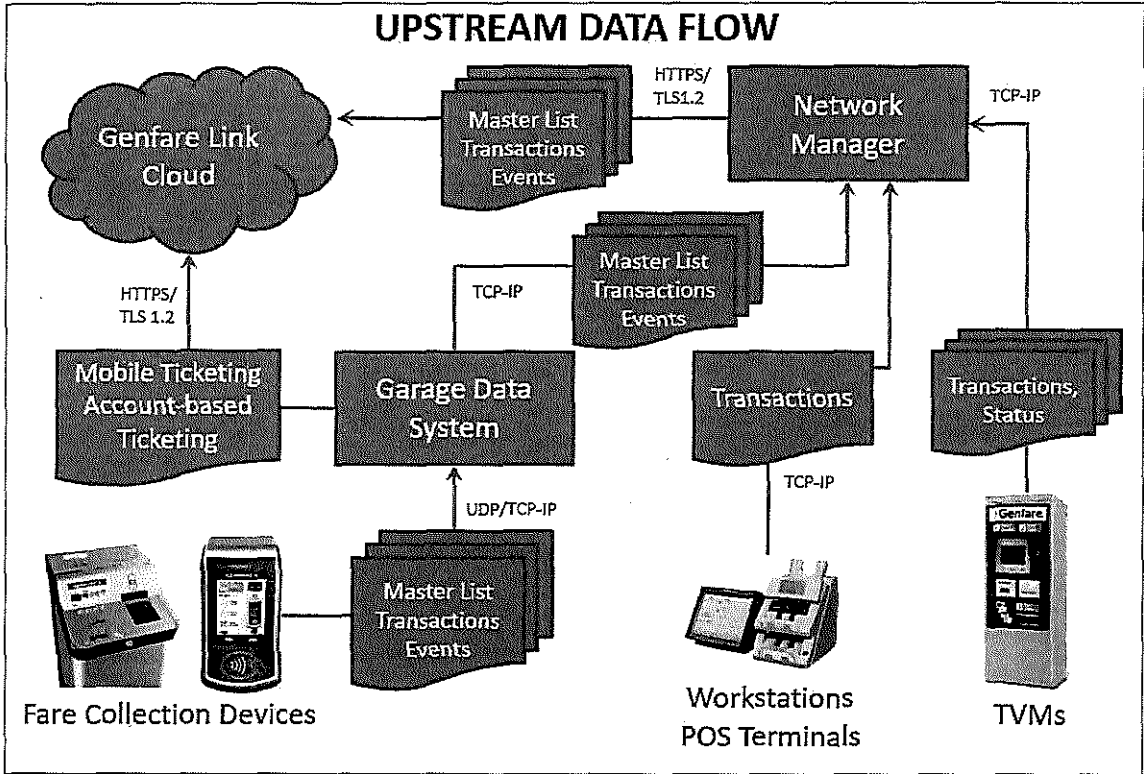
supports data archiving, the fare collection footprint (typically <200GB) is small enough to permit historical data to remain “live” indefinitely.

- *24/365 monitoring.* Cloud-based data system operations are automatically monitored at all times and problems are immediately resolved, in most cases without local intervention or awareness.
- *Common code base for efficient software maintenance.* Genfare Link is a multi-tenant solution in which each agency has a secure private data store drawing on a common code base. This greatly simplifies ongoing software maintenance – enhancements made for one agency are available to all. Since the cloud makes it unnecessary to maintain multiple separate CDS instances, we can respond to customer requests and trouble reports more quickly.
- *Regular software updates.* Genfare Link is undergoing continuous enhancement and software upgrades are made available periodically. Customers using the cloud-based version are provided with these upgrades as a matter of routine. We provide an advance copy of new releases to enable agency exercise and review in a user acceptance testing (UAT) environment. In contrast, once warranty coverage has expired, agencies with locally hosted systems are responsible for purchase, installation and any necessary configuration of software updates.

Genfare Link enables the agency to control fare devices, generate reports, and otherwise manage the system. The core of Genfare Link is a database providing end-to-end tracking of activity by all fare media. Genfare Link is powered by a set of applications within which the system’s business rules reside. It is the system of record for all activity involving any card or account authorized for use in the fare system, whether open or closed loop. Configuration and features reflect the equipment and options selected. The following features are available:

- Distribution and recharge of agency-issued smart fare media
- Loading of value to closed-loop fare media
- Real-time access to value in an existing transit account balance
- List-based validation of agency-issued and selected third-party cards
- Ability to view and retrieve transit account balances and transaction history
- Fare system maintenance
- Fare calculation for all compliant fare payments
- Remote software and configuration upgrades to all devices
- Real-time monitoring of system health
- Security controls on access permissions
- Advanced reporting capabilities.

The diagrams below show the upstream and downstream data flows between field devices and Genfare Link.



3.14.2 Provisions for Reliability, Security and Data Integrity

In developing our software products, we have made it our mission to achieve the same reliability, security and ease of use and maintenance for which Genfare hardware has long been known. Measures we have incorporated into Genfare Link include:

High Availability. Genfare Link provides 99.99% system availability, exclusive of maintenance downtime scheduled in advance.

Message Brokering. We utilize standards-based message brokering to ensure loss-free data distribution among system components, an industry best practice.

Autoscaling. If extra storage, processing power or communications bandwidth is required due to short- or long-term increases in traffic, additional resources can be readily brought online.

Multiple Database Replicas. To minimize the impact of server, storage, or database failure, multiple instances of Genfare Link are continuously maintained in geographically separate data centers and monitored 24/7/365. Link synchronously replicates all transactions to all database instances. In the event of database failure, the system automatically transfers connectivity to the standby replica, a new backup instance is spun up, and all data is copied over to it. The process requires no manual involvement and in most cases is invisible to the user, with little or no impact on day-to-day activity.

Failover occurs automatically in the following situations:

- Datacenter outage
- Primary database failure
 - Loss of network connectivity to primary
 - Failure of compute unit on primary
 - Storage failure on primary
- Database patching issues
- Manual reboot of the database instance.

Automated Data Backup. Complete snapshots of the Link database are stored in an Amazon Simple Storage Service (Amazon S3) data bucket daily. S3 backups can be used to restore the primary database to a prior state should a problem arise. Backups can be retained for as long as desired. Data can be recovered to any point within 5 minutes of the current time.

Optional Archiving. As an option, we can provide periodic archiving of selected data to low-cost long-term storage.

Data Warehousing. To reduce server load, Genfare creates a read-only copy of the central database for use during read-intensive tasks such as reporting, ensuring that they will not impact other central data system operations. The read-only replica lags <1 sec behind the production copy.

Dedicated Database Instances. Each Genfare Link tenant is provided with an independent database instance -- there is no commingling of data between tenants. This segregated private data store ensures data security and integrity.

Centralized Monitoring of Field Devices. All Genfare-supplied field equipment, including onboard devices, is continuously monitored from the central office. (Onboard devices in sleep mode “wake up” periodically to report status and request updates.) Failure to detect a device “heartbeat” generates an immediate alarm. Priority maintenance and security alarms reported by field devices can be immediately relayed to agency-designated personnel via text or email. A system health monitor shows the status of all devices in a given category, with alarm conditions highlighted in color (red = failure, yellow = service needed soon, etc.). Updated firmware can be centrally distributed to field devices as required. Genfare monitors the availability and reliability of all networked devices and components.

Database Security. Provisions include:

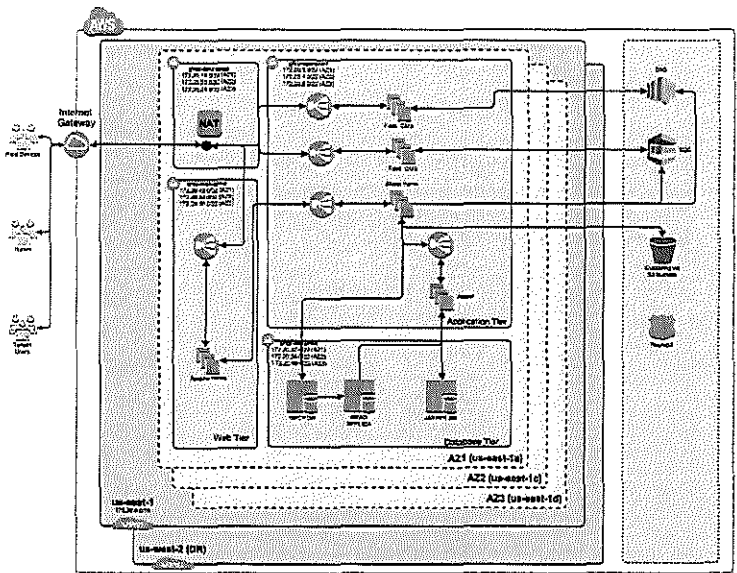
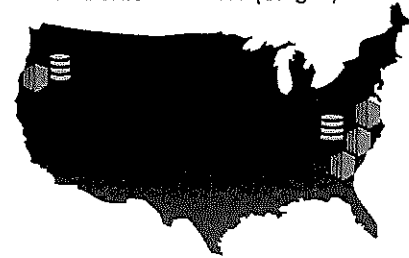
- Industry-standard user ID/password scheme, with permissions assigned individually, in hierarchy or per group
- Passwords stored in encrypted form
- Users not needing to modify the database can be provided with read-only access
- Third-party access provided via secure API.

Dual Region Disaster Recovery. To protect against the rare case of a regional outage, Genfare maintains a “warm site” in the AWS U.S. West region – see illustrations on next page. This consists of a continuously synchronized replica of the production database plus provisioning for the necessary hardware and communications bandwidth. In the event of disaster on the east coast, Genfare personnel would take immediate steps to spin up the west coast Link implementation (including primary and backup sites) and transfer connectivity to it. The process, which has been tested multiple times, takes 2-4 hours. No agency participation is required.

Since Genfare Link uses a distributed architecture for core fare collection operations (the garage data system and network manager are maintained locally), essential tasks such as probing can continue until the central data system is brought back online. In the event of multiple failures – for example, if both the GDS and NM became unavailable in addition to Link – the onboard equipment would continue to validate electronic fare media against the local card list.

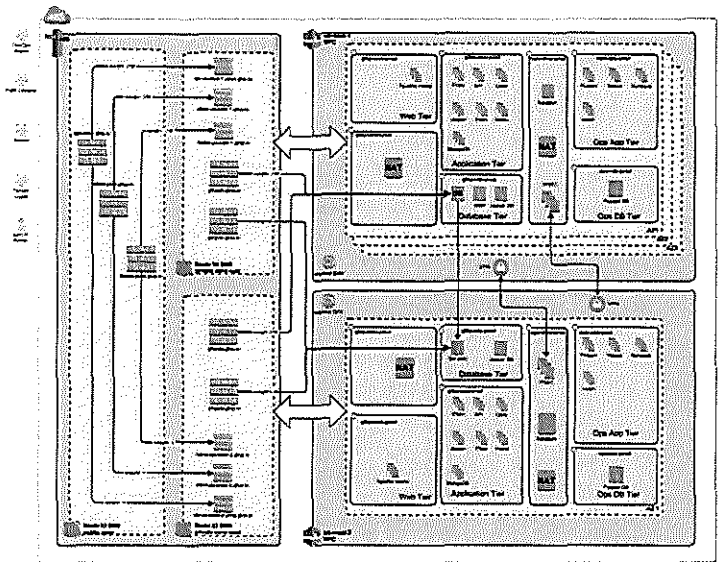
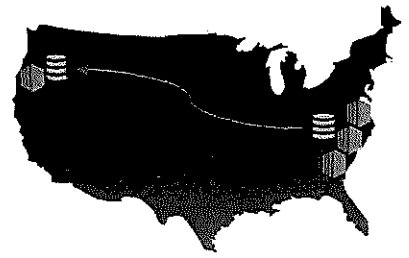
Link’s cloud architecture provides multiple levels of redundancy

- East – production site
 - Database instances distributed over 3 availability zones in US East region (Virginia)
 - Automatic failover to backup if primary instance falters
- West – disaster recovery site
 - 1 zone – US West (Oregon)



‘Warm site’ kept ready for disaster recovery

- Continuous RDS/DB replication between East and West
- No data loss if U.S. East goes down (e.g., regional blackout)
- West coast instances spun up, back online in 2-4 hours



If disaster knocks out U.S. east coast, west coast recovery site gets Link back online in 2-4 hours

3.14.3 Genfare Link Modules

The following is a list of Genfare Link modules and other back office systems and services available.

3.14.3.1 System Administration

The Administrative Module facilitates management of agency users and their roles. Functionality includes:

- *User Management.* Add or remove users of Genfare Link; manage user profiles; assign roles to users

- *Role Management.* Create custom roles and responsibilities for users
- *Organization Management.* Create, update, enable or disable a third-party organization account – for example, a university managing student ID cards used for transit.
- *Clerk Management.* Add, update, enable or disable users of a retail point of sale (RPOS) terminal.
- *Email and SMS Configuration.* Update/customize the content of email and SMS messages sent to riders by the system based on events – for example, the email or text a rider receives when a password is reset.

3.14.3.2 Account-Based Transaction Processor

Genfare’s account-based processing solution consists of two major elements:

- A central account database implemented using the open-source MySQL RDBMS, in which all fare transactions and events are stored.
- A fare processing engine that performs the following tasks:
 - Accepts incoming fare validation requests from field devices, a cellular data link is required.
 - Returns an accept/reject decision based on current business rules and status of the relevant card or account as recorded in the central account database
 - Posts incoming transaction and event records to the database upon receipt and continuously updates card records and accounts accordingly
 - Periodically generates an updated bad list and pushes it out to field devices.

Genfare Link tenants draw from a common code base. Each tenant has its own instance of the central account database and fare processing engine, which is isolated from and operates independently of the others to ensure security and sufficient processing power and bandwidth.

Pertinent fare processing data resides in the following locations:

- Fare document – serial number, card type (adult, student, senior, etc.)
- Onboard fare collection device – fare table (downloaded from back end), operator ID, route, direction, etc. (entered at login, either manually or via J17081587 interface), current location (from CAD/AVL system)
- Back end:
 - Accounts/account types (full fare, reduced, etc.)
 - Rates (fare structure, peak/off-peak hours, etc.)
 - Business rules for fare capping
 - Media linked to accounts, e.g., smart cards.

When a fare document is presented for payment, the validator reads the document ID and account type, looks up the appropriate fare (if relevant) in the fare table, and sends the document ID, timestamp, active fareset, fare amount, route, direction, etc., to the back end. On the back end, the fare processing engine consults the fare capping business rules. If the fare has reached the cap limit, no fare

amount is deducted from the account. If the fare has not capped, the fare processing engine calculates the fare amount due based on the account type and rate per the fare table, and deducts this amount from the account.

The central database will track status and usage per card and per rider, as follows:

- For each item of electronic fare media, including extended-use smart cards, LUM cards, and mobile tickets, a *card record* is maintained showing status and usage history for that card.
- For each registered rider, an *account* is maintained showing status and usage of all cards associated with that rider. Riders may have multiple cards linked to their accounts. Each card can be assigned to one rider account at most. Cards are not required to be associated with a rider account.
- If a registered rider purchases additional stored value, that value is associated with the rider's account, not a particular fare card. If the fare products on a card are depleted or expired, but the card is linked to a rider account with enough stored value to pay the fare, the card will be accepted as valid. In other words, the stored value in an account acts as the payment backup for any card linked to that account.

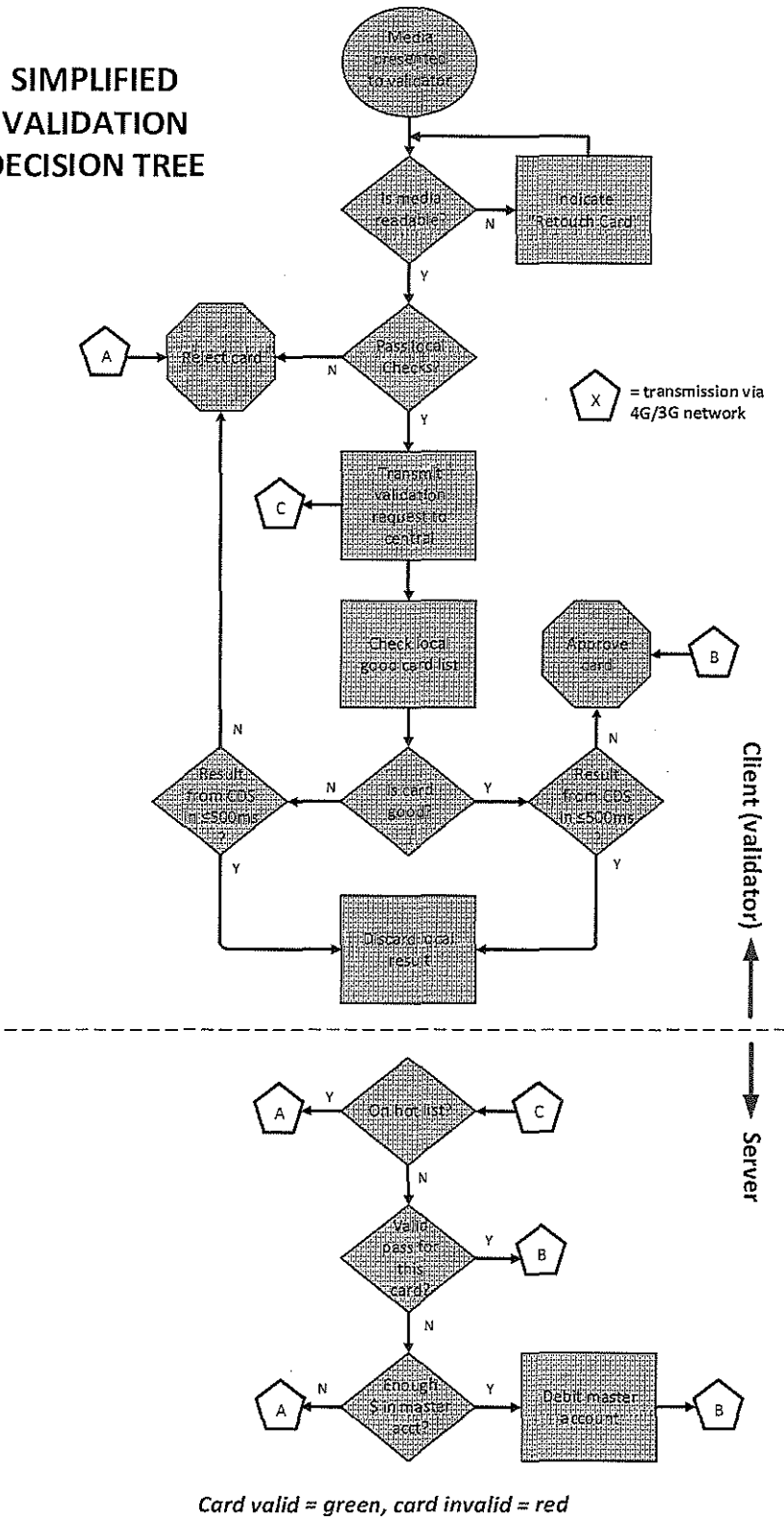
Riders may obtain electronic fare media in the following manner:

- Smart cards may be purchased or recharged through our eFare web ticketing portal. We also provide our administrative point of sales terminal (APOS) to enable agency ticket-office staff to sell or recharge smart cards. The agency can also arrange for distribution of preloaded fare media through retail sales agents.
- Reduced-fare riders, employees and others requiring a photo ID may obtain one from agency staff using a card production workstation equipped with a camera and card printer. A portable card production workstation is optionally available to enable photo IDs to be produced a senior citizen centers and the like.
- Riders may purchase barcoded mobile tickets using our mobile ticketing application, which can be downloaded to a mobile device at no charge. Barcoded tickets can be automatically read by the farebox and other devices as specified in the RFP.

Electronic fare media, including smart cards, LUM cards, and barcoded tickets, will be processed in the following manner:

- Periodically the central data system (CDS) will generate a master status list (MSL) showing the status of all cards in circulation. Subject to agency approval, each card will, at minimum, be assigned to one of two status levels:

SIMPLIFIED
VALIDATION
DECISION TREE



- When the farebox is logged on, the MSL is automatically pushed out to it updated periodically thereafter. When an electronic fare card is presented for payment, the fare device attempts to validate it in real time against the central account database (see validation decision tree). If real-time validation times out, the farebox validates the card against the MSL.

- The farebox indicates “accept” or “reject” for each listed card based on the following criteria:

- (1) Is there a valid and sufficient fare product associated with this card?
- (2) If not, is this card associated with a rider account that has sufficient stored value to pay the fare?

If the answer to either #1 or #2 is YES, the card is accepted. If the answer to both is NO, the card is rejected.

Regardless of validation method, the fare device indicates card acceptance or rejection through visual and audible signals. Other information about card status may also be shown, as defined during design review. The fare device stores the results of each transaction.

- At an agreed-on interval, which may be every few minutes, the CDS pushes an updated MSL to the farebox, and the farebox uploads transaction and event records accumulated since the last probing to the CDS. The CDS uses the uploaded transactions to update each card’s record. If, due to this update, the card’s status changes, or if the status of a card or account changes as a result of other inputs (e.g., value is added to an account through an eFare auto-replenishment transaction), the MSL is revised accordingly.
- Cellular probing takes place at defined intervals while the farebox is logged on. Cards presented for fare payment are checked against the most recent list, which in turn is generated using the latest account information. This provides maximum control over cards and prevents fraudulent use.
- We do not anticipate that existing magnetic media will be validated against the MSL but this is open to discussion.

The preceding is a high-level description only. We are happy to review specific card payment scenarios during our presentation.

Authorized agency staff can revise fare tables as needed using the Fare Link module, which provides the following functions:

- *Product Management.* Create, update, enable or disable a fare product.
- *Channel Management.* Manage the availability of fare products in distribution channels – for example, those sold via the eFare online portal or the RPOS.
- *Merchandise Management.* Manage availability of merchandise on the APOS.
- *Fare Structures Management.* Manage active and pending fare structure versions.
- *OCU Wizard.* Define OCU keys using a what-you-see-is-what-you-get interface.

- Agency Configuration. Manage rider loyalty promotions, including pay-as-you-go with daily cap, earned bonus ride, birthday bonus ride, and special occasions.

GENFARE

admin@pb.com

Channel Management

Org Sales Groups

Basic Information

Sales Org: MOBILE Default Sales Group

Channel: Mobile

Org Count: 1

Edit

Add an Organization

Organizations

Products Offered

Media Types Offered

All Products

Offered Products

Search:

Showing 1 to 10 of 18 entries

Order	Name	Type	Value	Price	Designator	Farecode	Offered	Action	Discount	Action	Edit Price
1	20-RIDE	Stored Ride	20.00	20.00	2	Senior Rid	YES	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>	Edit Price
	APL	Period Pass	1095.00	0.00	30	Full	NO	<input type="checkbox"/>	NO	<input type="checkbox"/>	
2	DAY PASS	Period Pass	1.00	4.00	3	Full Senior	YES	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>	Edit Price
	Driver Card	Maintenance	38.00	0.00	0		NO	<input type="checkbox"/>	NO	<input type="checkbox"/>	
3	Fund	Stored Value		0.00	20	Full	YES	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>	

Channel Management screen defines how fare products are distributed – in this case, through mobile app

Advantages of Fare Link compared to previous-generation fare table editors include:

- Single point of contact for revisions to all fares and fare products on all devices using all media, including cash and electronic. It is not necessary to input revisions using separate interfaces for each device or system, e.g., farebox, TVM, online ticketing portal, etc.
- Ease of use. Fare Link is more intuitive than previous-generation technology and makes it easy to implement fare changes without contractor involvement. Genfare is always happy to provide technical consultation when requested.
- Fewer limitations. Many previous fare management restrictions have been loosened, providing greater flexibility when implementing fare policy. For example, the maximum number of non-cash fare items (ticket/token/passes or TTPs) has been increased from 48 to 240, the maximum number of passes has been increased from 32 to 240, and so on.

3.14.3.3 Configuration Management

The Asset Link module facilitates management of field device configuration. Functions include:

- *Device Type Configuration.* Set up the default configuration for all devices of the same type – e.g., sync time for the APOS or RPOS.
- *Device Details.* View the location, current software version, status and other details of field devices
- *Device Software Management.* Manage remote firmware upgrades for field devices.

3.14.3.4 Monitoring Management

The RealTime Link monitoring module reports the current status of field devices such as the farebox, APOS or RPOS. Functionality includes:

- *Event Management.* View, filter, and analyze events logged by field devices.
- *Event Type Management.* Enable, disable and set severity of events logged by field devices.
- *Device Status.* View status of field devices.

3.14.3.5 Revenue Management

The Invoice Link module provides sales files for invoicing purposes. Functionality includes:

- *Sales Search.* Search, publish, download and/or show sales files/reports. Published files/reports can be downloaded and used by a third-party accounting system.
- *Sales Export.* View or delete published sales files/reports.
- *Publishing report extracts.*

3.14.3.6 Media Inventory Management

The Inventory Link module includes the following components:

- *Inventory Overview.* Import (via cross-reference file), view and move inventory between locations.
- *Location Management.* Create and manage inventory locations.
- *Inventory Adjustment.* Adjust (remove) missing or damaged media.

The card check module enables reading or manipulation of data on smart cards. Functionality includes:

- Read/manipulate data on smart cards.

3.14.3.7 Customer Relationship Management

The Customer Care Link module enables authorized personnel to perform a variety of tasks on behalf of patrons. Tasks can be performed by agency personnel or by agency-approved administrators for business partners. Functionality includes:

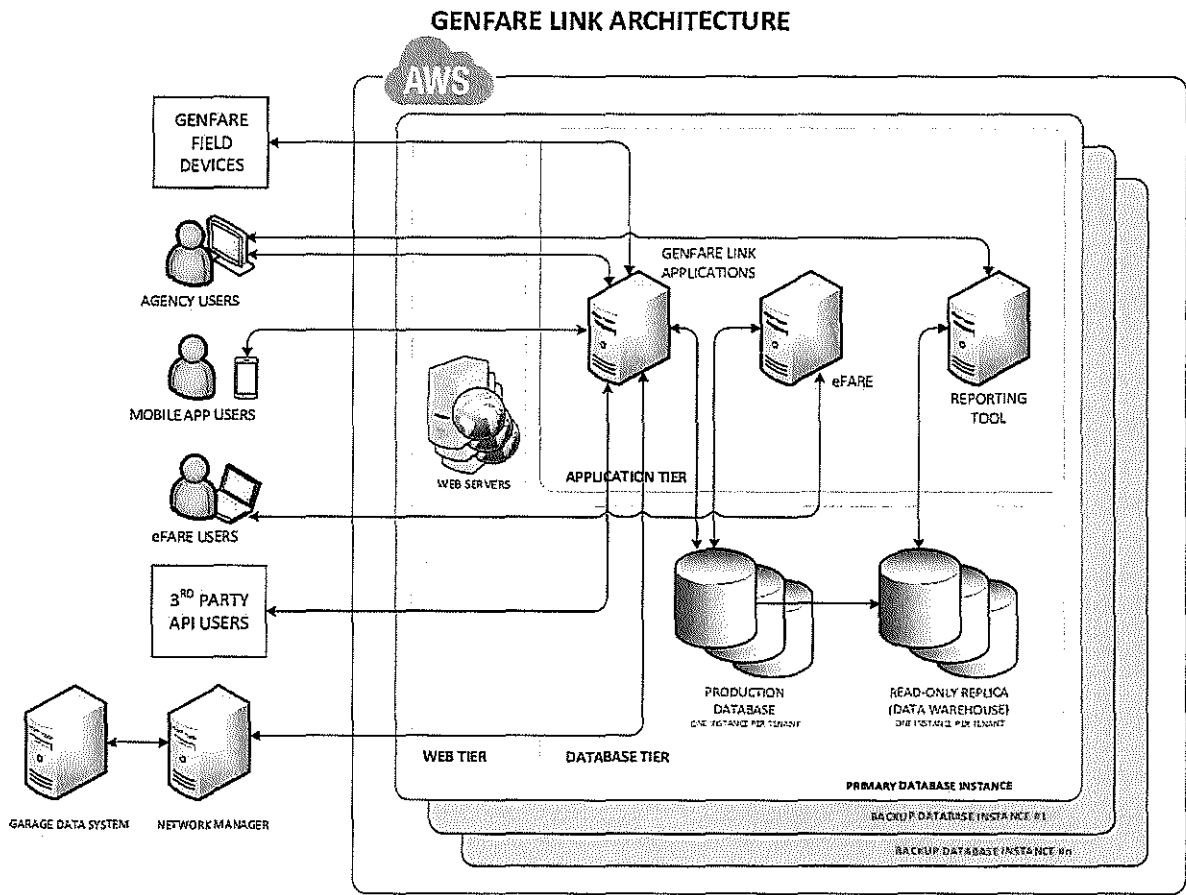
- *Customer Management.* Create, update, enable or disable rider accounts. Includes the ability to add cards to a rider account – this can be done at the agency or organizational level. See below.
- *Fare Care Management.* Manage cards on behalf of riders (add products, badlist card, disable products, etc.).

- *Order Management.* Fulfill orders placed by individual riders through the eFare portal or by an organization.
- *Order History.* Displays information about orders.

The customer care module enables agency-authorized administrators for partner organizations to manage their own programs. Organizational administrators can perform the same services for their members as agency staff can perform for the general ridership.

3.14.3.8 Data Warehouse

As indicated, Genfare creates a read-only copy of the central database to reduce server load during read-intensive tasks such as reporting, ensuring they will not impact other central data system operations. The read-only replica lags <1 sec behind the production copy. The diagram below indicates the architecture of major elements within Link, including the data warehouse.



3.14.3.9 Data Reporting

The Report Link module allows authorized Genfare Link users to generate reports necessary to operate and maintain the system and analyze revenue, and ridership data. Functionality includes:

- **Reporting.** Provides all predefined reports on the Genfare cloud platform, categorized by administration, equipment, finance, inventory and ridership. A report scheduler allows authorized users to specify reports to be generated, time/date (including one-time or recurring), recipient and format. Reports can be readily sorted and filtered – see example below.

Reporting

Reporting Module Landing Page

Scheduled Reports

Detailed Boarding History

Export Types▼

Export

Summarizes all boardings (including transfers) by route, media, and fare

Start Date

01/14/2015

End Date

01/15/2015

Refresh

Media	Product Type	Fare Type	Route	Day	Rides
Paper	Stored Ride	Full	351-149	Weekday	1
Fare Card	Stored Ride	Senior	80-146	Weekday	1
Paper	Fixed Period Pass	Veteran	100-149	Weekday	1
Near Field Communication Device	Stored Ride	Veteran	125-147	Weekday	1
Paper	Stored Ride	Veteran	80-146	Weekday	1
Smart Card	Fixed Period Pass	Veteran	80-149	Weekday	1
LUCC	Floating Period Pass	Full	530-149	Weekday	1
Mobile Phone	Floating Period Pass	Veteran	813-147	Weekday	1
Third Party Issued	Stored Ride	Senior	351-149	Weekday	1
Fare Card	Stored Ride	Disabled	813-149	Weekday	1
Fare Card	Stored Ride	Youth	351-146	Weekday	1
Smart Card	Fixed Period Pass	Full	80-149	Weekday	1
Adhesive Smart Media	Stored Ride	Employee	100-146	Weekday	1
LUCC	Stored Ride	Youth	100-146	Weekday	1
Third Party Issued	Stepped Value	Full	125-147	Weekday	1
Paper	Floating Period Pass	Employee	100-147	Weekday	1
Mobile Phone	Stored Ride	Senior	80-146	Weekday	1
LUCC	Stored Ride	Senior	100-149	Weekday	1
Mobile Phone	Stored Ride	Senior	100-146	Weekday	1
Fare Card	Stepped Value	Senior	80-146	Weekday	1

Detailed Boarding History

Page 1 of 3

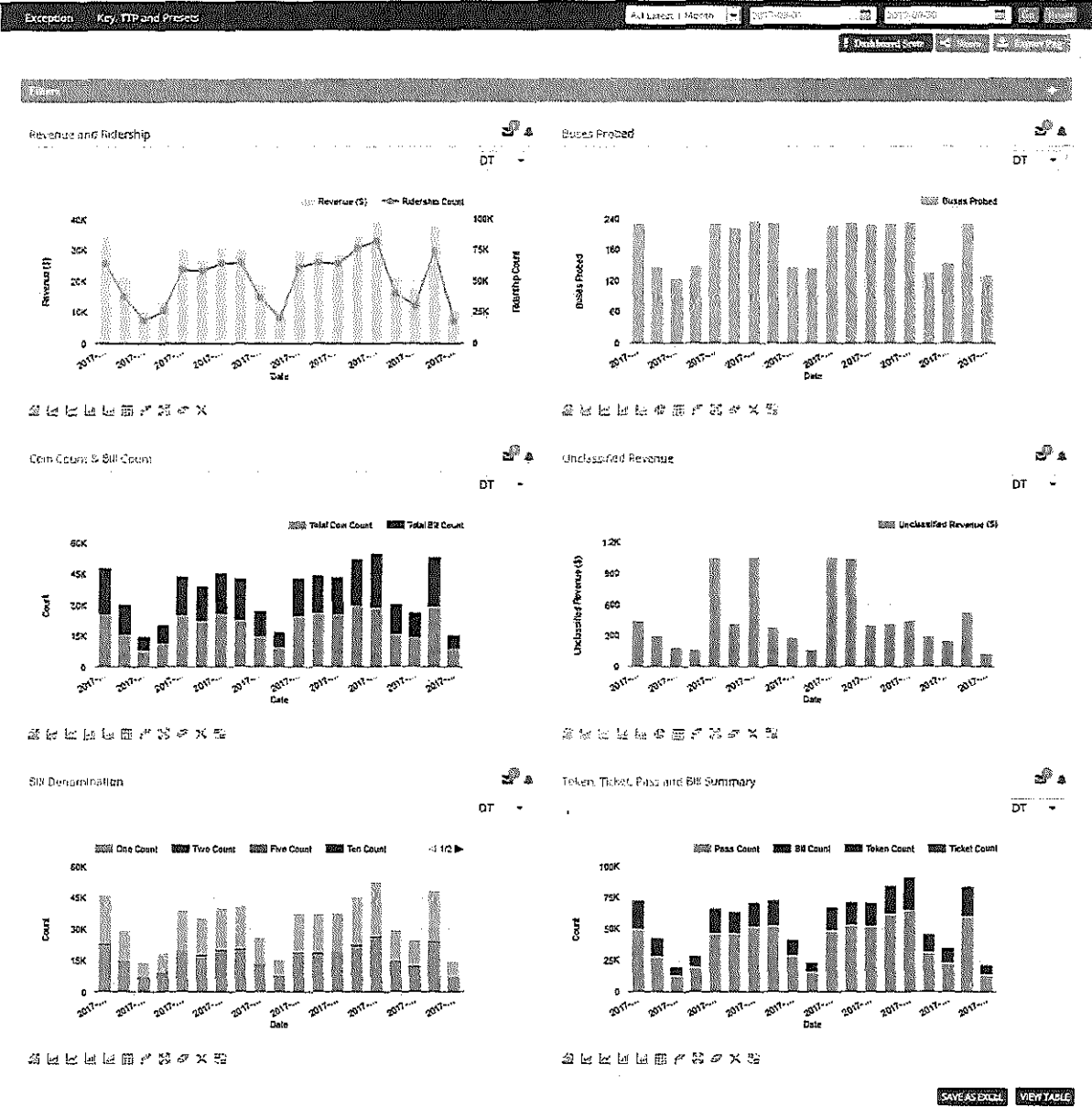
Previous

Next

Typical web-based report using Report Link module

- **Organization Ridership.** Provides ridership reports for selected or all organizations by product or route between specified dates.
- **Enhanced Reporting.** Facilitates data visualization of garage data system and network manager reports – see example below.

GENFARE Monthly Summary – Revenue, Ridership, Coin and Bill
Summary



Summary reports include graphical representation capability

Report Link features:

- Reports on sales, revenue, inventory, devices, and media.
- Graphical representation in summary reports – users can change graphs on the fly.
- Ad hoc reports allow advanced users to create their own custom reports
- Reports can be exported in Excel and PDF formats.

Report Link offers capabilities far exceeding those of previous generation technology. Going beyond simple data recitation, Genfare Link is designed to make data *actionable*. Comprehensive collection, processing, and display of data – in perspective – becomes Data as a Service.

The Genfare Link concept moves past reporting to become data visualization, transforming data into a visual context to better understand patterns, trends, and insights. The ability to see and manipulate data leads to more efficient agency management:

- More effective and informed decision making
- Increased marketing opportunities
- Instant trend recognition
- Exposed anomalies and irregularities
- Simpler team communications.

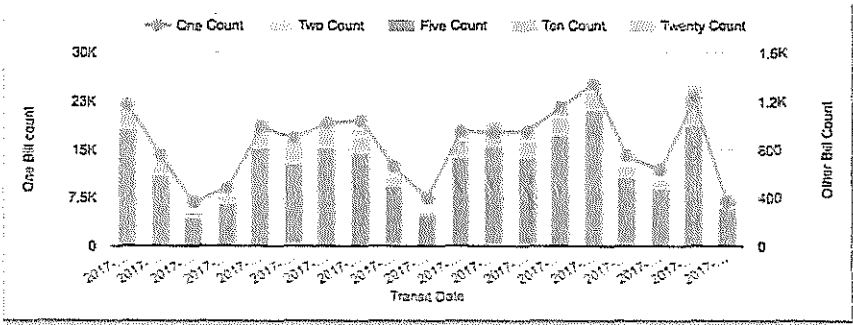
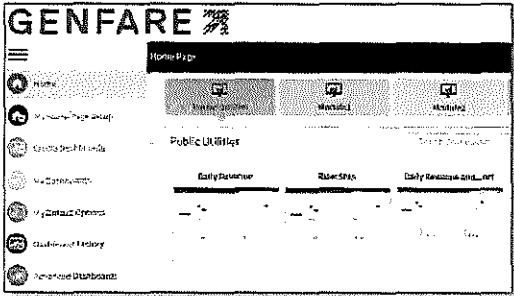
Genfare Link’s reporting module includes state-of-the-art Business Intelligence (BI) tools to allow unprecedented access and visibility into the management, processes, and results of the revenue system. The BI tools enable fast and uncomplicated access to the data warehouse, allowing the agency insight and control from the macro to the micro level.

Amazon Web Services provides a powerful foundation for the secure aggregation and display of the agency’s fare processing system performance. The scalability of AWS hardware resources, along with the Genfare Link design, provides an infrastructure that accommodates all field hardware and system activity. This robust environment is continually updated and refreshed as it simultaneously processes reports. It must perform and maintain velocity over time and years of data accumulation. To accomplish such a feat, Genfare’s design team has been assisted by Red Hat Software Technologies, similar to work they have done with Barclay’s, Lenovo, TransUnion and governmental agencies around the world.

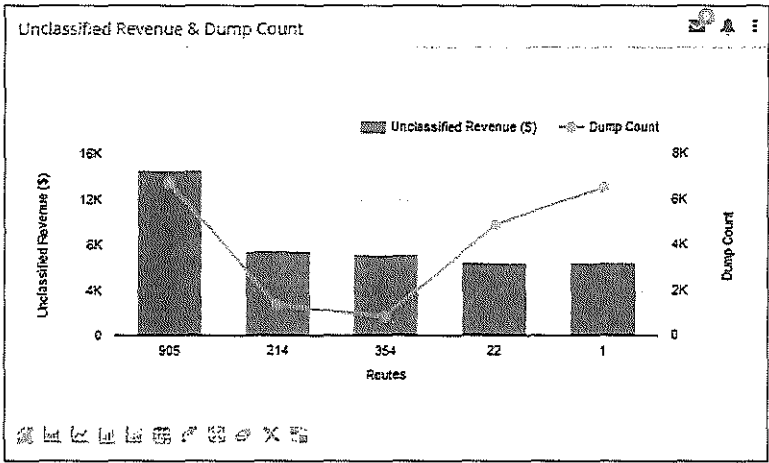
Prior generation reporting

	Date	Revenue	Ridership
Route 22			
1	05/01/2017	\$4,883.00	4,173
2	05/02/2017	\$7.50	12
Totals for Route 22		\$1,893.40	4,185
Route 80			
3	05/01/2017	\$973.55	1,157
Totals for Route 80		\$973.55	1,157
Route 85			
4	05/01/2017	\$4,445.70	2,301
5	05/02/2017	\$0.00	1
Totals for Route 85		\$1,561.70	2,302
Route 87			
6	05/01/2017	\$833.69	1,604
Totals for Route 87		\$833.69	1,604

Genfare Link reports



The Genfare Link data warehouse becomes the “single version of truth,” in IT terms, allowing all revenue management data to reside in one place. Every transaction at every level is recorded in the data warehouse. These transactions indeed go beyond the financial and ridership aspects of the system. The data warehouse even makes available information regarding administrative operations, account manipulations and equipment performance.

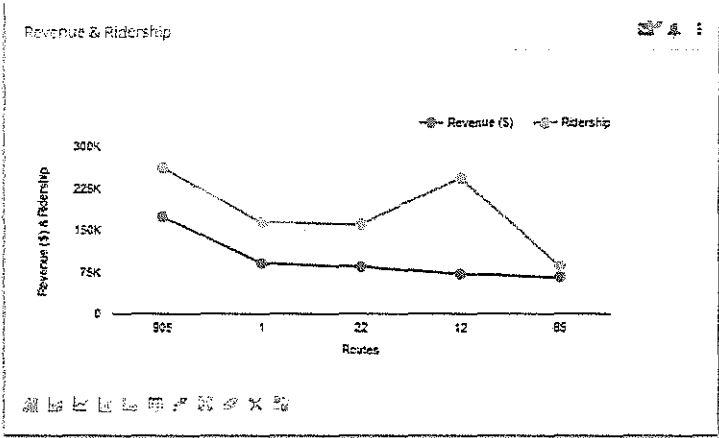


The data warehouse is a “read replica” continuously synchronized with, but separate from, the production database. This architecture allows complex data analysis and deep-dive data queries to be conducted without adversely affecting online account transaction processing. Interfaces to other agency systems are available to support greater integration of the revenue systems into the agency’s enterprise environment. For example, invoicing may be processed through the agency ERP system, providing a consistent billing, aging, and account reconciliation process for the agency’s A/R team.

Although the reporting module and data warehouse are powerful tools managing millions of transactions for the agency, they are built around straightforward concepts aimed at these core functions:

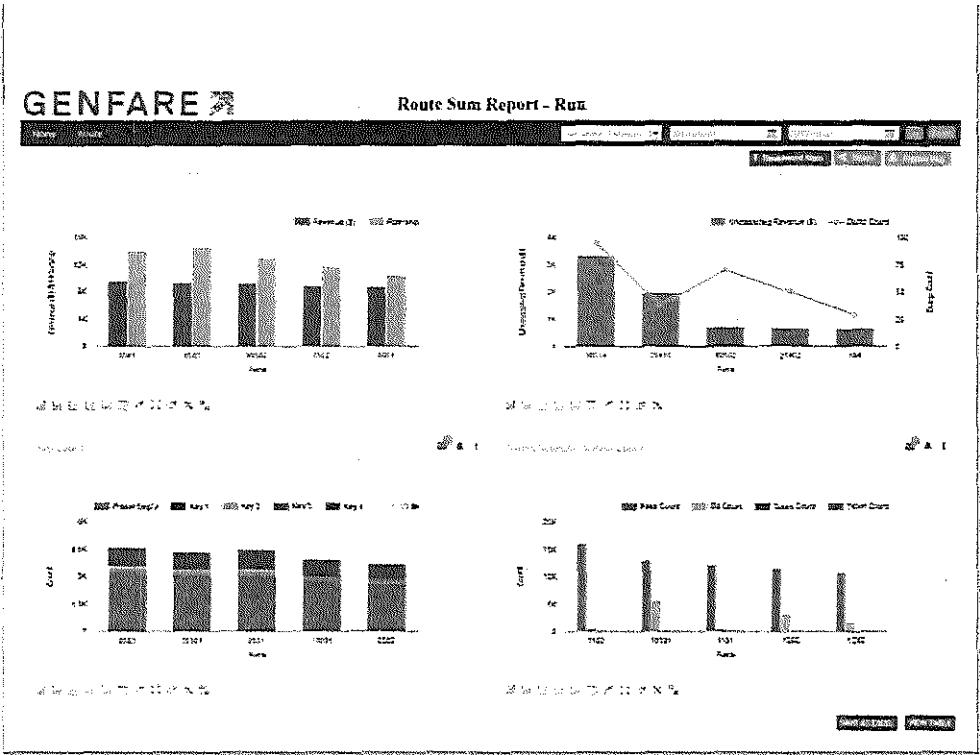
- *Collect:* Data from events at each level of the revenue system is recorded with high precision and in real/near-real-time (including from onboard devices if account-based fare validation is enabled). This data includes transactional status, operating conditions, administrative activity, system performance and much more. Genfare Link absorbs data from each component of the system, including fareboxes, vending machines, retail outlets, web portals, and all system components.
- *House:* The data warehouse resides in the AWS cloud, providing high security while remaining accessible to authorized users from any Web-enabled computer or mobile device. The data is protected in a highly reliable and secure environment where access is restricted to only those who are assigned graduating levels of access rights. The reporting module is easily accessible to the authorized user through a simple browser connection with encryption.
- *Interpret:* The powerful tools provide both tabular reporting and graphical results for users. The self-service portal allows a no-code solution for management and system administrators to analyze data in the ways they choose. For example, ridership and revenue data may be plotted on the same chart to provide instant visibility of trends in pre-paid fare activity.

- Act: Ultimately the analysis of data results in decisions which are designed to improve service, rider engagement, accessibility and other metrics of the agency’s performance. The reporting module allows analysis of data over varying time periods and data groups, providing rapid feedback and measurable results of the improvements that managers and administrators implement.



Comparison in context

The reporting module provides each user the opportunity to design a personal dashboard displaying the metrics critical to their own responsibilities. As each team member launches their user session, they are provided with an overview of information they need.

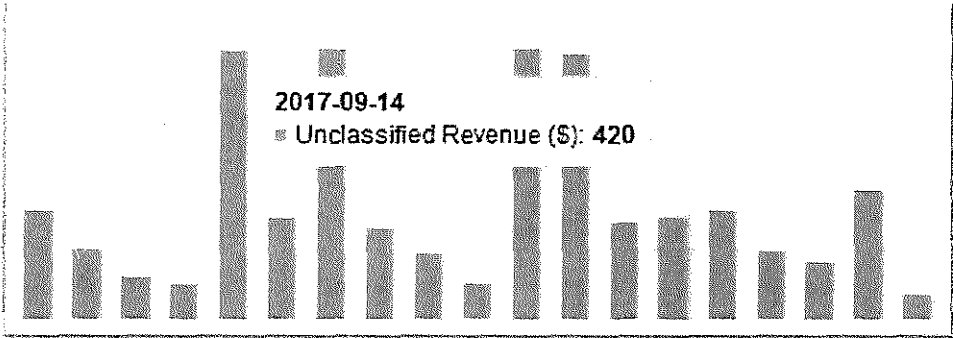


User-configured dashboard

Since the reporting module tools are user-friendly, each administrator has access (when granted permission) to key data elements. Maintenance crews can monitor equipment performance, the

finance department can review revenue trends, and the security team can be alerted instantly to intrusion attempts or other suspicious activity. Authorized users can quickly create custom reports, either for ad-hoc analysis or daily use. No developer assistance or technical background is required; data analysis goes from idea to implementation in minutes instead of months.

Hover-over display provides numerical support for visual indications. A quick move of the mouse pointer illustrates the values behind the chart icons.



Hover-over data display

Click-through functionality allows a summary chart to be analyzed in an instant. A simple mouse-tap will drill down into the background data that comprise the summary result.

Users may also choose to change the chart type with a simple click. The type selection appears below the visualization and allows a user to alter the graphic to display line charts, pie charts, stacked bar, area charts and more.

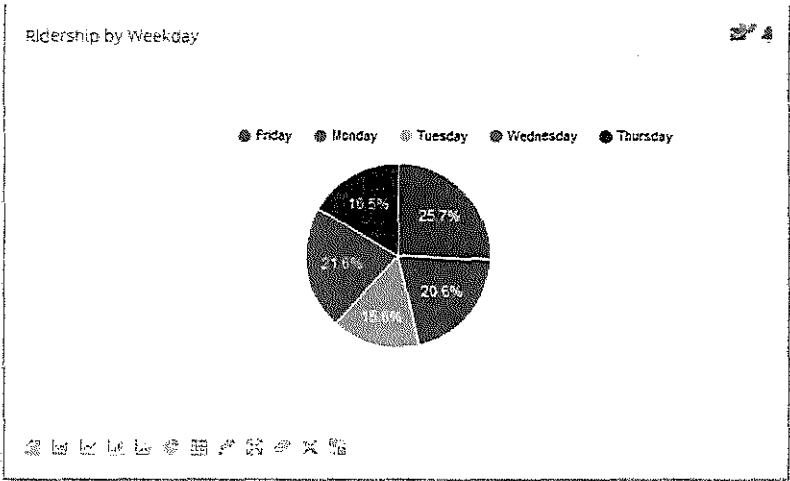
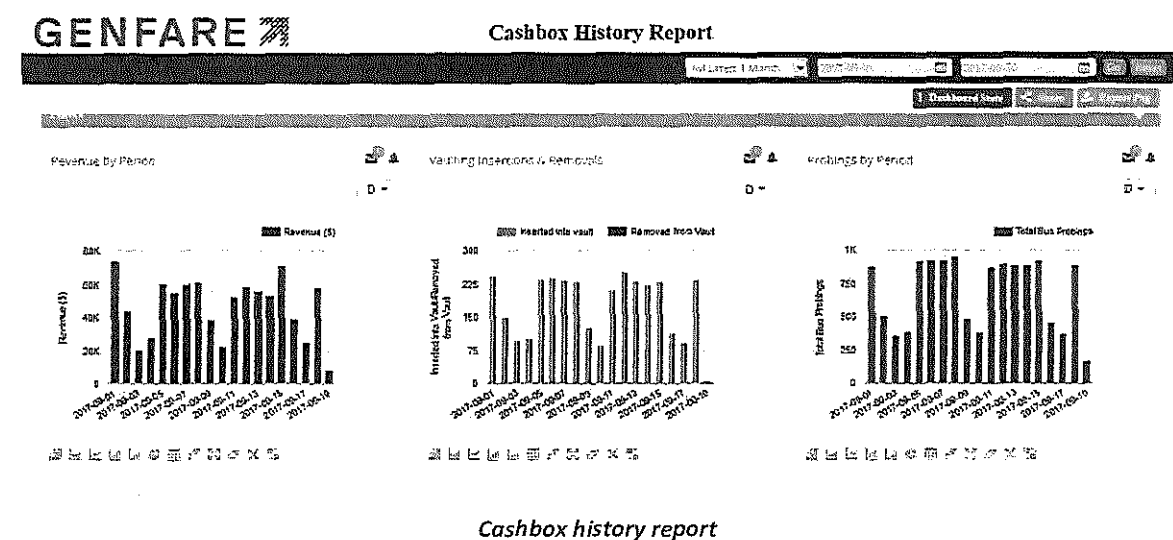


Chart format flexibility

The Genfare Link reporting module reflects Genfare’s decades of experience creating the insightful, user-friendly reporting and analytical tools needed to properly and securely operate a revenue system.

No other supplier can match Genfare’s insight into the proper operation of revenue collection and reconciliation.

Many legacy reports may have new formats, such as the cashbox history report shown below.



The Genfare Link reporting module combines Genfare’s decades of proven experience with state-of-the-art visualization and business intelligence tools to provide a true 360 view of the agency’s ridership and revenue operations.

Hosted Cloud Solution

Genfare Link is hosted in the cloud computing environment provided by Amazon Web Services (AWS). AWS provides reliability, scalability, security, and high performance virtually impossible to attain in a local environment, and difficult to achieve even in a Tier 1 single-tenant remote hosting facility.

Cloud computing offers many advantages:

- Horizontal scaling. Each Genfare Link module, such as administration, eFare self-service ticketing, reporting, etc., has its own tech stack – that is, a set of software components residing on a virtual server. Stacks can be replicated in the cloud as many times as necessary – in some circumstances automatically – without the need to provision additional hardware. This is called horizontal scaling. Among other advantages, horizontal scaling makes it possible to implement multiple identical stack instances in geographically separate locations to assure data redundancy. If one stack becomes unavailable, a replacement stack is automatically created.
- Simplified architecture. All back-end functionality is virtualized, and connectivity and latency issues are virtually eliminated. As a result, much processing currently handled by field devices due to reliability concerns can be centralized, simplifying equipment design and maintenance.
- Faster upgrades, improved technical support. Genfare’s cloud environment serves multiple customers, with all application software centrally stored and maintained. Bug fixes, security

enhancements and the like implemented for one agency will be immediately available to all. Version control and other administrative overhead are greatly simplified, enabling Genfare to focus more of its engineering resources on core customer concerns.

- System monitoring and control. AWS provides many tools to help monitor and control the system. AWS users benefit from Amazon’s ongoing expansion and investment.
- Greater security. As payments shift to new platforms, particularly NFC devices, opportunities for exploits by hackers increase. Cloud-based security features include pattern recognition algorithms capable of detecting anomalous activity not always obvious at the agency level but easily detectable across the entire payment stream, permitting quicker response. In addition, the AWS environment has been audited and certified to a level unlikely in most local installations. These certifications include:
 - *PCI DSS Level 1.* AWS is Level 1 compliant under the Payment Card Industry (PCI) Data Security Standard (DSS), version 2.0. Customers can run applications on AWS’s PCI-compliant technology infrastructure for storing, processing, and transmitting credit card information in the cloud. AWS has incorporated the PCI DSS Cloud Computing Guidelines into the AWS PCI Compliance Package for customers, which includes the AWS PCI Attestation of Compliance (AoC) and the AWS PCI Responsibility Summary, which explains how compliance responsibilities are shared between AWS and its customers.
 - *ISO 27001.* AWS is ISO 27001 certified under the International Organization for Standardization (ISO) 27001 standard. This widely-adopted global security standard outlines the requirements for information security management systems and provides a systematic approach to managing company and customer information based on periodic risk assessments.



3.15 WEB TICKETING APPLICATION

eFare, Genfare’s online ticketing application, enables transit patrons to purchase and recharge smart fare media using any web-enabled computer. eFare will be seamlessly integrated with the agency’s existing web presence and is intuitive, secure, and easy to maintain. By making smart media purchases fast and convenient, eFare will enable the agency to build ridership while reducing costs.

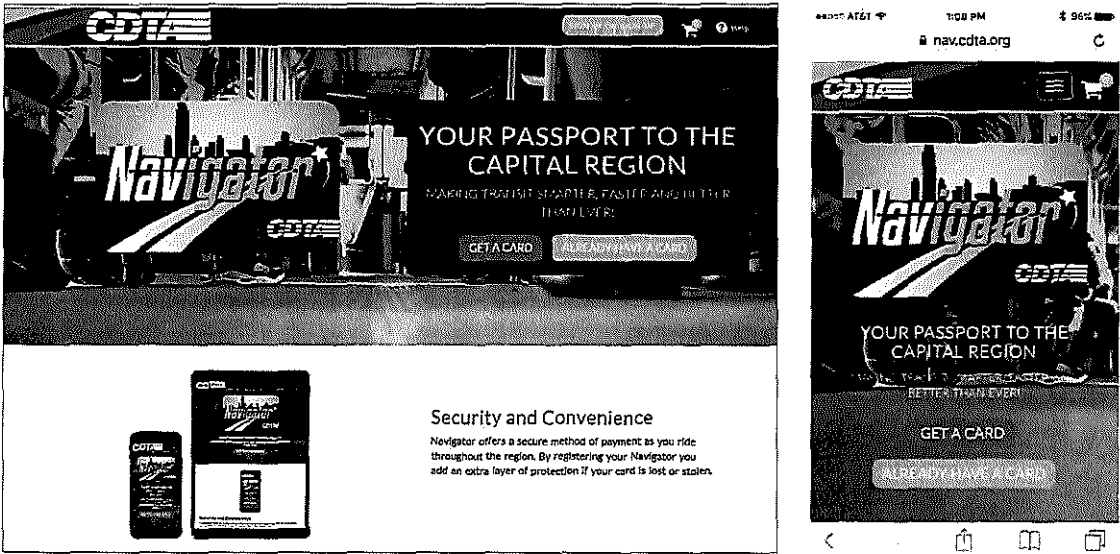
NOTE: The Genfare solution enables agency partners such as schools and businesses to manage fare programs for their constituents through an online interface.

eFare provides the agency with many benefits:

- Easier smart card media use. Smart cards are the fastest, most reliable method of fare collection with low life-cycle costs. By making smart cards easier to obtain by passengers, eFare helps you make the most of your investment in this economical fare medium.
- Rider loyalty. eFare makes fare payment almost effortless. Riders need never again stand in line to purchase or add value to their accounts. If desired, account replenishment can be completely

automatic, with the rider’s credit card debited as needed. Riders are notified by e-mail whenever a transaction occurs, and can opt out of the program at any time.

- Improved customer communication. Riders who register their cards can be notified by e-mail of special offers or service changes.
- Reduced expense costs and better cash flow. Account sales can be handled primarily online, reducing the need for vending equipment or sales outlets. Online sales proceeds are quickly and seamlessly credited to the agency’s bank account.
- Simplified fulfillment. eFare can generate a mailing list for export to the agency’s choice of label-printing software to enable clerical personnel to mail cards to riders. Alternatively, cards can be held for customer pickup. When existing cards are replenished, the account balance in the Genfare Link database is updated immediately and available for fare payment.



eFare welcome screen showing responsive design – desktop (left) vs. phone (right)

eFare also offers many benefits to riders:

- Convenient. Riders do not need to stand in line to purchase or add value to a smart card. Cards can be purchased or accounts recharged at any time from any computer with access to the web.
- Flexible. eFare offers riders a range of payment options. Those not wishing to establish an online account may anonymously add value or validity to their account as needed – no credit card data is retained. For riders who choose to create accounts, automatic replenishment can be selected, ensuring they will never be unable to ride due to an expired or depleted account.
- Secured against loss. Riders who register their cards online can obtain a replacement for a lost or stolen card with the same account value or validity.

3.15.1 Operation

eFare permits riders to configure their accounts online in either of two ways:

- *Nonregistered user.* This is the simplest way for a rider to interact with the system. The rider may purchase extended or limited use cards, or recharge extended use cards using a credit or debit card. The printed smart card serial number and bank card information must be re-entered during each purchase or recharge transaction – this data is not permanently stored. This method provides anonymity but offers fewer features than are available to a registered user. The system also offers options to add account value through retail outlets or using agency TVMs and revalue stations.
- *Registered user.* To register a smart card, the rider creates an online account, providing name, address, and other relevant information. Card registration offers the following benefits:
 - Loss protection. If a registered card is lost or stolen, the rider can order a replacement online with the same account value, rides or validity. The lost or stolen card is automatically invalidated and cannot be used for subsequent fare payment.
 - Automatic card replenishment (auto replenishment). The registered cardholder's credit or debit card information is securely stored by the payment processor, which provides a secure token. The token is stored in CDS and used to replenish the holder's account when the balance falls below a predetermined level. This process is automatic and ensures that the rider's fare card will never be rejected when presented for fare payment.
 - Flexible card management. Registered users can review account usage history and manage multiple cards from the same account.

Smart card accounts can be recharged in one of three ways:

- Manually online. A rider can purchase additional value for an account online.
- Automatically via auto replenishment. Whenever the value remaining in the account of a participating rider falls below a predetermined amount, the rider's bank card will be automatically debited.
- Manually at an agency workstation, kiosk, or other valid POS location.

eFare supports the following special capabilities:

- *Multiple applications per card.* For example, a card can be loaded with a transit identification card for fare payment plus a separate university ID application.
- *Transit benefits.* The system can provide a web-based interface to enable third parties to issue subsidized fare products to their employees, members or clients. Examples include employers providing transit benefits and government agencies. Riders and 3rd party administrators can check their accounts to determine if benefits have been properly loaded.

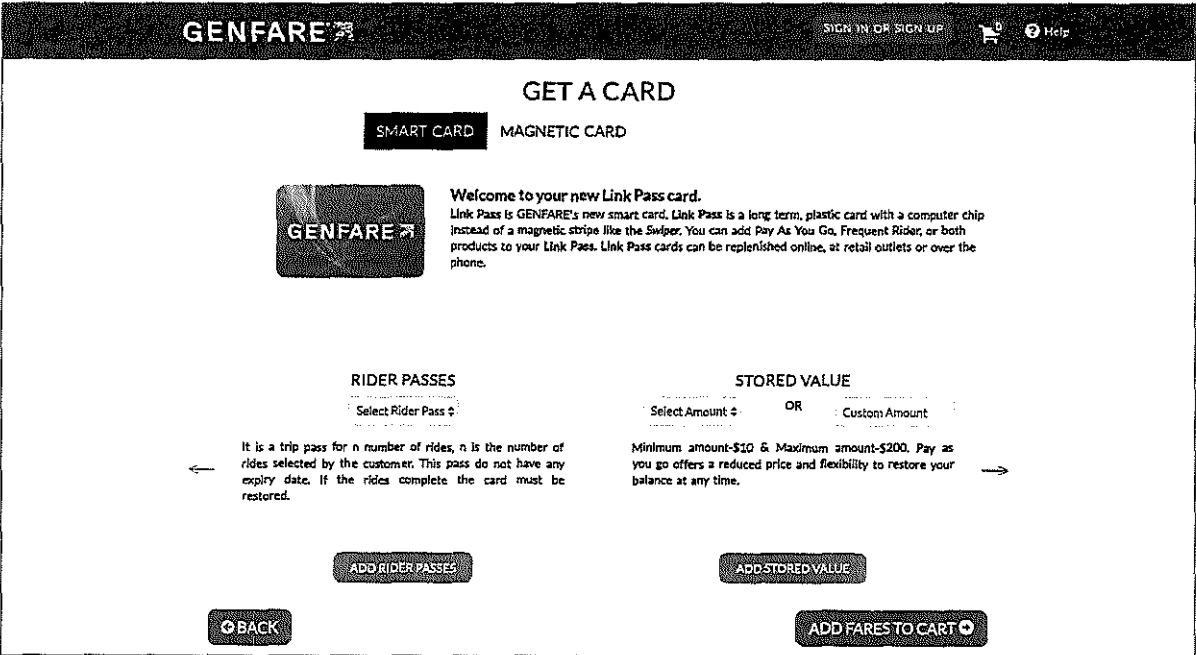
3.15.2 Functionality

The description below includes a sampling of eFare screens and functionality. The content, graphics, and organization of a specific eFare implementation would be customized in consultation with agency staff.

“Add Products” Page. This page provides menus of fare purchase options and lets riders pay using a bank card. Buyers may remain anonymous but receive more privileges if they register.

“Manage My Accounts” Page. This page provides registered users with information about their accounts and lets them replenish cards, buy new cards, check account history, register or unregister cards, and perform other tasks. If desired, riders can configure their accounts for auto-replenishment – when the pass expiration date draws near or the value drops below a threshold amount, the account is automatically renewed or recharged and an agreed-upon payment is charged to the rider’s bank card.

Shopping Cart Page. When users purchase cards or replenish accounts, the “shopping cart” gives them a running total of their selections. The shopping cart is hosted on a secure server compliant with relevant PCI requirements. Once a transaction has been authorized and executed, a receipt is automatically e-mailed, the rider’s bank card is debited and funds are credited to the agency, and the appropriate sales order is generated. If the rider is replenishing an existing card, the system generates an order that is transmitted to the CDS-maintained account to immediately indicate the new balance or fare product. If the rider is purchasing a new card, a fulfillment order is sent to the inventory control workstation, where the card can be encoded and a mailing label printed.



Sample “Add Products” page

3.16 ONLINE PARTNER PORTAL

The Genfare solution enables agency partners such as schools and businesses to manage fare programs for their constituents through an online interface. This is done through the online partner portal.

Administrators for agency partners that distribute fare benefits to their constituent's access account management functions via a web-based interface to the CDS. This interface provides essentially the same functionality available to agency staff but limited to participants in the partner's program. The interface supports tasks such as:

- Bulk card request enables organization administrators to order cards in bulk for distribution to constituents.
- Bulk user import.
- User report enables organization administrators to generate reports on fare activity by their members or customers.
- Beneficiary management enables organization administrators to add, remove, or modify status of their members or customers.
- Bulk product autoloading for beneficiaries.
- Card shipment.
- Action list management for beneficiaries.
- Pre-bill, post-bill, monthly or other period payment programs maintenance.
- Card and/or account history and status inquiry.

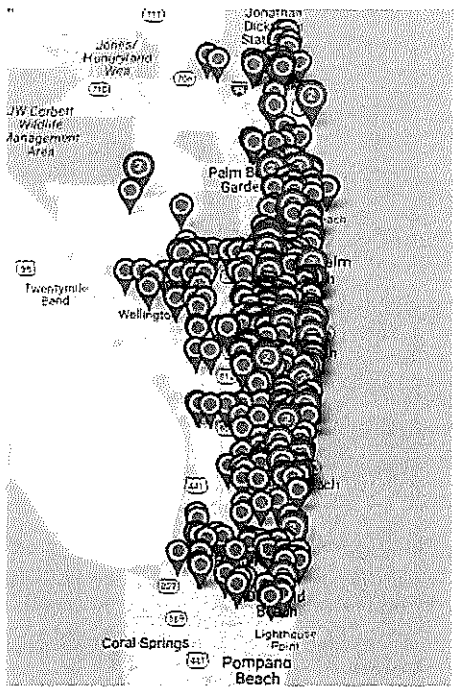
We are happy to demonstrate the partner interface during our forthcoming presentation discussions.

3.17 RETAIL NETWORK

Genfare will make all necessary provisions to interface the Genfare Link central data system to a third-party retail network via API as specified. The network will enable Palm Tran riders to purchase and recharge agency-branded smart cards and mobile accounts from prepaid card services at participating merchants throughout the agency’s service area. All cards sold through the network are configured for stored value. Rider payments are accepted using the merchant’s POS system and immediately posted to the Genfare Link central account database via a back-end link. A rider who added value to a depleted smart card or a mobile account at a participating merchant would be able to use it to board a Palm Tran service on leaving the store.

We have had extensive discussions with InComm, a leading provider of retail network services. A map of merchants in the Palm Beach area participating in the InComm network is shown at right. A description of InComm’s services may be found among the exhibits at the end of this submittal.

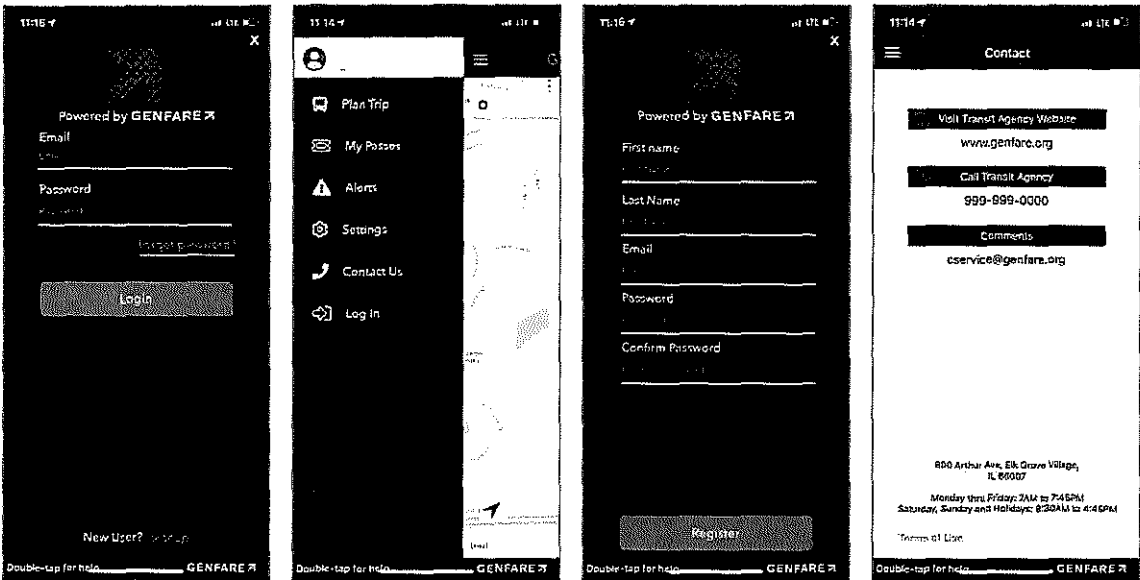
All major retail network providers to our knowledge use essentially the same technical approach. We have extensive experience interfacing our systems to third-party platforms and anticipate no difficulty in this instance.



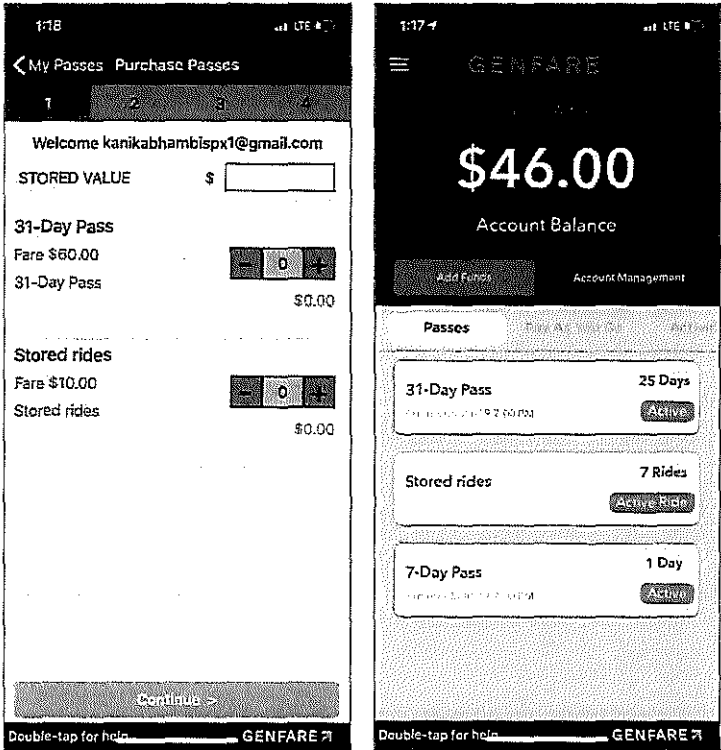
InComm merchants in Palm Tran service area

3.18 MOBILE PAYMENT SYSTEM

Genfare’s proposed mobile ticketing application is an end-to-end solution that allows riders to purchase transit tickets using a mobile device and have their tickets delivered instantly to their phones. Tickets are activated by the rider at time of use and read by the barcode scanner on the Fast Fare farebox or Fast Fare-e validator. Tight integration with the Genfare solution ensures the most effective and streamlined boarding process available in the transit market today. The solution is convenient for riders and provides the agency with increased revenue, reduced costs, and comprehensive analytics. The solution will be tailored to meet specific agency needs, including branding.



From left to right: Login screen, landing page, account registration, and contact information



Left: mobile ticket purchase, right: mobile wallet content



Left: Trip map, right: Step by step direction

3.18.1 Mobile Ticketing Operation

Here’s how mobile ticketing works:

- Customers with iOS or Android smart phones go to the app store for their device and download the mobile ticket application. Apps are also available through the eFare web ticketing portal. There is no charge for the app.
- Customers use the app to purchase mobile tickets. Payment via credit or debit card, transit benefits or stored value is accepted. Eligible ticket types include any fare product designated for mobile use by the agency, including passes, stored ride and stored value cards.
- The ticket is electronically transmitted to the mobile device. When received, the ticket is inactive and stored in the customers “ticket wallet.” To use the ticket, the customer must activate it by tapping a button on the screen. This causes a virtual ticket featuring a 2D bar code to be shown on the phone’s display. Alternatively, the ticket can be displayed for visual validation by agency staff.
- Activation “starts the clock” on period passes and embeds the current time and date in the 2D barcode or, alternatively, causes it to be displayed on the ticket for inspection. On boarding, the

customer must present the virtual ticket to the fare device (either the Fast Fare farebox, Fast Fare-e validator or handheld validator) within a predetermined time, typically 30 minutes. Alternatively, the ticket is displayed to the operator or fare inspector for visual validation if so configured. Once this time elapses, the ticket becomes inactive and cannot be used until reactivated. This reduces the chances that unauthorized copies of the ticket can be used to board without paying.

- If a fare device determines that the virtual ticket is valid for boarding, it sounds the “accepted” beep, the fare registers, and the fare product type is shown on the display. In the case of visual validation, the fare can be registered by driver keypress.

3.18.2 Features

The barcode ticketing application runs on iPhone and Android devices. The interfaces for each device feature common branding and operational flow while conforming to best practices for each platform, enhancing user acceptance and speeding adoption. The app makes ticket purchase easy for both regular commuters and occasional riders. All existing ticket types are supported, and new ticket types can be added as needed by transit authority staff using our ticket configuration module. Tickets purchased on a mobile device are delivered to a secure ticket wallet in the app and are available in both online and offline modes.

Features and benefits of the Genfare mobile ticketing solution include:

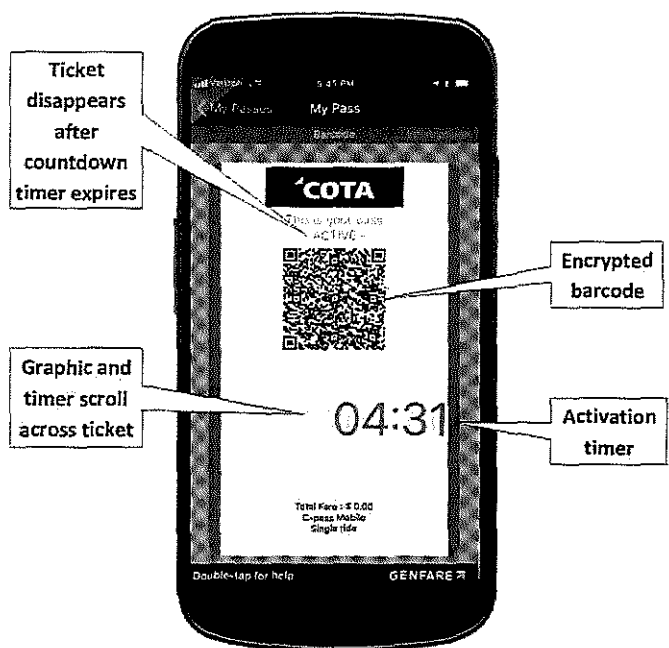
- *Integrated with eFare.* Genfare’s eFare web ticketing portal can be used to view current mobile tickets, review mobile ticketing history, and perform other tasks.
- *Secure payment.* Customers can pay for their tickets using credit or debit cards, transit benefits, PayPal, or a stored value account. Guest checkout for payment is an available option, but users are encouraged to create an account for maximum convenience. The app and web portal are PCI-compliant, using a hosted payment solution to ensure the security of sensitive customer data.
- *“Smart wallet.”* Registered users can store their payment information in our “smart wallet,” allowing them to easily purchase or re-purchase tickets. The wallet allows quick access to tickets and deletes expired or depleted items.
- *Increased customer data and analytics.* The mobile ticket usage data is recorded by the validator and can be used for ridership data and demographics analysis.
- *Ticket history.* The system maintains a history of all tickets purchased by a customer, whether online or using the mobile app. Repurchasing a previous ticket can be accomplished with a few clicks. Customers can also mark a ticket as a favorite, allowing them to easily find and repurchase it as needed.
- *Maps.* The app locally stores agency-provided system maps, which riders can pull up regardless of whether they are connected to the Internet. Location-based services and native map integration help customers find nearby stops and information.
- *Trip planner.* Customers can enter origin and destination and be provided with step-by-step directions for their trip, then click a button to purchase a ticket.

- *Bus arrival status.* We can integrate AVL data from published GTFS or GTFS-RT feeds where available, allowing transit riders to determine when their bus will arrive using their mobile device.
- *Alerts.* The mobile ticketing app provides an interface to the agency's alert channel (for example, a Twitter feed) to allow riders to easily access relevant service advisories and notices.
- *Online help.* The app provides a step-by-step video showing how easy it is to purchase tickets. Every screen has a help button to provide context-sensitive assistance. FAQs and searchable help documentation are also available.
- *Visual validation.* As an alternative to barcode validation, or as a backup in case of automatic fare collection system (AFC) failure, mobile passes can be visually validated by drivers or inspectors.
- *Animated graphics to reduce fraud.* Virtual tickets will feature an animated graphic, indicating the ticket is legitimate and not simply a screen shot sent from another phone. The graphic will be conspicuous from at least five feet away.

Purchasing mobile tickets requires that the app be online to the server. However, for greater reliability, much information is cached on the app for offline access. All information on purchased tickets is stored locally to allow activation and use in offline mode.

3.18.3 Safeguards Against Fraud

The mobile application employs several independent countermeasures to deter fraudulent use. These are particularly important when tickets are visually validated:



Multiple security features ensure secure validation

Activation timer. Customers must activate their mobile tickets upon boarding the transit vehicle. Activating a ticket launches a countdown timer and queues an event to be pushed to the cloud when a connection becomes available.

Scrolling security graphic. Displayed behind the activation timer is a security graphic. The security graphic plus the activation timer scroll across the screen at short intervals to show that the ticket is genuine and not a copy.

Automatic ticket deactivation. Once a ticket reached its activation time limit, it automatically deactivates and either returns to the ticket wallet for later use (as in the case of a pass) or else is sent to the ticket history section, where records of expired and/or invalidated tickets are retained. Customers can go online at any time and review their purchase history and access receipts if necessary.

Barcode security. The data to be encoded in the mobile app barcode totals 98 bytes in unencrypted form. It is encrypted using an AES encryption scheme with a key, and other information if necessary, selected and maintained by the transit authority and managed via the web-based ticket configuration utility.

Once encrypted, the data is passed through a secondary encoding algorithm to better secure and obscure the encryption scheme. The result is then dynamically rendered as a 2-dimensional barcode readable by most commercially available scanners but indecipherable without knowledge of the encoding schema, encryption scheme, and encryption keys.

3.18.4 Payment Processing and Settlement

Genfare will work with you to make payment processing as cost-effective as possible. Industry-standard interchange rates and processing fees are passed directly through to the agency. These fees are billed monthly by the payment processor based on the type and quantity of cards processed – you are only responsible for the payment services you use.

Direct settlement is recommended, with funds deposited directly into the agency’s bank account.

3.18.5 PCI Compliance

To reduce risk and ensure PCI compliance, no customer credit card information is stored on the Genfare platform. Instead, payment information is stored securely by our merchant services vendor and accessed by the Genfare system using tokenization. The token is a representation of the customer’s payment information only and cannot be used to gain unauthorized access to sensitive data. The mobile ticketing system is thus rendered “out of scope” with respect to PCI compliance.

3.19 SYSTEMS INTEGRATION AND OPEN ARCHITECTURE

[Explain] the Proposer’s approach to systems integration and open architecture

Open architecture has been a core principle in the design of the Genfare Link family of products and services from the outset. All communication between Link’s cloud-based components and between Link and field devices is Web-based using HTTPS. A subset of these interfaces will be published as application programming interfaces (APIs) meeting the County’s RFP requirements. The result is a flexible, scalable solution that can readily be integrated with external systems over time without contractor involvement.

Our Web services APIs are based on ReSTful (representational state transfer) architecture, the preferred approach for loosely coupled applications communicating over the Web using HTTP. Our API calls are stateless – client context is not stored on our server between requests, and the client has sole responsibility for managing the state of the application. As a result, no custom programming is required for particular clients and the same API can be used by a wide variety of users. We use layered architecture for deployment, data storage and authentication from one or more servers.

In developing APIs, Genfare has adhered to best practices for ReST services. Uniform API interfaces are exposed to API consumers for access to resources inside Genfare Link. One logical uniform resource identifier (URI) is provided to fetch related or additional data. Resource representations follow guidelines such as naming conventions, link formats and data format (XML and/or JSON). All resources are accessible through standard calls such as HTTP GET and similarly modified using a consistent approach.

Examples of Genfare’s use of APIs to integrate with third-party systems include:

- *COTA C-Pass program.* The Genfare Link software development team wrote an API and related code for the C-Pass program launched by the Central Ohio Transit Authority (Columbus). The API enables the Mid-Ohio Regional Planning Commission (MORPC) to enter details about businesses newly enrolled in the C-Pass program into the Genfare Link database.
- *GTFS, GTFS-R.* We wrote to these Google APIs to provide scheduling and real-time travel updates for our Mobile Link mobile ticketing applications.
- *OpenTripPlanner integration.* We wrote to this well-established open-source API to provide location-based services for the advanced trip planning functionality used in Mobile Link.
- *CDTA STAR program.* We worked with Trapeze to develop an API-mediated interface that enables fare transaction data collected for Albany’s STAR paratransit program to be sent from the Trapeze back end to Genfare Link to permit appropriate value deduction from rider accounts in the central database.



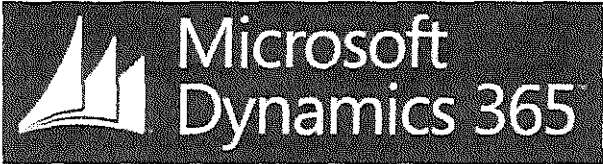
A Genfare-developed API plays a key role in the COTA C-Pass program

We are happy to provide further details about our use of APIs on request.

3.20 ENTERPRISE RESOURCE PLANNING (ERP) SOLUTION

The RFP requires the following:

- A financial clearing and settlement system (FCSS), which must include accounts receivable, general ledger and other modules.
- A customer account management (CAM) system.



To meet these requirements, subject to Palm Tran approval, we will implement an instance of Microsoft Dynamics 365, a cloud service that combines CRM and ERP platforms under one common data model,

and interface it to Genfare Link as specified. Dynamics 365 is designed for organizations looking for an all-in-one business management solution to streamline and connect business processes, improve customer interactions, and enable growth. It will serve as the RMS, GL, AR, and CRM systems specified in the RFP. We believe this integrated, well-supported tool is the optimal solution for the City's diverse needs – see dynamics.microsoft.com/en-us/business-central/capabilities/ for an overview. We will review MS Dynamics functionality during design review to confirm that it meets the City's requirements. Genfare Link provides a lot of capabilities and may fulfill many of the needs of Palm Tran without using Dynamics 365, we will investigate potential savings with the agency if desired.

3.21 TESTING, TRAINING, IMPLEMENTATION, OPERATIONS AND MAINTENANCE

[Illustrate] the Proposer's approach to the overall required work, including testing, training, implementation/transition, operations, and maintenance plans

3.21.1 Testing

3.21.1.1 Overview

Genfare will comply with the testing procedures specified in the RFP. To provide for an efficient process while ensuring that all contract requirements are met, we propose the following approach:

- All major components of the proposed solution are service-proven – we will submit necessary documentation to demonstrate alignment with RFP requirements. We believe the major focus of testing should be on new functionality.
- As part of the design review process, we expect to (a) demonstrate core functionality, with emphasis on features called out in the RFP; and (b) identify and define new features and enhancements to be developed for this procurement. At the conclusion of this process, we expect to provide the agency with a contract requirements list indicating the following for each requirement, subject to agency approval:
 1. Requirement provisionally acknowledged as met; no further contractor action required. It is understood that functionality later found by the agency to be materially deficient will be brought into compliance by Genfare.
 2. Requirement acknowledged as met subject to Genfare's submittal of waiver documentation acceptable to the agency.
 3. Functionality to be developed. At the conclusion of FDR, such functionality will be fully defined and documented.

Items in category #3 will be the focus of testing.

- We will develop test procedures and protocols intended to exercise new functionality and demonstrate contract compliance, subject to agency approval.
- We will implement a user acceptance testing (UAT) environment in accordance with RFP requirements as soon as practical following NTP.

- The test program described in the RFP is geared toward implementation of field devices such as the fareboxes and TVMs. During later phases of the project, the focus will be on acceptance of new media (smart cards) on previously installed equipment (fareboxes). Testing will be adjusted accordingly in consultation with the agency.

3.21.1.2 User Acceptance Testing (UAT) Environment

Genfare's standard practice is to establish a Web-based user acceptance testing (UAT) environment to permit testing of all systems and devices. The UAT environment is initially launched using a test implementation of Genfare Link; peripheral systems and devices are added in due course in specified quantities. The HockeyApp platform is used to deploy iterations of mobile apps.

The UAT environment is used to:

- Test iterations of newly developed functionality following each development sprint. The code is revised based on feedback and new iterations are generated until all contract requirements are met.
- Conduct lab testing prior to rollout as specified in the RFP, to confirm that the system performs as specified.
- Following system startup, the agency uses the UAT environment to test new versions of cloud-based software and mobile device apps, which are introduced periodically.
- Provide staff training.

The UAT is accessible only to agency and Genfare personnel with proper credentials. It is an ideal test bed for exercise of all system elements, including hardware and software.

3.21.1.3 Test Approach

We propose to implement the project in at least two phases, the first focused primarily on hardware and second on cloud-based functionality, new media and software, with a separate design review process for each phase. We believe testing should be conducted in a manner consistent with this approach.

In the first phase, the primary goal is to install and optimize new hardware, including fareboxes and TVMs. The testing program described in the RFP is well suited to this purpose and is not further described here. At the conclusion of phase 1 testing, the expectation is that field hardware will be operating satisfactorily and will substantially replicate the functioning of the current system. All phase 1 hardware is service proven and we expect implementation to be straightforward.

The new capabilities of the Genfare solution will be implemented in the project's second phase. Here we believe a somewhat different testing regimen is in order. The details will be established in consultation with the agency, but in general we suggest as follows:

- At the conclusion of phase 2 design review, all new system capabilities will be fully defined, including new work to be developed for this procurement. The Genfare and Palm Tran project teams will then jointly determine next steps, which may include division of the work into multiple subphases. The project schedule will be modified to reflect the agreed-on approach.

- Most new capabilities will be implemented in software by the Genfare Link project team, which is based at Genfare’s Elk Grove Village, IL headquarters (EGV). The EGV project manager will oversee the Link team’s work.
- As previously indicated, the Genfare Link team uses agile development methods in which new software features are produced in short “sprints,” with new functionality available for testing every few weeks. Initial testing will be conducted by Genfare only. Once we are satisfied that new functionality is operating in substantial compliance with contract requirements, the Palm Tran project team will be asked to conduct its own testing using the UAT environment. Any issues discovered during this process will be immediately addressed. All issues arising during one sprint will be resolved before moving on to the next.
- Once all functionality scheduled for deployment in a given subphase is complete, gradual field implementation will commence. Details will be jointly determined by the Genfare and Palm Tran project teams. We suggest the following framework:
 - System integration test (SIT) conducted in the UAT environment. Genfare PM will oversee preparation of test scripts to ensure that all new functionality is rigorously exercised and proper operation is confirmed. Ample time will be set aside for free-form testing by the Palm Tran team.
 - Once the SIT has been successfully passed, a pilot test of the new functionality will be conducted in the field using a subset of Palm Tran garages, routes or vehicles. The pilot test may or may not involve revenue service initially depending on the nature of the new functionality, but ultimately the new capabilities will be tested under load.
 - Systemwide rollout and acceptance testing.

The preceding is a high level description, the key to a successful outcome is careful planning and execution accompanied by rigorous testing. We look forward to in-depth discussions of this critical subject with the agency.

3.21.2 Training

Genfare will be responsible for training designated agency personnel in the operation of the new equipment. Training will include all necessary instructors, manuals, handouts, classroom aids, etc. Training will commence training approximately four months following notice to proceed or as otherwise agreed.

Training is provided by Genfare’s technical service department. The technical service department has extensive experience in training bus drivers, revenue service and maintenance personnel, and data system operators. In all cases, Genfare’s trainers have consistently received high marks for their knowledge and training skills.

Genfare provides complete training courses as close to installation and service as possible to maximize student retention. Follow-up training is also provided when requested two to four months after installation. (Because Genfare equipment is easy to use and fully documented, this follow-up training is rarely requested.)

On occasion, customer personnel turnover results in a lack of experienced trainers or operators. To address this long-term need, Genfare offers refresher courses at our factory training facility.

All Genfare training courses emphasize hands-on experience using equipment pulled from delivered stock. The instructors provided by Genfare are expert in the subject matter they are teaching. Upon request, bilingual instructors can also be provided.

Instructors. Genfare will provide experienced and qualified instructors to teach the courses as outlined. Resumes of each of the instructors can be provided on request. Instructors have experience, skills, and knowledgeable appropriate to the subject matter being taught and the intended audience.

Training Materials. Genfare's training materials are prepared by the same personnel who develop all customer documentation, providing consistent terminology in training aids and customer reference manuals. Outlines for all training material are presented during design review, providing a high degree of certainty that agency personnel will receive comprehensive training. Training materials will be submitted for approval prior to the start of training.

Instructor Guide. The instructor guide is a more detailed version of student material. An expansion of the student material is included along with instructor notes and discussion guides.

Training Summary. A syllabus is provided to all students in each course which details the course objectives, outlines the subjects to be discussed for each major operating function, briefly describes the equipment to be demonstrated, and identifies the reference material related to the subject. Maintenance courses include a section devoted to system fault analysis and troubleshooting.

Instructional Material. In addition to the training summary, Genfare will use appropriate manuals as the primary reference for each course. Included in these manuals are drawings, descriptive information and procedures necessary to ensure that all learning objectives are met in an orderly and timely manner. Training aids as discussed in the following section are another major source for student reference.

The handouts include all illustrations, operational requirements and procedures, and applicable maintenance routines, if any.

In many cases the manuals go into levels of detail inappropriate for some students. Genfare's training materials are always tailored to the audience; where necessary, condensed versions of the manuals are provided (as quick-reference cards).

Training Aids. Maximum use is made of visual aids for each course. "Hands on" training with actual equipment is employed extensively. All operating equipment, tools and testing devices needed for the training program are furnished by Genfare.

The authority may reproduce Genfare-generated training materials for internal use. Third-party materials may be reproduced to the extent permitted by Genfare's licensing arrangement. Third-party materials are clearly identified. Use of such materials is kept to a minimum.

If new training materials are produced by Genfare within two years following equipment installation, copies will be provided to requesting agencies at no cost.

If desired, all training courses can include written and performance examinations to demonstrate the proficiency of training participants.

Each training outline includes:

- Topics to be covered
- Description of training media to be used
- Training time expected
- Identification and credentials of Training instructor
- Identification of audience type.

3.21.2.1 Operator's Training

Genfare will provide to the agency experienced and qualified instructors who shall conduct one-day classes at the agency training facility. This training program will be oriented toward agency trainers who will in turn train operators. The training program will include the operations of the farebox and validator and log in to the related onboard systems, and will make use of one or more of the fareboxes and validators provided under this procurement.

3.21.2.2 Equipment Maintenance Training

Genfare will provide a comprehensive farebox and related equipment maintenance and repair training program. The Genfare instructor will be well versed in the maintenance and repair of the equipment.

The following topics will be covered thoroughly in the training program:

- Basic construction and functional operation and interaction of the components of the fare collection system
- Examination and disassembly of the farebox and subassemblies including, but not limited to:
 - Bill transport
 - Coin mechanism
 - Inspection plates and chutes
 - Electronic chassis
 - Lower stanchion and cashbox
 - Electrical wiring harnesses
- Preventive maintenance on all subassemblies
- Electrical wiring/troubleshooting
- Field repair of the farebox
- Disassembly, repair and preventative maintenance of revenue collection equipment.
- Review of the computers, probes and other parts of the data transmission and reporting system, its components and troubleshooting.
- Overview of the portable probe system, its components and troubleshooting
- Electronic theory and function of the farebox, computer and system components
- J-1708 and RS-232 ports and how they interface with other on-bus systems
- Software overview of all interrelated systems
- Disassembly and repair of cashboxes and vaults.

The Genfare instructor will make use of visual training aids to reinforce the material presented. The agency and Genfare may elect to conduct portions of training at Genfare’s facility.

Near the end of the equipment warranty period, the Contractor will provide training on bench level repair of all farebox subassemblies, including instruction on circuit board repair.

3.21.2.3 Data System Training

Genfare will provide a qualified instructor to train agency personnel in the proper operation and use of the central data collection and reporting system. Training includes:

- Data system architecture and theory of operation
- Understanding Genfare Link modules
- Understanding the administrative interface
- Understanding fare configuration tools
- Security administration (senior management only)
- Mobile ticketing concepts
- Online ticketing concepts
- Generating standard reports
- Creating custom reports using the report design tool
- Interpretation and management of alarms
- Data warehouse procedures
- Accessing the database for additional analysis
- Customer service procedures
- Introduction to APIs – interfacing to third-party tools
- Troubleshooting.

3.21.3 Implementation/Transition

Please see Sec. 3.3 and subsequent for Genfare’s proposed implementation approach.

3.21.4 Maintenance

3.21.4.1 Warranty

Genfare will comply with RFP requirements with respect to warranty, including the base two (2) year warranty and additional warranty as specified Tab-2 in the price form.

Genfare’s standard approach to warranty administration is as follows:

The Genfare warranty program is processed through Customer Care department. Genfare performs warranty work at its plant in Elk Grove Village, Illinois, except for repairs to revenue collection vaults or the data system, which are generally done on-site.

Genfare will provide the agency with hardware warranty services for a period of four years after the installation and acceptance of all equipment. The warranty covers all parts and labor associated with the factory repair of the equipment during the warranty period.

The remedial work to correct any and all potential deficiencies shall include the repair or replacement of equipment, components, devices, and/or materials. It is understood that Genfare shall be responsible for the costs of all materials and labor, except as provided herein.

The authority must operate and maintain the equipment in accordance with the instructions provided by Genfare in order to maintain the warranty. The warranty does not apply to any equipment which has been repaired and/or altered without knowledge or consent of Genfare and/or is in conflict with Genfare's instructions, and which repair or altering affected its stability, reliability or operating performance.

The warranty does not apply to any equipment which has been damaged through accident or negligence, or which has been subjected to other than normal use under conditions prevalent in buses. Temperature, humidity, bus vibration and ambient electric conditions are considered normal operating conditions for this equipment.

The warranty does not cover the replacement of normal consumable items nor items which are replaced in usual and scheduled preventative maintenance program, such as light bulbs.

For the purpose of the warranty the following types of failures are defined:

1. *Malfunction* – A malfunction is defined as a failure of a given device and/or component in the equipment furnished. This causes a degraded performance of the equipment, but does not render the equipment inoperative.
2. *Equipment Failure* – Equipment failure is defined as failure of a given device and/or component in the equipment. The effect of this type of failure renders the equipment inoperative and/or unsuitable for the intended purpose.
3. *Random Failure* – This is the failure of a given component and/or device in a singular item of equipment and/or failure of a given group of equipment, essentially unrelated in cause.
4. *Pattern Failure* – This is the failure of a given component and/or device in several items of equipment or the repeated failures of the component and/or device in the same item or equipment, which in the opinion of the agency and Genfare is related in cause.
5. *Class Failure* – This is a failure of a given component and/or device in twenty (20%) percent of the equipment provided. The determination of a "Class Failure" by the agency and Genfare shall assume that all such equipment within its respective category has these defects and shall ultimately experience these same failures.

For "random" and "pattern" failures, the agency is responsible for the removal of the various devices and/or components and the payment of shipping charges to Genfare's designated repair facility. Genfare is responsible for repair and/or replacement of defective items and shipping charges back to the authority.

For "class" failures, Genfare is responsible for all costs associated with the removal of components and/or devices, the shipping charges to and from Genfare's repair facilities, and the costs associated with their reinstallation. Genfare will also provide such additional components and/or devices to the authority to use while the repairs are taking place so as not to unduly interfere with usual and normal

bus operations. Genfare will be responsible for meeting with the authority to determine the schedule of repairs. Genfare may, at its option, perform the required repairs at the authority’s bus garages, providing personnel, tools, and materials all at their own expense.

Genfare will receive and inspect all incoming items in accordance with the warranty.

All repair work performed by Genfare shall carry its own ninety (90) day warranty which may be concurrent with the main equipment warranty.

Support Following Expiration of Warranty. Following expiration of the warranty, Genfare will charge the authority for the repair and/or replacement of returned parts on a time and materials basis in accordance with the schedule of rates and prices then in effect.

3.21.4.2 Spare Parts

Spare parts distribution is handled by Genfare's technical support department out of our Elk Grove Village, IL plant. This location is a ten-minute drive from O’Hare International Airport and is convenient to airfreight and other package delivery facilities, enabling us to ship parts quickly in an emergency.

Most of the hardware proposed for this procurement consists of standard product in regular production. Commonly used parts are kept in stock and we receive new deliveries on a regular basis from vendors. Most parts can be shipped within two weeks of receipt of your order. Longer lead times may be necessary to obtain any parts customized for this procurement.

As technology evolves over the equipment's service life, some parts, particularly those involving OEM components, may become obsolete; in such cases an equivalent part or parts will be provided. If Genfare receives sufficient notice that an OEM plans to discontinue a particular part, it notifies agencies using that part so that they can stock up. If OEM parts are discontinued and no one-for-one replacement is available, Genfare typically offers an upgrade package involving the replacement or refurbishment of one or more farebox subsystems.

3.21.4.3 Technical Support

Following expiration of the warranty, Genfare will provide the agency with technical support necessary to operate and maintain the system. Genfare will charge the authority for the repair and/or replacement of returned parts on a time and materials basis in accordance with the schedule of rates and prices then in effect.

Tech support is handled out of our Elk Grove Village, IL plant. We have centralized our tech support and other customer service functions into a single customer care team dedicated to enhancing client service. This new structure makes it easy for our clients to obtain technical support for hardware and software questions, schedule training, order parts and fare media or coordinate repairs. We have implemented tracking and escalation procedures to ensure that all customer service requests are acknowledged, logged and routed to the appropriate party for initial response, then escalated if and when needed. Central logging makes it possible to readily determine the status of an inquiry. Management is alerted to inquiries or requests that have remain unresolved beyond defined limits. This provides a higher level of visibility for each inquiry and ensures that we see it through to resolution.

Genfare technical support personnel are fully trained in the operation and maintenance of Genfare fare collection systems, including bus and data system equipment. The data system is provided with remote access capability to facilitate software maintenance. Genfare field support will be available throughout the service life of the equipment.

The Genfare support functions include tech support, parts ordering and customer care. Our field support personnel have extensive knowledge of our equipment and systems. Most are engaged to varying degrees in equipment repair, system configuration, training, troubleshooting, and occasional special projects in addition to telephone support and as a result have well-rounded knowledge. In the rare case of persistent problems, we can draw upon engineering resources and other senior personnel.

An advantage of the proposed Genfare Link back end is that software support and upgrades are provided as a matter of course. Genfare Link is a multi-tenant hosted solution using a common code base – any improvements can become available to all users. (Enhanced functionality not contemplated in the services agreement may be available upon negotiation of a fee.) The system will be configured to meet agency requirements during initial setup; thereafter agency staff will have the ability to manage system configuration using the tools provided. Genfare technical support personnel are available to assist in this process.

3.21.4.4 Software Maintenance

The Genfare Link cloud-based central data system is provided on a software-as-a-service (SaaS) basis. Clients pay a fee on a scheduled basis and have immediate access to any updates implemented in the Link modules to which they have subscribed. Modules are optimized and enhanced on an ongoing basis and updates are pushed to the cloud periodically. Genfare rigorously tests all updates in a staging environment prior to installation in the cloud. We strongly recommend extensive use of the user acceptance testing (UAT) environment to enable similar testing by the agency. No additional fee is charged for routine updates. An upgrade involving significant new functionality typically would entail subscribing to one or more additional modules for an agreed-on fee.

3.21.4.5 Response Times and Escalation Procedures

The table below describes typical response times and escalation procedures.

Error Priority Level/Description	Genfare’s Expected Action(s) and Response Times
Tier 1 Support – CRITICAL An Error is classified as Critical if an AFC component fails such that any of the following occurs: <ul style="list-style-type: none">Software and/or equipment is inoperable.	Expected response: Genfare will provide an e-mail response stating the status and action plan in 3 hours or less from the time Genfare is notified of the malfunction during standard service hours. Genfare will make every attempt to resolve the Error within <u>24 hours</u> (i.e., allocate as many resources as required). Genfare will give the highest scheduling priority and devote its best efforts and best available resources to the verification, analysis, response, temporary amelioration and full resolution and correction of Errors in this category. If the Error is not resolved within 3 hours, Genfare will assign its most senior

Error Priority Level/Description	Genfare’s Expected Action(s) and Response Times
	personnel to resolution of the Error on a full-time basis.
Tier 2 Support – HIGH PRIORITY An Error is classified as High Priority if any AFC component fails such that any of the following occurs: <ul style="list-style-type: none">Information is not being collected from equipment;Reports are not being generated;The Software or any part or component thereof is not functioning in accordance with specifications.	<p>Expected response: Genfare will provide an e-mail response stating the status and action plan in 4 hours or less from the time Genfare is notified of the Error for High Priority Errors first reported during Standard Service Hours, or prior to 10:00AM CT on the next business day for High Priority Errors first reported outside of Standard Service Hours.</p> <p>Genfare shall provide a status report on the situation within 1 business day.</p> <p>Genfare will make every attempt to resolve the Error within <u>24 hours</u> (i.e., allocate as many resources as needed). Genfare will assign the second highest scheduling priority and devote sustained effort and experienced and available resources to the verification, analysis, response, temporary amelioration, full resolution and correction of Errors in this category. If the problem is not resolved within 6 hours, Genfare shall assign its most senior personnel to resolution of the Error on a full-time basis.</p>
Tier 3 Support – LOW PRIORITY The Error is classified as a Low Priority Error if a malfunctioning element of the Fare Collection System cannot be fixed by swapping out components.	<p>Expected response: Genfare will provide an e-mail response stating the status and action plan within 24 hours or less from the time Genfare is notified of the Error for Low Priority Errors first reported during Standard Service Hours, or prior to 4PM CT on the next business day for Low Priority Errors first reported outside of standard service hours.</p> <p>Genfare shall provide a status report on the situation within five (5) business days.</p> <p>Genfare commits to 100% resolution of the Error within <u>twenty (20) business days</u> (i.e., it will allocate as many resources as are required to resolve the Error within this time). Genfare will give the third highest scheduling priority and devote reasonable efforts and reasonably available resources to the verification, analysis, response, temporary amelioration, and full resolution and correction of Errors in this category. If the problem is not resolved within 12 hours, Genfare shall assign more senior personnel to the work of resolving the Error.</p>

3.22 PROPOSER’S UNDERSTANDING OF NEEDS OF COUNTY AND PALM TRAN

[Demonstrate] the Proposer’s understanding of the needs of the County and Palm Tran

See Sec. 3.7 for a detailed explanation of how the Genfare solution meets the County’s goals.

3.23 COMPATIBILITY WITH OTHER REGIONAL TRANSPORTATION PROVIDERS

[Provide evidence of] the Proposer’s FARE SYSTEM’s compatibility with the other regional transportation services providers

As indicated in Sec.3.7 – item #1, the Genfare solution, particularly our Genfare Link cloud-hosted central data system, provides an ideal platform for whatever regional fare arrangements the agency may wish to enter into. We are happy to discuss this matter further with the agency.

3.24 PROPOSER’S ABILITY TO MEET PROJECT MILESTONES

[Show] the Proposer’s ability to meet project Milestones, including a commitment to or improvement of the project schedule and phasing

A proposed schedule may be found among the exhibits at the end of this submittal. Our schedule will permit early replacement of fareboxes while providing for phased rollout of new capabilities.

3.25 EXTENT OF COMPLIANCE WITH TECHNICAL SPECIFICATION REQUIREMENTS

[Describe] the extent of compliance with the Technical Specification requirements, including key performance indicators

The Genfare solution is substantially compliant with the County’s requirements. All core systems and devices are service proven. Some new functionality will be developed for this procurement. Except where noted, all such work has been included in our base bid. To facilitate evaluation, we provide the following information below:

- New work to be provided
- Exceptions and clarifications
- Information and materials requested in the RFP.

Key performance indicators are proprietary information not suitable for a document subject to public disclosure. We are happy to discuss KPIs with the agency privately.

3.25.1 New Work to Be Provided

All core functionality requested in the RFP is currently in revenue service. Our Genfare Link family of products is subject to continuous improvement in response to customer demand. The new work described below is part of this process and is included in our base bid.

RFP Ref	Requirement	Genfare Comment
8.1.1	Newly detected tokens or authorized identifiers associated with both closed-loop and open payments will result in the creation or modification of an individual Transit Account within the FARE SYSTEM automatically.... For open payment transactions, a transit account will maintain a record of payments processed	Account-based processing, cellular probing, open-payments-ready hardware, and cloud-hosted fare processing platform currently in revenue service. Genfare is at an advanced stage of completing the remaining items as per our roadmap.

	against the financial account being used ... The FARE SYSTEM will manage, batch and submit Open Payment transactions to the Payment Application, as necessary.	
8.3.1, 8.3.2, 8.3.3	<p>The FARE SYSTEM will support all mobile wallets and all open payments bank cards. Proposers should state within their proposal which wallets and open payment bank cards their proposed FARE SYSTEM supports. If not all, Proposers should explain what limitations their proposed FARE SYSTEM has regarding the support of mobile wallets and open payment bank cards.</p> <p>The FARE SYSTEM shall accept the following mobile wallets:</p> <ul style="list-style-type: none">• ApplePay• GooglePay• SamsungPay• MasterPass• Visa Checkout• PayPal Mobile <p>The FARE SYSTEM shall accept ISO 14443 compliant credit and debit cards, including the following association-branded formats:</p> <ul style="list-style-type: none">• Visa payWave• Master Card PayPass• American Express ExpressPay• Discover Zip. <p>[etc.]</p>	We plan to accept all the major wallets and cards as specified. Individual brands has their certification requirement which is time consuming, this is ongoing work that we are undertaking.
8.4	In addition to the APIs, where possible, the CONTRACTOR shall provide Software Developer Kit (SDK)s to provide maximum flexibility to build applications and interfaces with the FARE SYSTEM, without requiring CONTRACTOR support.	SDKs to be developed for this procurement as defined during design review. APIs in current service – these are published versions of Web-based client/server functionality used for all communication between system nodes.
12.3.4	The FARE SYSTEM will be configurable to support a range of capping periods, such as per day, week, or month. Unique full fare and reduced fare threshold values will be supported for all capping periods. The fare capping algorithm will support	Basic fare capping currently in revenue service. Cascading fare capping and other specified enhancements will be developed for this procurement as specified during design review.

	configurable accumulators and threshold values based on the payment type, customer fare category and Palm Tran and/or service type (e.g., local service, express service) being accessed. the algorithm will apply to the transit account and will allow for lost/stolen/expired media to be replaced without interruption of fare capping.	
12.4	Data related to photo ID Media under the FARE SYSTEM, including employee information, reduced fare applications, photographs and access rights, will be stored in and managed by the Photo ID Module of the FARE SYSTEM Back Office (accessible via the CAM System).	Personalized card production capability currently in revenue service. Enhancements specified here to be developed for this procurement as defined during designed review.
12.4.1	The FARE SYSTEM will support storage of reduced fare applications and supporting documentation including photos for identification to be printed on extended-use media. Reduced fare customer information will be stored in the photo ID module of the FARE SYSTEM Back Office (accessible via the CAM System). The FARE SYSTEM will support a potential additional fee for media replacement rate above a certain threshold (e.g., two per year).	See preceding response. Specified enhancements to be developed for this procurement as defined during design review.
14.3	The mobile application shall be compliant with the WCAG 2.0 standard for usability. Compliance will be affirmed by a third-party chosen by Palm Tran. The mobile application will be available in English, Spanish, and up to three (3) other languages to be identified by Palm Tran during design review	Mobile app is WCAG 2.0 compliant. Additional languages to be implemented as defined during design review.
14.5	The [mobile ticketing] rider classifications will be able to be modified manually, or automatically based on customer date of birth or the granting of a temporary classification with a configurable end date. The mobile ticketing will provide Palm Tran the capability to add new modes or participants (e.g., parking and	Automatic reverting of rider classification to be developed for this procurement. Addition of parking and bike share participants to be defined. Genfare APIs enable third-party developers to interface to our system under controlled conditions; this may meet intent of requirement.

	bike share) with unique fare pricing as needed.	
14.6	Customers will be able to transfer their account from one mobile device to another in case of a lost or new device.... There will be a configurable number of times an account can be transferred within a period to prevent fraud (e.g., 5 times a year or 2 times a month).... Bulk creation of accounts will be possible by uploading a spreadsheet or files with customer information.	Account transfer between devices to be developed for this procurement as defined during design review.
17.2.2.5	Registered customers will have the option of <u>initiating a customer service request</u> . The request will generate an incident within the CAM System and assign the incident to the appropriate customer service staff. The Customer Website will allow registered customers to report a card lost or stolen. <u>Initiating this action will immediately result in the associated media being blocked from further use.</u> The Customer Website will allow registered and unregistered customers to automatically resolve issues related to charging of a fare against an instrument other than that intended. This feature will allow customers to transfer existing charges to a designated alternative open payment card or transit account, as allowed by Palm Tran business rules.	We assume underlined functionality is to be provided by automated process with the CAM. To be developed for this procurement as designed during design review.
20.4.3	The APOS Terminal will support no less than 70 preloaded templates from which the user will select prior to printing.... For bulk card personalization production runs, the APOS Terminal will use data files imported from an external source in a Palm Tran-specified format. The data files will include the customer name, digital photograph, and other data as required.	Card production using templates is in revenue service. Enhancements specified here will be developed for this procurement following definition during design review.
30.8.4	The CONTRACTOR shall deploy a COTS software CAM System that allows for the	We propose to deploy an instance of Microsoft Dynamics as described in this

	central management of all customer payment data, order management and fulfillment, and the cradle-to-grave tracking of FARE SYSTEM customer service incidents.... The core function of the CAM System will be to support customer service operations.	submittal. MS Dynamics supports enterprise resource planning and customer relationship management.
30.8.5	The FARE SYSTEM Back Office shall include a Financial Clearing and Settlement System (FCSS) that maintains a general ledger of all financial activity within the FARE SYSTEM, generates invoices and tracks Accounts Receivable (AR), and supports the settlement and reconciliation of funds.	See preceding comment. We propose to deploy an instance of Microsoft Dynamics to support the required accounting functions.
36.5	All diagnostic/troubleshooting information from the FARE SYSTEM shall be sent to Palm Tran’s Enterprise Asset Management (EAM) system for tracking and scheduling of all maintenance and troubleshooting activities. Lastly, all FARE SYSTEM devices shall allow diagnosis via a laptop as well as report self-check information via an email update through the maintenance department’s Verint surveillance system.”	These capabilities will be developed as part of the maintenance tracking system referred to above, as defined during design review. We believe Genfare field devices have sufficient internal processing power and I/O to obviate the need for laptop diagnosis but will review the question with the agency.

3.25.2 Exceptions and Clarifications

RFP Ref	Requirement	Genfare Comment
6.8.1-3	Table 4 refers to EN60529 (1992) IP54 standards for enclosures and says equipment must be “fully protected from power washing (to be tested during Factory Integration Testing (FIT)).”	We comply with the understanding that equipment must be protected with a cover during power washing.
6.9.1	Clearly visible indicators shall be designed in each of the FARE SYSTEM Revenue Components [cashboxes] that allow visual inspection to determine quickly whether the Component has been serviced or not.	Farebox cashbox does not have “needs service” indicators; assumption is that cashbox will be emptied nightly. If less frequent vaulting is desired, we can explore visual indication on display(s).
6.9.1	Each FARE SYSTEM Revenue Component shall be equipped with a contactless Radio-Frequency Identification (RFID) “label” (RFID-Tag), which contains the	Various ID technologies used, e.g., infrared – not necessarily RF. We are functionally compliant.

	unique serial number that can be read by the respective FARE SYSTEM Device upon insertion.	
6.9.1	Each individual FARE SYSTEM Revenue Component shall be able to report the history of its movement as well as be tracked throughout the entire FARE SYSTEM, from first insertion through revenue servicing, <u>to/from repair/storage</u> , and back in to a FARE SYSTEM Device.	Money-containing modules are trackable between field device and vault or money room. Trackability to/from repair/storage would require additional touchpoint. We are happy to explore.
6.16.5	Each FARE SYSTEM Computing device shall be equipped with one or more USB ports to provide for programming information, or the upload and download of data.	ALTERNATIVE. Farebox not provided with USB ports. All data exchange and downloading of new software and configuration parameters accomplished via cellular modem. As local backup, we provide (a) Ethernet port and (b) microSD card slot. USB ports provided in TVM, other devices.
8.2.1	The card formats shall be <u>fully owned by Palm Tran</u> , including the right to distribute specifications to third-parties for media production and to support multi-application smartcard implementations.	ALTERNATIVE. Card format is licensed to Palm Tran and can be used for indicated purposes, including distribution to third parties pursuant to the terms of the license. Genfare retains ownership of underlying IP.
8.2.2	The CONTRACTOR shall provide documentation detailing the format of all transactions generated and used within the FARE SYSTEM. This will include any data formats, message elements and containers, and transport protocols which are not already covered by the required APIs, which Palm Tran will be free to use or distribute without cost or restriction.	To be discussed and defined. Distribution needs some restrictions, as Genfare must protect its IP investment and wide distribution of transaction detail has security implications.
17.2	Websites [for public and for agency partners] will be hosted by Palm Beach County ISS on their Microsoft Azure.	ALTERNATIVE. Genfare-provided websites are hosted on Amazon Web Services, but can easily be linked to from sites hosted on any other platform, including Microsoft Azure.
19.1.2	The cabinet will have a base or mounting pedestal constructed of Grade 316 stainless steel.	ALTERNATIVE. We use Grade 304 stainless steel, which is well suited to this application as demonstrated by tens of thousands of fare devices in current service.
19.1.5.2, 19.1.6	19.1.5.2 says, "Overall, the Farebox shall be no more than 39.5" high, 10.4" wide, and 9.5" deep." 19.1.6 says, "The Farebox required under this contract is a "regular"	These requirements are inconsistent. We assume the latter is intended – this is the size of the Genfare Odyssey farebox currently in use at Palm Tran. The Fast Fare farebox

	or standard Farebox, which shall be no more than 42" high."	measures 41.5" tall by 10.5" wide and 11.9" deep.
22.1	LUs will be dispensed from roll or fan-fold stock.	EXCEPTION. Limited-use cards are provided in die-cut format only.
25.1, 26.1, 30.2	25.1 says extended use cards are to have a minimum useful life of 10 years. 26.1 says limited use cards are to have "a minimum life expectancy of at least 180 days of normal daily use." 30.2 says, "All issued LU-CSCs shall last at least thirty (30) days when used on a regular basis under normal circumstances for fare payment. All issued EU-CSCs shall last at least three (3) years when used on a regular basis under normal circumstances for fare payment."	These requirements are inconsistent. The cards to be supplied comply with 30.2, which reflects standard industry practice.
30.1	The CSC Card format is to be fully documented and it will be owned by Palm Tran to obtain compatible cards from alternative sources.	ALTERNATIVE. Genfare will license the card format to Palm Tran but must retain ownership of the underlying IP. Subject to the terms of the license, Palm Tran may share the card format for the purpose of obtaining compatible cards from alternative sources.
31.2	The CONTRACTOR shall develop all required interfaces to and among the FARE SYSTEM Components.... All such developed interfaces shall become the property of Palm Tran for its use in interfacing other 3rd party components as Palm Tran's needs dictate.	ALTERNATIVE. Genfare does not do agency-specific development. Although new capabilities, including interfaces, are often developed in response to customer requests, they are developed at Genfare's expense, incorporated into our standard product line and are available to all customers. All interfaces are licensed to the agency and may be used to interface to third-party components in accord with our standard licensing agreement.
31.12	Processor load, memory utilization, errors, and other system performance indicators will be available in real-time to help prevent performance degradation and troubleshoot back office issues. Alarm types and thresholds will be able to be configured to allow for custom alerts.	ALTERNATIVE. System performance indicators are provided by Amazon Web Services and indicate the status of Genfare Link as a whole, not individual tenant instances. We use these metrics internally to monitor performance. AWS's system monitoring and diagnostic tools are highly automated and efficient and we not found it necessary to intervene to prevent performance degradation. We are happy to

		provide the agency with a periodic report showing selected cloud KPIs.
31.2	The integrated Farebox will also include an embedded GPS receiver, and append locally captured GPS coordinate data to each transaction.	ALTERNATIVE. Since the agency has a robust Cradlepoint IBR1100 cellular router which provides GPS information, the farebox will obtain location data from the router instead.

3.25.3 Information and Materials Requested in the RFP

6.13.1 – Proposer shall provide with its Proposal, documentation illustrating how its proposed FARE SYSTEM complies with ADA.

ADA compliant features of the TVM include:

- *Insertion and Controls* – All slots, bezels, pushbuttons and dispensing bins requiring manual manipulation are positioned between 18 inches and 48 inches from the floor. All controls are wheelchair-accessible via side reach. Ten function keys are numbered 1 through 0.
- *Graphics* – TVM graphics are printed in color on .007-inch clear Lexan polycarbonate and affixed to their backing by full-area high-yield adhesive. The graphics make use of symbols where possible and have ADA Braille raised character equivalents for all words provided.
- *Audio* – It is possible for a patron to press a button to hear spoken instructions.

ADA compliant features of the farebox include:

- *Insertion and Controls* – Slots, bezels, buttons and dispensing cups requiring manual manipulation are positioned between 18 inches and 48 inches from the floor. All controls are wheelchair-accessible via side reach. The coin and bill are shaped to facilitate insertion of cash.
- *Graphics* – Pictograms etched into the top lid depict the type and orientation of fare media to be inserted in the various bezels. Etching is sufficiently deep to enable the visually impaired to “read” the pictograms by touch.
- *Positioning* – The farebox will be positioned on the bus to ensure that the aisle is unobstructed and allows for side reach and passage of a wheelchair.

6.13.2 – Proposer shall provide with its Proposal, documentation illustrating how it will comply with Title VI provisions and language for English, Spanish and Creole.

The system has been designed with the knowledge that it will serve a diverse audience and must not disadvantage unbanked or low-income patrons. Our ticket vending equipment includes robust provisions for cash payment, including change-making capability, and enables unbanked riders to manage their transit accounts and deposit cash, allowing them to share in the benefits of electronic fare media. Our administrative point of sale terminal (APOS) likewise facilitates cash payment. We offer multiple options for distribution of low-cost fare media to clients of social-service agencies. Our systems provide multilingual support, including English, Spanish and Creole. The Vendstar TVM makes it easy to

switch languages at any point, and to hear instructions in audio form. On both the TVM and farebox we use pictographs rather than verbal instructions wherever possible.

6.16.5 – Data shall be protected so that, in event of failure of the main logic board, data generated by the FARE SYSTEM Device prior to the failure may be retrieved through authorized means. Specific means are to be described within the Proposer’s Proposal.

All field devices upload data to the central data system in real time or at short intervals – this is the most reliable backup. If additional safeguards are desired, we can provide local backup memory cards as an extra-cost option.

7.1.1 – The Proposer shall include sample screen shots of the various UIs included with its Proposed FARE SYSTEM as well as a description of how its FARE SYSTEM application has been developed adhering to commonly accepted UI/UX principles.

UI screenshots have been included in this submittal as part of the technical narrative for each proposed device or system. Our UI/UX design conforms to commonly accepted principles, including but not limited to simplicity of design; minimal steps to accomplish core tasks; consistent look, feel and navigation across all screens; industry-standard navigation icons and conventions; context-sensitive help; plain-language, non-threatening error messages; back up/undo/cancel functionality as appropriate; and so on. We are happy to demonstrate our UI approach if invited to make a presentation.

29.2 – The Proposer shall list supported smart card protocols; e.g., ISO 14443 A/B, and describe in its Proposal how its Proposed FARE SYSTEM could recognize and accept existing third party Pass participants’ IDs as well as the Proposers proposed CSC technology, including memory size.

The Genfare solution supports the ISO/IEC 14443, the standard for virtually all smart media used in U.S. transit. We can recognize and accept any third-party card that is ISO 14443 compliant provided the card format and an agreed-on quantity of sample cards is provided to us. We have successfully implemented many third-party card programs involving multiple types of media over our history, including a complex program in Columbus, Ohio (COTA) involving four kinds of card – smart cards, smart stickers, mobile tickets and magnetic cards.

For account based system Genfare recommends the use of DESFire EV1 256B, the Limited use smart card can be Ultralight Nano unless Palm Tran sees a need for more memory. We are happy to discuss.

30.9.1 – Proposers shall describe the types of dashboards that the FARE SYSTEM is capable of displaying, including the ability for Palm Tran to create and/or configure these to display the information it would like to track.

Sec. 3.14.3.9 for a description of Genfare Link’s reporting and data visualization capabilities, including the ability to create user-configurable dashboards. As the illustrations in this section show, users can configure their dashboards to show any desired metric, which is updated on a regular basis. We are happy to demonstrate how to set up dashboards if invited to make a presentation.

30.9.13 – As part of the CONTRACTOR’s Proposal, the CONTRACTOR shall provide samples of all reports available from the proposed FARE SYSTEM Backend, as well as procedures for generating custom reports not included in the FARE SYSTEM.

Samples of all standard reports have been provided with this submittal in two forms – one separately bound hard copy, and one electronic copy in PDF format on the flash drive accompanying the printed copies of the proposal. We are happy to demonstrate procedures for generating custom reports and queries if invited to make a presentation.

30.13 – The CONTRACTOR shall provide Palm Tran with its Disaster and Recovery plan (DRP) as part of its Proposal. The DRP shall include provisions to ensure that all settlement information continue to be accessible.

A copy of our disaster recovery plan may be found among the exhibits at the end of this proposal.

30.14 – Data and Information sent over public communication lines shall be encrypted. The CONTRACTOR shall submit with its Proposal its proposed encryption scheme.

All data between system nodes is accomplished using the secure HTTPS protocol, in which all data is encrypted as described in data flow diagram in 3.14.1.

33 – The Proposer shall provide a sample of its Training Program Plan (TPP) that would cover the training of its proposed FARE SYSTEM. Also, the Proposers shall include in its proposed FARE SYSTEM MPS [Master Project Schedule] when and for how long training will be provided. This should be of sufficient detail to highlight each of the individual training modules.

A sample training program plan may be found among the exhibits at the end of this proposal.

34 – The Proposer shall provide a detailed description of its proposed solution for addressing [documentation requirements].... The Proposer shall provide a listing of all the documentation being provided with the proposed FARE SYSTEM. Also, the Proposers shall include in its proposed FARE SYSTEM MPS when Documentation will be provided.

Genfare provides user manuals and other documentation in accordance with contract requirements. Absent such requirements, our practice is to provide a comprehensive user manual for each major system or device. Our hardware manuals typically address such topics as:

- Equipment overview
- Unpacking, installation, and commissioning procedures
- Operating procedures
- Troubleshooting guides and flowcharts
- Step-by-step maintenance procedures for all major modules, including repair, replacement, cleaning, lubrication, adjustment, etc.
- Recommended preventive maintenance schedule
- Safety warnings and advisories
- Revenue service procedures
- Security procedures
- Illustrated parts guide, including exploded diagrams showing all subassemblies and components, with part numbers.

Our software manuals include:

- System overview
- Quick start guide
- Installation
- Description of system architecture and major components
- System startup
- Illustrated description of all menus, screens and functions
- Report generation
- Security procedures
- Database procedures
- System administration procedures
- Troubleshooting
- Special procedures, e.g., database rebuilds.

A proposed project schedule indicating when documentation will be provided may be found among the exhibits at the end of this submittal.

34.1 – The Proposer shall provide [a special tools] list with its Proposal.

Subject to agency approval, the following special tools will be provided:

- *Farebox test bench.* The test bench is essentially a complete Fast Fare farebox minus the cabinet, with all components spread out on a board. Sufficient slack is provided in the cabling connecting the components to permit easy swapout of modules for testing/troubleshooting, training and adjustment.
- *User acceptance testing (UAT) environment.* The UAT environment is a test implementation of the fare system set up on agency premises, ideally near the training room. It is isolated from the production system and can be used as a “sandbox” to test new software and processes. It can also be used for training/familiarization, demonstrations, testing of “what if” scenarios, etc.

Our base bid UAT includes test equipment specified in Tab-1A, and test instance of our Genfare Link cloud-hosted central data system. The Link implementation will include test instances of our Mobile Link mobile ticketing system, eFare online ticketing portal, online partner portal, administrative portal, and customer service portal.

The UAT should also include Wi-Fi and cellular probing equipment plus administrative workstations, which may be any Windows-based computer. We assume the agency will provide these items unless other arrangements are made.

We will do all work needed to assemble and configure the UAT and make it fully functional in consultation with the agency as reasonable and necessary.

During implementation, we will provide a list of common needed to maintain field equipment (hand tools, voltmeter, etc.) These tools are readily obtained from commercial sources and are not provided as part of this procurement.

35 – The Proposer shall provide a sample of a Delivery and Installation Plan (DIP) that it has used for similar AFCs as the one it is proposing for Palm Tran. The Proposer shall include its proposed Delivery

and Installation schedule in the MPS being included as part of its Proposal.... The Proposer should describe its proposed FARE SYSTEM Transition Plan for keeping Palm Tran’s Current FARE SYSTEM in operation until it is ready to “cut” over to the proposed FARE SYSTEM.... The Proposer should highlight any specific requirements expected of Palm Tran.... The Proposer shall indicate in the Proposed MPS time to obtain any required permits, licenses and to have any required inspections conducted.

A sample installation plan has been included among the exhibits at the end of this submittal. The installation plan is reflected in the proposed master schedule, which is also included in the exhibits. Our farebox transition plan is described in Sec. 3.3. Tasks to be accomplished by the agency are listed in Sec. 3.26.2. Genfare has all licenses necessary to conduct business in the Palm Tran service area. Since the proposed hardware will replace existing Genfare hardware of similar footprint, we do not anticipate a need for facilities modifications requiring permits; facilities modifications in any case would be the responsibility of the agency. We have conducted preliminary inspections of agency facilities and will conduct any additional inspections that seem advisable prior to contract award.

36 – The Proposer shall provide a detailed description of its proposed solution for addressing maintenance equipment, specialized tools and fixtures, spare parts and maintenance reporting system].

Specialized tools and fixtures were addressed in item 35.1 above. Other maintenance equipment consists of commonly available tools; as indicated we will provide the agency with a list of such tools during implementation. Spare parts and tech support are discussed in Sec. 3.21.4.

37.1 – The Proposer shall provide with its Proposal a sample of its Testing Program Plan (TSPP), which illustrates all of the testing to be provided for a similar system as its proposed FARE SYSTEM.... The Proposer shall indicate in its proposed MPS when and for how long testing will be conducted.

A sample testing program plan may be found among the exhibits at the end of this proposal. Testing is addressed in the proposed master schedule, which can also be found in the exhibits.

37.1.1 – The Proposer shall include Sample Test Procedures illustrating the above tests as conducted for other similar FARE SYSTEM projects.

Sample test procedures may be found among the exhibits at the end of this proposal.

39.1 – The Proposer shall name its intended PM for this project and include their resume in its Proposal.

Genfare’s designated project manager is Rob Antonio, who has successfully managed many previous projects comparable in scale and complexity to the present procurement. Rob’s resume may be found among the exhibits at the end of this submittal.

39.1.1 – The Proposer shall include in its Proposal, its proposed Program Management Plan (PMP) for the proposed FARE SYSTEM.

A high level description of Genfare’s program management approach may be found in Sec. 4.6. An organization chart may be found in Sec. 4.1. A sample program management plan may be found among the exhibits at the end of this submittal. We will provide a detailed program management plan including CDRLs list, etc., at the kickoff meeting following Notice to Proceed.

39.1.2 – The Proposer shall include a description of its proposed Document Control Process for the proposed FARE SYSTEM.

Document control procedures may be found in the sample program management plan included among the exhibits at the end of this submittal.

40.1.3 – The Proposer shall provide in its Proposal its proposed master project schedule for the proposed FARE SYSTEM.

Our proposed master schedule may be found among the exhibits at the end of this submittal.

3.26 COUNTY RESOURCES REQUIRED TO FACILITATE IMPLEMENTATION

Indicate the County resources that will be required to facilitate the implementation, including clear indications when within the Proposer’s proposed project schedule

Tasks to be performed by the Genfare and the County are listed below. Deadlines for completion of these tasks will be reviewed during the kickoff meeting following Notice to Proceed.

3.26.1 Tasks to Be Accomplished by Genfare

- Genfare will perform all work tasks in the manufacture and delivery of the fare equipment proposed.
- Genfare will develop a schedule and work plan for the performance of all work tasks within an agreed-on time frame.
- All equipment will be installed and tested in accordance with an installation plan developed by Genfare and submitted for agency approval.
- For those items of equipment to be installed by the contractor, Genfare will provide all hardware, tools, personnel and supervision for installation work in accordance with a schedule proposed by Genfare and approved by the agency.
- Genfare will provide sufficient personnel to monitor, inspect and adjust all equipment during system startup.
- All equipment proposed will be of the latest engineering change level available with modifications installed for all known operational problems.
- Genfare will retrofit all new problem solutions (engineering changes) to the equipment installed during the testing and warranty period following agency approval.
- Genfare will make on-site visits and surveys as necessary to fully familiarize itself with agency vehicles, operations, and facilities.
- Genfare will provide full and competent engineering services to handle and correct all problems associated with the performance of its equipment.

- Subsequent to the warranty period, parts, assemblies, and equipment shipped to Genfare for repairs shall be subject to repair charges, and the services of Genfare personnel for repairs in the field shall be compensated in accordance with an optional fee schedule.
- Genfare will provide the services of a qualified project manager to consult with the agency as needed regarding installation of the equipment specified under this contract.
- The Contractor will utilize existing DC electrical power on agency buses and AC electrical power on the property. Genfare will supply any electrical equipment necessary to utilize existing voltages. If existing power arrangements are unsatisfactory, Genfare will provide sufficient advance notice to enable agency to make necessary provisions.
- Contractor will provide all necessary training and documentation as described in this proposal.

3.26.2 Tasks to Be Accomplished by Authority

- Agency is responsible for providing all data and access reasonable and necessary to configure the system, including but not limited to fare structure and business rules; style sheets, logos and other necessities for “skinning” websites, the mobile application, and the like; and fare media requirements. It is understood that time is of the essence and that delays by the agency in providing necessary information may result in delays in implementation.
- Agency is responsible for making vehicles available to Genfare for installation in a timely manner and providing a suitable installation site and necessary utilities. Agency is responsible for vehicle movement and repair, supervision of agency personnel, and inspection and signoff on installed equipment.
- Agency shall provide a suitable air conditioned location on agency property to house computers, printers, and other items of equipment required for the transmission and reporting of data.
- Agency shall provide the network and wireless coverage for the wireless data probing system.
- Agency shall provide project management to work with the Contractor’s project manager throughout the life of the project.
- Agency is responsible for site or facility modifications that may be required for installation of the fare collection system.

3.27 DETAILED TIMELINE FOR REQUIRED SERVICES

[Provide] a detailed timeline for performing the required services from NTP start to completion

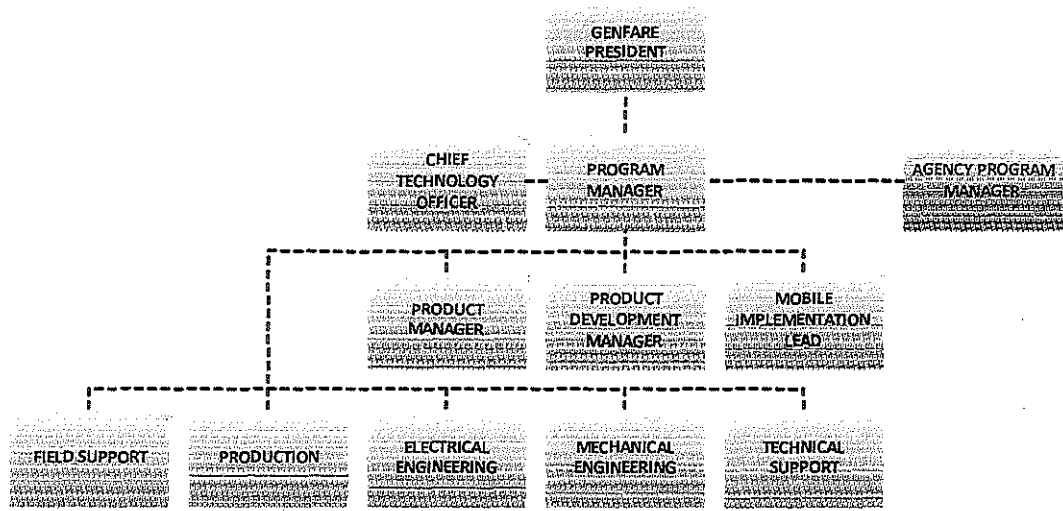
A proposed project schedule may be found among the exhibits at the end of this submittal.

4. PROJECT MANAGEMENT, KEY PERSONNEL AND OPERATIONS INFORMATION

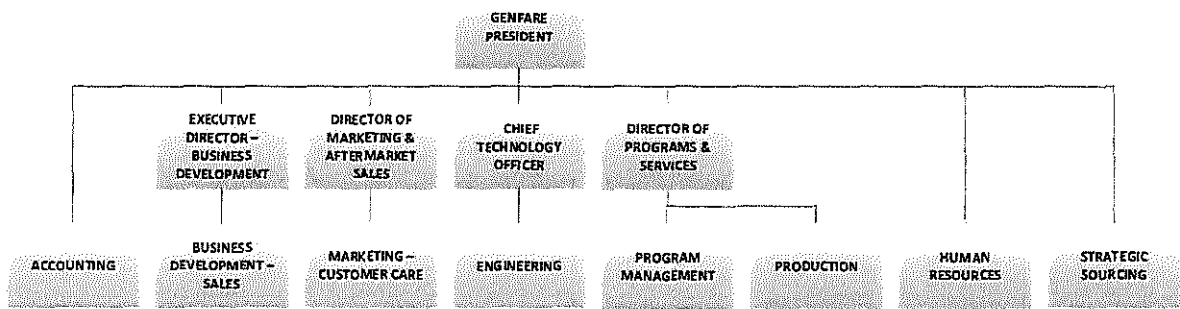
4.1 ORGANIZATION CHART

The proposer shall provide ... an Organizational Chart identifying the structure of firm and that of the project organization, including subcontractors/suppliers

Two organization charts are provided. The first shows the organization of the project team proposed for this procurement. The second shows the organization of Genfare as a whole.



Genfare project team organization chart



Genfare company organization chart

4.2 KEY PERSONNEL

Provide a list of the key personnel, including those from subcontractors/suppliers, assigned to the project, along with a complete resume detailing their experience, education, expertise, qualifications and knowledge of the project

The Project Manager, subject to the County’s approval, will be Rob Antonio, PMP, who has successfully managed many major projects including Broward County. Resumes for Mr. Antonio and all other Genfare project personnel are included in the exhibits at the end of this submittal.

All key project personnel proposed for this contract including the project manager are based at Genfare’s headquarters in suburban Chicago. Time commitment of each team member will vary depending on the stage of the project, as shown in the following table. During periods of peak involvement, the Palm Tran project will be the primary focus of attention.

As indicated in this submittal, the Genfare project manager participates in weekly production meetings with Genfare senior management at which project progress and outlook are reviewed. The project manager can obtain additional resources at these meetings in the event of schedule slippage or other issues. The project manager coordinates with Genfare departments internally as needed during the design, implementation, testing, training and acceptance stages of the project.

4.2.1 Project Manager

Rob Antonio will have full project authority and oversee design, development, manufacturing and factory testing. He will be in frequent contact with the Genfare Link team and other engineering personnel and will ensure that all requirements have been correctly communicated and the project remains on track. He will be on-site at Palm Tran during critical periods. He will manage and oversee field testing, training, installation, startup and warranty service. Rob Antonio has been managing the Broward County project, in addition to managing the work needed to be done for Palm Tran he will be a great asset for regional integration project.

4.2.2 Genfare Link Development Team

The Genfare Link development team consists of the following individuals:

- *Vijay Balan, chief technology officer.* Vijay gives direction to Genfare’s overall technology development efforts and oversees and assigns engineering resources. Vijay will ensure that new features developed for this contract are consistent with Genfare’s overall design approach and product roadmap. Vijay has been closely involved with the development of Genfare Link, assembled the team implementing the product, and signs off on significant expansions of Link capabilities.
- *Dr. Moe Bouji, Genfare Link lead software engineer (in agile parlance, “product owner”), installation task lead.* In consultation with the other members of the Link team, Moe determines the product roadmap, accepts new “stories” (use cases requiring new functionality) and develops preliminary design specifications based on the stories. Moe is also the implementation lead for onboarding of new Genfare Link accounts, and will act in that capacity for the present procurement.
- *Tony Jannotta, Genfare Link user experience engineer.* Tony implements new features and capabilities based on design specifications provided by Moe, the product owner. In consultation with the Link team, Tony determines the product architecture (system components and the relationships among them) and tech stack (operating environment and software tools) and supervises the development team. Tony will oversee the team in developing any new features and capabilities required for this procurement.

- *Vandana Sudini, assistant installation task lead.* Vandana manages the team that handles onboarding of new mobile ticketing accounts and assists Moe Bouji in onboarding of new Genfare Link accounts, and will act in that capacity for the present procurement.
- *Developers and testers.* Most of the agile team consists of developers and testers who work in close contact with one another under Tony’s direction. The developers write code and any automated testing routines and check new code into the shared repository every day. Testers work in parallel with developers to write acceptance test cases (automated wherever possible); with the product team that testing reflects the desired functionality; conduct the tests; and maintain the test cases in a shared repository.

4.2.3 Other Genfare Project Personnel

The project team is assisted by other Genfare engineering, production, and business resources as required. A partial list of these personnel is provided below.

Name	Position	Responsibilities
Dan Gilfand	Director of Programs and Services	Oversees program management
Andrew Chan	Director of Business Development	Project definition and technology compliance
Gopi Shankar	Manager, Software Engineering	Software architecture and supervision
Roy Purnell	Sales Director, Eastern Region	Primary pre-award contact with agency through negotiation and contract close
Mark Mahon	National Sales Director	Sales team oversight
Igor Haskin	Manager of Mechanical Engineering	Mechanical design
Delbert Gray	Electrical Engineering and Quality Assurance Manager	Electronics design, testing and quality control
Tara Farnsworth	Director of Marketing and Aftermarket Sales	Long-term customer relationship maintenance

4.3 **RESUMES**

Resumes of important personnel may be found among the exhibits at the end of this submittal.

4.4 **ROLES OF STAFF MEMBERS RESPONSIBLE FOR HANDLING AND MONITORING CONTRACT**

Provide a description of the role of each staff member who will be responsible for handling and monitoring the Contract

4.4.1 Project Manager Responsibilities

The Project Manager has principal responsibility for ensuring that the project remains on schedule and within budget. The Project Manager is responsible for the following major activities:

- Overall program management and direction, including planning, management, supervision, and control of the project. The project manager is responsible for directing and coordinating the technical effort as well as the manufacturing and administrative aspects of the project. He has the authority to commit the personnel and other resources needed to bring all tasks to a successful conclusion. The project manager periodically meets or confers via teleconference with other Genfare department heads in production meetings chaired by Genfare’s president. At these meetings the project manager reports on the status of the project, including any projected deviations from schedule or other issues, and if necessary obtains commitment of sufficient additional resources to ensure that all program milestones are met.
- Preparing the project schedule and budget and obtaining customer approval. The project manager maintains the project schedule once it has been approved, tracks the status of all tasks and costs, and issues revised schedules for authority approval as required.
- Providing technical direction and expertise. In consultation with Genfare engineering staff, the project manager has frontline responsibility for managing any technical issues that arise over the course of the project.
- Providing coordination between the customer and Genfare. The project manager consults with the customer to identify the appropriate agency staff responsible for various aspects of the project and ensure timely and appropriate exchange of information between the two organizations. The project manager reviews all incoming correspondence and sees that it is appropriately recorded and filed, oversees preparation of all outgoing correspondence, and ensures that all communication is directed to the proper parties.
- Overseeing preparation of all required submittals and deliverables, conducting design review, and obtaining customer signoff.
- Assisting in the resolution of any issues. The project manager is the “point person” for all issues that may arise during the contract. The project manager will identify the staff or other resources needed to address the issue within Genfare, brief the appropriate parties on the situation, establish a plan of action to resolve the issue, see that the necessary resources are assigned, and follow up as needed.

4.5 CROSS-REFERENCE OF KEY RESOURCES TO PROJECT REFERENCES

[Provide] a cross-reference of each key resource to the project references provided above ... indicating their role in the respective projects. If a key member was not a part of the project references included above, proposers shall include a listing of 3 to 5 projects of similar nature in which key resources were involved, including their role within those references. Proposers shall provide similar project information as requested above in 3.1.1.

All the key personnel listed above were involved in the project references provided in the capacity described in 4.2 except for the Project Manager. Genfare had assigned different project managers for CDTA, COTA, and TARC. Rob Antonio was the project manager for Broward County and GRTC, two of the project references listed above. The RFP restricted us to provide no more than 5 projects, so we did not list other projects that Rob Antonio handled as project manager such as Charlotte and Fresno. As mentioned, Rob’s experience in Broward would be of great help when he works with Palm Tran.

4.6 APPROACH TO PROJECT MANAGEMENT, SCHEDULING AND QUALITY ASSURANCE

[Provide] a detailed description of the Proposer's approach to Project Management, Scheduling, and Quality Assurance (QA)

4.6.1 Overview

To ensure timely delivery of systems and devices compliant with contract requirements, Genfare plans to rely on the following measures:

- *User acceptance testing (UAT) environment.* This is a test lab in a controlled environment on agency premises consisting of specified quantities of each system and device to be included in the delivered solution. As each system, device and software/firmware version is introduced, it is exercised in the UAT environment to confirm that it performs as expected and is free from defects. The UAT is described in greater detail elsewhere in this submittal.
- *Multi-phase design review.* As specified, Genfare will conduct conceptual, preliminary and final design review in conjunction with Palm Tran. As discussed in Sec. 3.3 of this submittal, we believe a multi-phased approach is essential to ensure an orderly implementation and permit more efficient allocation of resources. Subject to discussion with Palm Tran, we believe it may be advisable to conduct two rounds of design review. The first would focus on phase 1 hardware, including the farebox and related equipment and the Vendstar ticket vending machine if implemented during this phase. Since all equipment is service proven, an abbreviated design review process may be appropriate. During the second phase, the remaining elements of the solution would be implemented, including the Genfare Link cloud-hosted central system, related systems and devices, account-based processing and open payments acceptance. Since this phase is software intensive and many new capabilities must be developed, rigorous design review is essential to ensure all requirements have fully communicated and defined.
- *Agile software development approach.* In developing software, Genfare uses agile development techniques as explained later in this submittal. In agile, small software teams work collaboratively over the course of two- to three-week "sprints" to develop new features or capabilities addressing defined use cases ("stories"). At the end of each sprint, the new feature is reviewed by the "business owner" (ultimately the County and Palm Tran) to ensure that it meets expectations. This provides an opportunity for refinement of requirements provided such adjustments do not have a material impact on cost or schedule.

4.6.2 Project Management Process

We propose the following project management process:

- *One design review sequence per phase.* We propose to conduct one round of design reviews during each of the two proposed phases, with review limited to items to be introduced during that phase. This will allow a more manageable and thorough process than is possible if numerous complex systems and devices are reviewed at the same time. As indicated, we believe an abbreviated design review may be appropriate during the phase 1 due to the proven nature of the equipment. During phase 2, when many new capabilities will be developed, design review will proceed in the following manner:

- *Conceptual design review.* Using the conformed contract as a baseline, the Genfare project team will review and define all requirements in consultation with the agency and document the result for Palm Tran approval.
- *Preliminary design review.* For each deliverable system or device, the Genfare development team will present preliminary wireframes, i.e., mockups showing the intended user experience for each function, typically consisting of a sequence of screens showing desired inputs and outputs.
- *Final design review.* The Genfare team will present final wireframes, including solutions for all gaps noted during PDR. To the extent possible, wireframes for core sequences will be rendered on the device and will closely approximate the desired look and feel of the end product. Once revised and approved by the agency, the final wireframes will fully reflect the functionality to be delivered.
- *Development.* The Genfare development team will develop the code needed to support the final wireframes. As indicated, this will be an iterative process involving successive sprints of several weeks' duration in which individual features will be developed under the guidance of the Genfare Link team in EGV.
- *Genfare in-house testing.* As each new software version is completed, it will be turned over to Genfare's Lead Engineer in Florida for testing. The Lead Engineer will develop test scripts and procedures; oversee the test team in exercising the software; and coordinate any needed revisions with the Genfare Link team. The Lead Engineer will remain in close consultation with the Genfare and agency project managers throughout this process, apprising them of progress and requesting decisions and other input as appropriate.
- *User acceptance testing.* Once the Lead Engineer is satisfied that a new software version performs as specified and that all previous functionality remains operational, he or she will notify the Genfare project manager, who in turn will notify Palm Tran. Agency staff may then conduct their own testing using the UAT. Testing may be script-driven or freeform as preferred. Few defects are expected at this stage but any encountered will be immediately addressed. This process will continue repeatedly until all functionality captured in the final wireframes has been delivered.
- *System testing.* Once all desired functionality has been developed, tested and approved, the testing regimen described in the RFP can begin.

The advantage of the above approach from the agency's standpoint is that the Lead Engineer acts as the point person during testing and ensures that obvious problems are addressed before they come to the Palm Tran's attention. This reduces the burden on agency staff and allows more thorough review. Furthermore, the iterative nature of the process makes it easier to optimize the software with minimal rework, saving time and money and resulting in a better product.

The balance of this section describes the tools, processes and procedures used to communicate with the County and Palm Tran about the progress of the project and solicit feedback.

4.6.3 Staffing

We will provide qualified personnel as needed to perform project tasks in a timely manner. In addition to the Field Project Manager and Lead Engineer, we plan to hire additional staff for our Florida office to assist with software testing and related tasks..

4.6.4 Master Program Schedule

The EGV Project Manager will maintain the schedule using Microsoft Project. The schedule will indicate in graphical format the status of all project tasks, both complete and pending, and provide projected completion dates, schedule variances, etc. A revised schedule will be submitted to the agency for approval on a monthly basis. Schedule changes will be coordinated between the Genfare and agency program managers prior to schedule revision. Tasks addressed in the schedule include:

- Documentation and other required submittals
- Equipment design and manufacturing
- Delivery, installation, and in-service testing
- System acceptance.

4.6.5 Progress Reports

Genfare will provide project status reports indicating planned vs. actual progress on a monthly basis or other agreed upon interval. Reports may be written or oral as desired and may be delivered in conjunction with project meetings. Progress reports will address:

- Updated master program schedule, including timeframe for design, fabrication, delivery, etc.
- Narrative of project status, including accomplishments since last report, current/anticipated issues
- Updated action item log
- Payment milestones achieved, if any
- Any other relevant items.

4.6.6 Project Meetings

4.6.6.1 Kick-Off Meeting

The project will start with a kickoff meeting at the agency as soon as practical following notice to proceed. All key personnel on both Genfare and agency teams should be present. Major tasks include:

- Introduction of team members – review of roles
- Review and confirmation of initial project schedule
- Project phasing
- Review of each team’s responsibilities and deliverables, including description, delivery date, responsible party, etc. Key agency deliverables include but are not limited to:
 - Desired fare schedule and business rules
 - System configuration parameters as required, e.g., authorized users and privileges
 - Agency logos, artwork, and graphic design scheme (including color palette)
 - Installation details where relevant, e.g., device mounting locations

- Review and confirmation of all project particulars, including equipment types, quantities and configuration; installation locations and constraints; design review and testing process, etc.
- Review of process, including lines of communication, desired progress reports and meetings, and design review process if required
- Review of documentation and training to be provided
- Review of project priorities and sensitivities.

4.6.6.2 Periodic Project Meetings

The EGV Project Manager and agency project managers will confer periodically to review project progress and next steps. In most cases these meetings are conducted by teleconference. Status meetings may be accompanied by agendas, minutes, status reports, and schedule updates as agreed. The EGV Project Manager will be responsible for:

- Providing meeting agendas and notices where appropriate.
- Taking meeting notes and providing subsequent minutes.
- Tracking action items.

4.6.6.3 Design Review

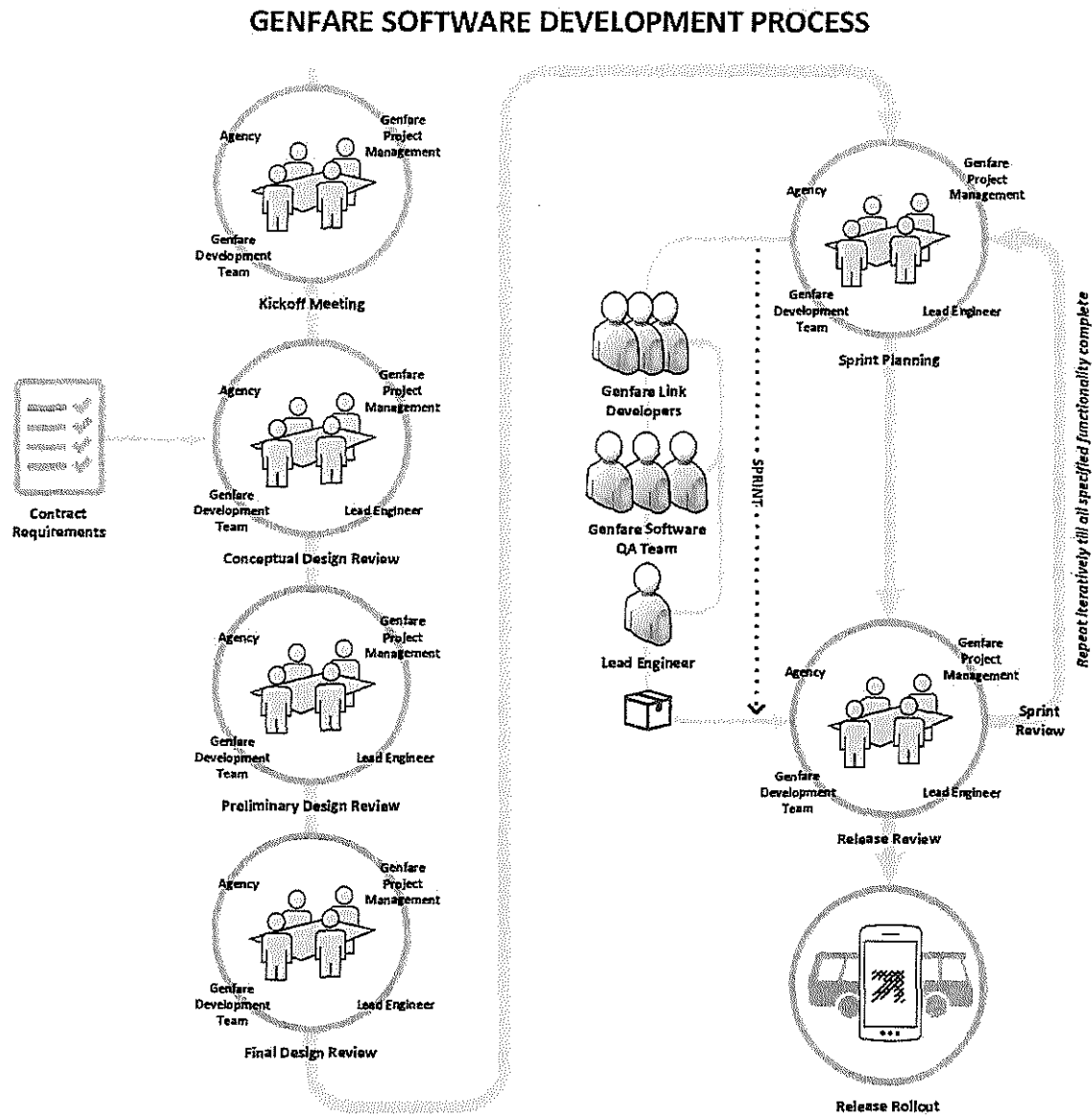
Design review will be conducted as previously described. Tasks typically accomplished during design review include but are not limited to review of:

- Basic product functionality
- Capabilities to be developed for this procurement
- Hardware to be provided, including modifications thereto as required
- Configuration details, e.g., fare table details, display messages, alarm routing, etc.
- Sample fare media and receipts
- Site preparation requirements
- Training requirements and schedule
- Local data system provisioning (e.g., garage data system)
- Report generation procedures and standard reports
- Revenue service procedures where relevant
- Delivery schedule, installation plans, etc.
- Manuals and other documentation
- Spare parts provisioning.

For further discussion of design review and subsequent development, see next section.

4.6.7 Genfare Software Development Process

The diagram below illustrates Genfare’s agile software development process.

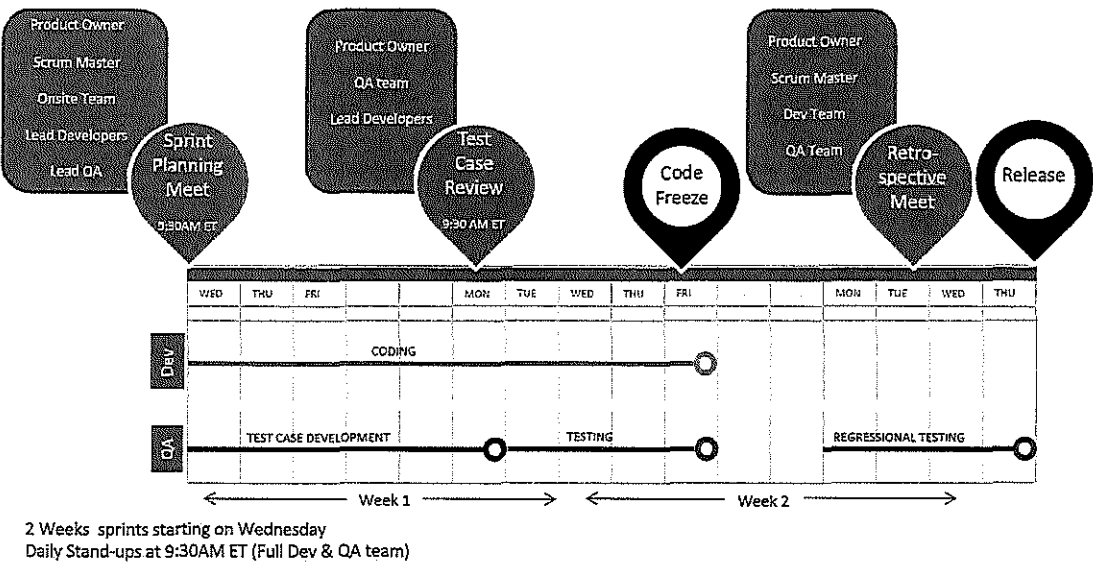


Genfare uses agile development techniques to ensure that delivered software meets customer expectations. The philosophy behind agile is that fast, frequent delivery of working software modules is the best way to demonstrate progress and ensure customer satisfaction. Our approach to agile development with respect to Genfare Link is built around the following concepts:

- *Multi-tenant solution with common code base.* Genfare Link is a multi-tenant platform in which each participating agency is provided with a secure private data store drawing on a common base of application software. Genfare Link modules are highly configurable and can be adapted to the needs

of each agency, but in principle all functionality is available to all customers. This means that when a new feature is developed in response to a contract requirement, it must be incorporated into the common code base in a manner consistent with Genfare’s overall design approach. This process is overseen by the product manager, Moe Bouji, in consultation with chief technology officer, Vijay Balan.

- Product roadmap.** The product roadmap consists of new features and functionality (in agile terms, “stories”) that have been accepted for incorporation into the Genfare Link feature set. The major driver of roadmap additions during the present procurement will be contract requirements as clarified and defined during design review. Once product manager Moe Bouji accepts and schedules a new story, its development is overseen by product development manager Tony Jannotta.



Genfare sprint process

- Sprints.** A sprint is a short interval, usually a few weeks, during which new software features are developed and tested – see diagram. If multiple features are called for or the new capability is complex, a series of sprints may be necessary. Software iterations developed during each sprint are thoroughly tested before the next sprint starts.

As indicated, the Lead Engineer will oversee software testing and ensure that QA issues are resolved before new software versions are presented to Palm Tran. We are happy to provide the agency with any desired degree of transparency into the development process and anticipate that interaction in this respect between the Genfare and agency teams will evolve over the life of the project.

4.6.7.1 Pre-Installation/Rollout Meeting

Prior to system rollout in any given phase, meetings will be held between Genfare and agency staff to review preparations. For hardware installation, Genfare prepares an installation plan for review. The plan addresses schedule, procedures, division of responsibilities between Genfare and the agency, mounting and other installation details, provision for parallel operation of new and old systems during

the transitional period, etc. Provision of agreed-on training and documentation is discussed at the meeting, as are plans for system startup and subsequent acceptance testing.

For software installation, the Genfare implementation lead will review all necessary steps during the pre-rollout meeting, including training, testing, and launch.

4.6.8 Change Orders

The project scope is defined by the executed contract documents between Genfare and the agency as refined during design review. Any scope change introduced after design review requires a change order.

All change order requests must be presented in writing by the agency or Genfare to the other party and must fully and clearly define the desired change. The project manager for the party receiving the change order will provide a written response that includes (a) any necessary clarification of the change to be made; (b) proposed means for review and approval of the changed work; (c) the cost; and (d) the impact if any on the schedule. Change orders will not be implemented until all terms have been agreed to and the change order duly executed by both parties.

Approval or rejection of the change request typically is expected to occur within (5) business days. Acceptance or rejection will not be assumed if there is no response to the change request. Additional time for approval or rejection may be requested in writing if more than (5) business days are required for a decision.

4.6.9 Correspondence Control

Genfare maintains a correspondence control system for the transmittal and filing of project correspondence. The system includes equipment specifications, drawings, contract deliverables, and such other documentation as may be appropriate. Genfare logs and retain copies of all communications between Genfare and the customer including minutes of meetings, letters, drawings, memoranda, and other written material which form the file and record of the program.

Documents submitted by Genfare to the customer in fulfillment of contract requirements will be identified with firm name, document title and number (if any), issue date, and revision designation. Each page of the document will indicate the document ID and revision designation. Documentation will accurately reflect the equipment furnished. When equipment is modified, revised documentation will be submitted to the customer as soon as practical.

4.6.10 Quality Assurance

Genfare is ISO 9001-certified, signaling that it complies with the rigorous international quality assurance standards promulgated by the International Organization for Standardization. ISO 9001 is the most rigorous of the ISO 9000-series standards. The ISO 9000 standards are designed to help companies set up quality systems for the design, development, production, installation, testing, inspection, and servicing of products.

ISO 9000 requires that participating companies document their quality assurance systems and conduct periodic compliance audits. In essence, ISO 9000 requires that companies say what they do (in writing), and then do what they say. The Genfare QA program is based on MIL-I-45209 quality program

requirements to ensure that quality is maintained throughout all areas of contract performance. A copy of Genfare’s quality program can be provided on request.

4.7 RESUME OF PROPOSED QUALITY ASSURANCE MANAGER

[Provide] a resume(s) illustrating the qualifications and experience of the proposed QA Manager

Genfare’s QA manager is Delbert Gray, whose resume can be found among the exhibits at the end of this proposal.

5. FINANCIAL/BUSINESS STABILITY

As evidence of financial/business stability, the RFP says the proposer can provide:

Balance sheets and income statements for the current fiscal year and prior two (2) fiscal years of operation, prepared in accordance with generally accepted accounting principles and compiled by an independent certified public accountant or notarized by the chief financial officer or owner.

In fulfillment of this requirement, Genfare offers links to the following documents prepared by its parent company, SPX Corporation:

- Most recent quarterly report (Form 10-Q), filed May 6, 2019:
<https://www.spx.com/investor-relations/financial-information/quarterly-results/>
- 2018 annual report:
<https://spx.gcs-web.com/static-files/41fd426a-4f32-470d-99db-5157c66cb058>
- 2017 annual report:
<https://spx.gcs-web.com/static-files/ab598b91-b242-4424-b2bb-00306ee0c0fe>

6. PRICING AND DBE

Pricing and DBE form can be found following this page.

7. REQUIRED APPENDICES AND EXHIBITS

The following exhibits may be found after this page.

Appendix A – Price Proposal has been submitted via the online portal as specified in the RFP.

- Resumes
- Terms and conditions
- Forms
- Disaster Recovery Plan
- Drug Free Workplace policy
- InComm service description
- Evidence of Insurance
- Program Management Plan
- Sample subscription and license agreement
- Sample support agreement
- Sample Test Plan(s)
- Sample Training
- Schedule

RESUMES

Resumes for the following individuals may be found after this page:

- Rob Antonio – Senior Project Manager
- Vijay Balan – Chief Technology Officer
- Moe Bouji – Lead Software Engineer
- Tony Jannotta – User Experience Engineer
- Vandana Sudini – Assistant Installation Task Lead
- Delbert Gray – Manager of Electrical Engineering and Quality Control
- Resumes of Other Important Personnel

ROB ANTONIO, SENIOR PROGRAM MANAGER

Summary

Responsible for Program Management of major contracts with transit authorities; both for standalone and complete, integrated fare collection solutions. Robert has over 20 years of experience in design engineering, project & program management, and lean 6 sigma process improvement.



Skill Highlights

- Project and Program Management
- Advanced MS Project Proficiency
- Vendor/Subcontractor Management
- Excellent Communication and Organization Skills
- Leadership and Team Management

Genfare Experience

Senior Program Manager, June 2014 to present

Managed multiple, simultaneous projects to deliver, install, and bring online automatic fare collection systems, which consist of front end devices and back end software systems. Projects ranged in value from \$50,000 to \$15M+, to include: Winnipeg Transit, Sun Tran (Tucson), Charlotte Area Transit System, Big Blue Bus (Santa Monica), BCT (Broward County), and GRTC (Richmond)

Previous Experience

Laird Technologies, Product Manager

Provide strategic direction for the Public Safety & Land Mobile Radio antenna market segment. Plan, lead, and manage the entire life cycle of antenna products from the identification of market opportunities through design development and product launch, and end of life management.

Laird Technologies, Engineering Manager

Led development efforts for Land Mobile Radio antenna products, to include portable radio, mobile radio, and dispatch base station antennas. Managed operational projects, to include plant relocations, product transfers, and lean six sigma projects

Amphenol, Project Manager

Led development efforts of project team for antenna products, to include internal and external antennas for cellular phones, personal digital assistants, and laptop computers.

Motorola, Operations Program Manager

Led cross-functional team to manage international cellular infrastructure customers, to include project management of hardware and software system implementations & expansions.

Education and Certifications

Bachelor of Science, Mechanical Engineering, University of Illinois at Chicago
Project Management Professional (PMP)

VIJAY BALAN, CHIEF TECHNOLOGY OFFICER

Summary

Global technology leader with 18 years of experience in leading and implementing enterprise transformation programs, product engineering, information technology, and shared services in large multi-national organizations. Well versed in multiple industries including automotive and manufacturing, public transit, financial services, insurance, and life sciences with specific expertise in strategic planning, implementing and improving IT initiatives, systems, products and organizations with the goal of delivering cost-effective service quality and enhancing revenue generation. Experience in data analytics, global application delivery, product engineering, business intelligence, integration architecture, program management, data warehousing, global ERP/CRM Implementation and IT strategy.



Genfare Experience

Chief Technology Officer – 2016 to present

- Established vision, lead technological development of intelligent fare management platform
- Directed strategic design, acquisition, product engineering, implementation and operational management of all SaaS, MaaS and DaaS platforms
- Lead joint planning and integration with engineering teams on roadmap development, continuous improvement of offerings, delivery and implementation methods and feedback to drive product/service improvements
- Designed technology stack, operational tools, resources and processes needed to provide appropriate availability, scalability and service levels across all technology services
- Established, communicated and maintained all technology best practices and standards, including those related to software, hardware, cloud services, data collection/retention, and data privacy management
- Defined and drove all technology vendor/partner evaluation, engagement and management processes; own technology vendor/partner outreach, communication, and governance

Previous Experience

Co-founder, CTO/COO, NCYCLO, Chicago, IL – 2014-2015

Led product strategy, architecture, big data, analytics, digital transformation for multi-channel attribution software platform to help marketers improve campaigns and optimize ROI.

Vice-President and Technology Leader, Imaginea, Mountain View, CA – 2012-2013

Spearheaded transition of Arthur J. Gallagher's shared services division to Imaginea.

Assistant Vice-President and Technology Leader – Arthur J. Gallagher & Co., Itasca, IL – 2008-2011

Led IT strategy and transformation, global shared services, IT management, spend and efficiency for \$2.5B global insurance brokerage, risk management and consulting firm.

IT Technology Leader, GE Money, Schaumburg, IL – 2005-2008

Led IT strategy and management, client integration, product development and global operations management for leading provider of credit service and products to retailers and consumers with one of world's largest portfolios of consumer credit services.

Education

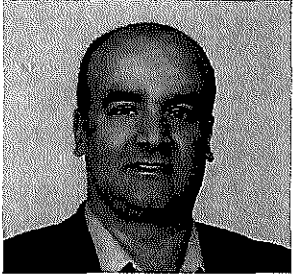
MS, Software Engineering, Coventry University, Coventry, UK

BS, Engineering and Computer Science, University of Madras, Chennai, India

MOE BOUJI, PH.D – LEAD SOFTWARE ENGINEER, LINK IMPLEMENTATION

Summary

Seasoned product manager, able to direct multiple areas of responsibility while maintaining strong relationships with clients and internal senior management and demonstrating highest level of ethics and integrity. Superior organizational, negotiation and interpersonal skills. Proven ability to design, develop, manage, and provide strategic guidance for launching new products and features. Capable of working in a fast-paced environment where priorities can change quickly with little notice.



Skills

- SaaS product development
- Mobile solutions
- Secure architecture
- Point of sale systems
- Embedded systems
- Software quality
- AWS
- System implementation

Genfare Experience

Product Manager – 2014 to present

Manage multi-million-dollar SaaS product, a cloud-hosted multi-module software suite providing transit agencies with a state of the art toolbox to manage all aspects of fare sales and collection. System includes fare management, mobile ticketing, online ticket purchase, administrative and retail point of sale systems, inventory, real time monitoring, and integration with legacy systems.

- Lead cross-functional team with disciplines spanning embedded systems, data systems, retail systems, and cloud computing.
- Provide leadership and direction to onsite and offsite consultant teams throughout the development life cycle.
- Provide architecture and framework needed to secure system sensitive information in cyberspace including customer credit card information and encryption keys.
- Provide strategy and design guidelines to ensure conformity with PCI-compliant networks.
- Work with client's Qualified Security Assessors (QSA) to validate adherence to PCI DSS guidelines.
- Direct QA team to validate system integration and robustness.
- Develop, implement and oversee engineering processes as required to support business needs.

Previous Experience

Product Development/Section Manager – Motorola (2000 – 2014)

Managed development team responsible for designing and implementing cybersecurity features and secure software for Motorola mission-critical communication systems. Team included architects, engineers, and testers. Development concentrated on distribution of critical cybersecurity parameters across all system components.

Education and Publications

Ph.D., Electrical Engineering and Computer Engineering, Marquette University, Milwaukee, Wisconsin

Artificial Intelligence Models for the Prediction of Switched Reluctance Motor Operation (Ph.D dissertation), U.S. Navy-funded project to model behavior of reliable but nonlinear electric motors. Modeled equipment mathematically using artificial intelligence. Accuracy essential since motors intended for mission-critical applications such as fuel delivery for aircraft engines.

TONY JANNOTTA – USER EXPERIENCE ENGINEER

Summary

Tony builds and maintains both Genfare’s cloud and garage-based software systems, including data visualization platforms, mobile applications, open API services, and customer-facing and administrative websites. He is a technology enthusiast with a breadth of experience to quickly deliver change, innovation, and strategy on an enterprise scale.



Skills

- Enterprise architecture
- Service-oriented architecture
- Mobile solutions
- Database development and design
- AWS, Azure architecture
- Agile/Kanban/SDLC processes
- Web-based LOB applications
- Git/DVCS evangelist

Genfare Experience

Application and Development Manager – 2017 to present

Tony came to Genfare as a consultant in April 2016 providing services as a software architecture and delivery process analyst. He now works across all teams and software-based components contributing to both cash-based and next-gen fare collection systems.

- Managed delivery of Genfare’s first data visualization platform delivering traditional garage-based revenue and ridership reports in responsive-web, mobile-friendly presentation with anytime/anywhere availability
- Led design and delivery of next-gen, public-facing user ticketing portal, EFare
- Introduced SaaS system web channel metrics, securely delivering per-client experience through Google Universal Analytics
- Featured panelist and speaker at APTA Conference(s) on mobile’s role in next-gen fare collection solutions
- Led integration of TVMs to cloud
- Consolidated and optimized web-based databinding patterns to improve customer experience and lower support costs
- Modernized SDLC processes and achieved cross-departmental consistency of delivery.

Previous Experience

Director, Global Web Systems – Arthur J. Gallagher (AJG), 2002-2015

Enterprise architect, manager, and mentor of all onsite and offshore teams during the expansion of AJG’s web-based ecosystem from a single web channel in 2002 to over 36 digital marketing and client extranet websites in 2015. Streamlined CSR by introducing integration partners such as Salesforce, Box.com, and SilverPop and empowered management and marketing resources with content management independent of developer support by introducing enterprise-scale CMS solutions.

Education and Certifications

B.S.B.A., Accounting, Creighton University — Omaha, NE
CSM – Certified Scrum Master in Agile Methodology

VANDANA SUDINI, ASSISTANT INSTALLATION TASK LEAD

Summary

Vandana oversees onboarding of new mobile ticketing accounts and support for existing accounts. She draws on her extensive experience in business requirements analysis and testing to ensure rigorous implementation of contract requirements across Genfare’s diverse mobile ticketing user base.



Skills and Expertise

- 9+ years as business and quality analyst
- All aspects of software testing, including test strategy and plan development, test case design, automated testing (including development and maintenance of test scripts), system integration testing
- Agile development methodology
- DB tools: MySQL, SQL Server, Oracle 10g, DB2
- Testing/tracking tools: Quality Center 10.0, Test Director 8.0, Win Runner 8.0, JIRA, Rational Clear Quest, Rational Requisite Pro, Track Record, TFS 2012, Test Manager
- Thorough knowledge of SDLC

Genfare Experience

Mobile Ticketing Specialist, February 2016 to present

Vandana started as a QA team member focusing on mobile ticketing testing and was subsequently named QA lead. When Genfare acquired the assets of its mobile ticketing partner, she assisted in the transition and was named mobile implementation lead. In that role she supports existing customers and oversees the onboarding of new mobile ticketing accounts, assists in the implementation of mobile and Genfare Link projects, and does demonstrations and training for mobile products and Genfare Link.

Previous Experience

Ibase IT, Business Analyst, 2015-2016

Onsite liaison between Hyderabad, India-based IbaseIT and Chicago-based client HFR for website design. Managed client/tech team communication, created use case, gap analysis and requirements documents.

Alliant Energy, Business Analyst, 2014-2015

Conducted testing for new customer information system as part of agile development team. Worked with stakeholders to develop test cases, performed tests, analyzed results, assigned issues to teams.

State Farm Insurance, Senior QA Analyst, 2013-2014

Developed, implemented test plan for loss-sensitive invoicing system. Participated in spec review meetings, prepared test cases and scripts, conducted testing, logged defects, coordinated reports.

Liberty Mutual Insurance, Quality Analyst, 2012-2013

Analyzed, documented requirements for technical underwriting referral facility through Salesforce.com.

Sierra Atlantic, Business Analyst, 2009-2011

Did plans, estimates, development, tracking for front-end system for client Bank of America.

Education

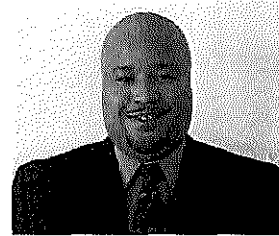
MBA, Osmania University, Hyderabad, India

BS in Genetics/Microbiology, Osmania University, Hyderabad, India

DELBERT GRAY – MANAGER OF ELECTRICAL ENGINEERING AND QUALITY CONTROL

Summary

24 years of experience in the engineering and manufacturing industrial electronics industry.



Skills

- Analytical
- Problem solving
- Customer service
- Quality management
- Project management
- Planning and organizing

Genfare Experience

Electrical Engineering and Quality Control – 2006 to present

Oversees electrical design of Genfare’s hardware products and responsible for the company’s quality assurance program. Other responsibilities include manufacturing support, new product introduction, prototyping, value engineering, supplier continuous improvement and manufacturing continuous improvement. Major products for which he provided technical guidance and coordination include Vendstar ticket vending machine, Fast Fare farebox, Odyssey Plus farebox, and Fast Fare-e validator.

Previous Experience

Electrical Engineering and Manufacturing Engineering – Texas Instruments, 1999-2004

Responsible for providing technical support to the Plug In Power Group. Responsibilities include manufacturing support and new product introduction. Troubleshooting and analysis of product design problems and quality issues. Provide manufacturing and engineering with quality feedback and root cause corrective and preventive actions. Performed design, maintenance and repair of manual and automated equipment. Modified and created technical documents, schematics, and implemented process improvements.

Manufacturing, Process Engineering and Electrical Engineering – Motorola, 1994 – 1998

Responsible for providing technical support to the Components Products Division Group. Responsibilities include root cause analysis for resolving product quality issues and customer field returns. Design, maintenance and repairs of equipment including printed circuit boards, laser markers, test fixtures and automated equipment. Performed planning and performance experiments to establish improved processes. Process and development characterization studies, defect analysis, and implementation of cost saving programs.

Education

Electrical Engineering Technology, DeVry Institute of Technology, Chicago, IL

Certifications

Six Sigma Green Belt: Organizational Problem Solving

Resumes of Other Important Personnel***Dan Giffand, PMP, Director of Programs and Services, with Genfare since 2000***

With over 20 years of transit industry experience managing and implementing a diverse portfolio of fare collection system technology programs, Dan is responsible for Genfare's operational business functions. He has extensive experience with organizing and prioritizing multiple, complex, technical projects while directing the company's teams of Program Management staff, Field Service staff, and Manufacturing/Repair staff. Dan and his staff have managed hundreds of fare collection system implementations and upgrade programs across the U.S. and Canada.

Education: B.A., De Paul University, Chicago
PMP, Program Management Institute

Andrew Chan, Director of Business Development – with Genfare since 1989

Senior technology leader who has played a central role in the design, development, and technical support of numerous bus and rail fare collection programs for Chicago, Cleveland, Los Angeles, Atlanta, Miami, Washington, Baltimore, Honolulu, Connecticut, Columbus (Ohio), Oakland, and Orange County. Has also managed partnering and working relationships with multiple fare collection and AVL companies. Andrew actively participates in the Secure Technology Alliance and other APTA standards groups.

Education: B.S., Electrical Engineering, University of Illinois at Chicago

Gopi Shankar, Manager, Software Engineering – with Genfare since 2001

Over 28 years of experience in the software industry. Implemented farebox projects for WMATA, Maryland MTA, LA in partnership with Cubic Transportation Systems; for Montreal in partnership with ACS. Developed second and third generation ticket vending machines. Managed software for eFare Classic, PEM, TVM, SCRIV and Odyssey product lines. Managed software/integration for fare collection projects including Tucson, Jacksonville and Winnipeg.

Education: B.E., Electronics & Communication, Anna University

Roy Purnell, Director of Sales, Southeast Region, with Genfare since 2000

Responsibilities include rapid growth in revenues in the Eastern Region through upgrades or expansions of existing fare collection system and targeted new account development. Roy was previously Director of Operations for the Greensboro Transit Authority/ATC Vancom. He has a broad experience in the transit industry.

Education: MBA, Marketing, Keller University
B.S., Technical Management in Sales & Marketing, DeVry University

Mark Mahon, National Sales Director, with Genfare since 2008

Seasoned sales director with 26 years in the fare collection industry. Former consultant and director of revenue and operations at a major transit agency, able to direct multiple areas of responsibility while maintaining excellent relationships with clients and internal senior management and demonstrating the highest level of ethics and integrity. Superior organizational, negotiation and interpersonal skills. Proven ability to develop relationships, manage sales activities, and provide strategic guidance for launching new contracts. Capable of working in a fast-paced environment and adapting quickly to evolving priorities.

Igor Haskin, Manager of Mechanical Engineering, with Genfare since 2014

Over 25 years of extensive hands-on product/design engineering, research and development experience for consumer, commercial, and professional markets. Visionary manager passionate about developing innovative product solutions and leading global cross-functional teams through complex projects, with aggressive time and resource constraints. Strategic and creative problem solver who consistently achieves business objectives, while mitigating risks and ensuring quality. With the Six Sigma Green Belt Motorola experience, he is a proven advocate for continual process improvement and innovation.

Education: MEM (Master of Engineering Management), Northwestern University

Tara Farnsworth, Director of Marketing & Customer Service – with Genfare since 2012

A marketing professional since 1992, Tara partners with sales, program management and customer service to support new product development and system installations. Strong background in strategic marketing, implementation and ongoing project review and improvement. Customer focused and dedicated to improving the agency experience from order entry through system implementation with a strong emphasis on after-sale support.

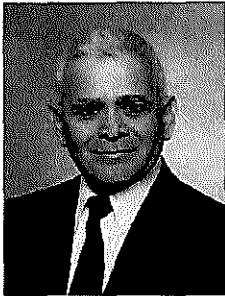
Education: M.S., Marketing Communications, Roosevelt University
B.S., Marketing, Southern Illinois University

Eric Kaled, President with Genfare since 2019

Eric is a highly accomplished and strategic P&L leader with transit industry experience in payment collections (hardware, software including SaaS) and technology innovation. Prior to his start at Genfare, Eric spent more than a decade in Payment Innovations and then the Connectivity Solutions groups as the Senior Vice President and General Manager at Crane Corporation. He possesses a broad business background with global experience across business development, commercial leadership, strategy, product development, project management and global operations.

In addition to his extensive experience, Eric has a proven record of driving growth through innovation and building/leading strong, collaborative teams. Eric has a distinguished global management career spanning EMEA, APAC, and the Americas, serving as senior leader for publicly-traded B2B companies with revenues up to \$3B and employee groups up to 11,000+. Eric has run businesses while expanding and turning around global technology, payments, and industrial companies selling systems-based hardware and software product offerings.

Education: MBA, Anderson School of Management, UCLA, Los Angeles, CA
B.S., Chemical Engineering, Rensselaer Polytechnic Institute, Troy, NY



DBE / MBE / SBE FIRM

GABRIEL PEREZ

Gabriel Perez has over 32 years of experience providing Program and Project Management services. His project management experience has included Executive level positions with the City of San Antonio, TX, and Bexar County, TX in managing capital improvement programs. He has managed the process to identify project scope, funding recommendations, timelines, and phasing strategies to implement capital programs, working within the framework of the public entities process, in collaboration across multiple agency Departments. His expertise has provided project management services for multiple entities with varying types of projects, scopes, requirements, and budgets. This effort has required managing the efforts of all project resources (staff, project consultants, contractors, etc.) to ensure an economic & effective project delivery. These numerous programs have included projects for:

- Fare Collection System Installation / Project Support
- Street / Road Improvements
- Flood Control / Drainage Improvements
- Juvenile Detention Facilities
- Emergency Operations Center
- Subdivision Infrastructure Development
- Wage & Hour Compliance Service
- Parks / Athletic Facilities
- Adult Detention Facilities
- Courthouse Restoration & Renovation
- Fire & Rescue Facilities
- Economic Development Projects
- Environmental Assessments

Mr. Perez established Perez Project Consulting, Inc. in April, 2007 and continues to successfully utilize his extensive program / project development and management experience for both private and public entity clients and their projects. His relationships and knowledge of the public project process, including the federal, state, and local development regulatory & permitting process, and the ability to manage project resources to address these items has proven to be extremely effective to the Client's benefit.

This project experience on multiple programs / projects utilizing local, state and federal resources have ranged in total project values from \$100,000 to \$200,000,000.

PROGRAM / PROJECT MANAGEMENT PROCESS EXPERIENCE

- Strong interpersonal / communication skills
- Program / Project Plan, Logistics, Research, Development
- Program / Project Assessment & Review
- Agency Process / Protocol Knowledge & Experience – Federal, State & Local Agencies Structure & Process
- Quality Assurance / Quality Control (QA/QC) Program
- Procurement – Solicit (A/E), Bid Process (Construction), Value Engineering, Contract Process
- Maintain & Manage Project Budgets & Schedules
- Architect, Engineer & Contractor Coordination / Design Reviews
- Facilitate Public Agencies Program & Project Development Review & Permitting

FARE COLLECTION PROJECTS EXPERIENCE

- VIA Metropolitan Transit, San Antonio, TX (Sub-Consultant) 2013 – 2015
- Alameda-Contra Transit District, Oakland, CA (Sub-Consultant) 2013 – 2014
- Pierce Transit, Tacoma, WA (Sub-Consultant) 2014
- Capital District Transportation Authority, Albany, NY (Sub-Consultant) 2015 – 2016
- Central Ohio Transit Authority, Columbus, OH (Sub-Consultant) 2017 – 2019
- Fort Worth Transit Authority, Fort Worth, TX (Sub-Consultant) 2018

5820 W. Interstate 10, Suite 500

San Antonio, Texas 78201

210.683.5222

EDUCATION

Master of Science May, 1986	Public and Institutional Administration St. Mary's University, San Antonio, Texas
Bachelor of Arts August, 1983	Political Science St. Mary's University, San Antonio, Texas

PROFESSIONAL CAREER EXPERIENCE

President Perez Project Consulting, Inc.	April, 2007 to Present
Senior Project Manager - Development Earl & Associates, P.C.	October, 2006 to April, 2007
Senior Vice President of Operations for Texas Hollyhills Development	January, 2006 to August, 2006
Executive Director Infrastructure Services Department Bexar County	March, 2000 to January, 2006
Capital Programs Manager Public Works Department City of San Antonio	February, 1995 to March, 2000
Project Control Manager Asset Management Department City of San Antonio	March, 1994 to January, 1995
Special Projects Coordinator Office of Dome Development (Alamodome Project) City of San Antonio	April, 1989 to March, 1994
Capital Projects Officer Public Works Department City of San Antonio	January, 1987 to April, 1989

Additional information and references will be provided as requested.

Perez Project Consulting, Inc.
Gabriel Perez
5820 W. Interstate 10, Suite 500
San Antonio, TX 78201
210.683.5222
gperez@ppcprojects.com

Steve Phelan
713.397.0735
steve@espterprisesinc.com

PROFESSIONAL EXPERIENCE

ESP Enterprises Inc., Houston, Texas **President (10/2002- Present)**

Oversight/Coordination with HR/Admin on department efficiencies and outline of goals.

Oversight/Coordination with Operations on Scheduling, production/processes, and Quality Control solutions.

Supervise Install crews on Fare Collection installs.

Train New employees on procedures and best practices.

Responsible for continued growth and direction of the company.

Established ESP as the Go To installation group for all Fare Collection Installations and CAD/AVL manufacturers.

Oversee operations of past 15 years of Low Voltage Electronics for Transit Focused installations for OEMs with over 70,000 bus and Rail installations with 100% success.

Primary Communications Solutions, Houston, Texas **Vice President of Operations (3/1997 – 10/2002)**

- Promoted to Vice President of Operations at Primary Communications, after putting forth a sales effort and having PCS awarded nine SBC telecom installation projects averaging \$200k each.
- Formalized and managed departments within the company. The departments consisted of Installation (Transport-SBC, DC Power, CLEC Installation), Detail Engineering, Training, Technical Assistance/Operation Analyst, Quality Assurance, and Contract Management.
- Assisted in installing Purchasing, Receiving, and Payables systems: reduced purchase order cycle from four weeks to one, elevated job completion accuracy from 55% to 97%, and insured the highest staff productivity.
- Recruited and Managed seven direct reports with a total of ninety plus

employees under my team.

EDUCATION

University of Houston

Houston Community College

COMPUTER SKILLS

MS-Windows 3.11/95/98/NT, MS-DOS, MS-Excel, MS-Word, MS-Power Point, MAS-90, Peachtree, MS Access, Internet Knowledge of HTML, Photo Shop 5.5, MS Draw, Apple OS

OTHER

During my employment Primary Communications has been awarded Houston Business Journal's "47th fastest growing company in Houston" and placed 3rd for "Best Places to Work" Award.

Well Networked in the Telecommunication Industry. Established many client relationships with Fortune 500 companies.

Single, Non-Smoker

REFERENCES

References available upon request.

Terms and Conditions

The following additional terms and conditions are incorporated into the final Contract terms and conditions (the “Contract”) between the County of Palm Beach (“County”) and Genfare, a division of SPX Corporation (“Contractor”). In the event of a conflict between these additional terms and conditions (or the subject matter thereof) and any term or condition (or the subject matter thereof) in the underlying RFP, Proposal or Contract or any document, these additional terms and conditions shall apply in precedence over such other terms and conditions and the related subject matter, to the fullest extent permitted by applicable law. The Contractor’s bid is made subject to County’s acceptance of these terms and conditions.

Acceptance. The goods and services shall be deemed accepted, and any attempt by County to reject an order or shipment of goods shall be waived and not enforceable, unless County has promptly inspected the goods and services, and written notice from County of any defect has been received by Contractor within thirty (30) days following any delivery of goods or performance of services. Goods may not be returned without obtaining written authorization and shipping instructions from an authorized representative of Contractor.

Confidentiality. During this Contract, County will learn information that Contractor regards as confidential or proprietary, including information regarding Contractor’s business. To the extent permitted by law, County will keep this this information confidential, unless and until Contractor consents to disclosure, or unless such information otherwise becomes generally available to the public through no fault of County.

Delivery; Transfer of Title and Risk of Loss. All products will be shipped FOB destination. Risk of loss and title to all equipment shall pass to County, free of encumbrances, at the time of delivery to County.

Force Majeure; On Time Delivery. To the extent that either party is not able to perform an obligation under this Contract due to fire, flood, acts of God, severe weather conditions, strikes or labor disputes, war or other violence, acts of terrorism, any law or order of any governmental County, or other cause beyond that party’s reasonable control, that party may be excused from such performance so long as such party provides the other party with prompt written notice describing the condition and takes reasonable steps to avoid or remove such causes of nonperformance and promptly continues performance whenever and to the extent such causes are removed.

Any shipping or milestone dates are predictions made by Contractor of the times by which it is likely the products will be shipped or milestones will be met; however, due to the difficulties inherent in predicting future dates, Contractor does not promise, guarantee or otherwise obligate itself to have the products shipped or milestones met on or before that time and shall not be liable in damages or otherwise, nor shall County be relieved of performance, because of failure to meet them.

Indemnification. Contractor agrees to indemnify and hold harmless County, its elected and appointed officers, and employees from and against any and all claims, demands, defense costs, liability or damages of any kind or nature from a third party for property damages, personal injury or death to the extent arising directly from Contractor’s (or Contractor’s subcontractors, if any), negligent acts, errors or omissions or willful misconduct.

Insurance. Contractor shall maintain insurance coverage consistent with its existing programs and the requirements of any applicable law. Further, Contractor shall include County as an additional insured on its Commercial General Liability Policy pursuant to Contractor's standard endorsement, but shall not (nor will its insurers) be obligated to waive any rights of subrogation Contractor or such insurers may have against County or its affiliates. Contractor and/or its insurers will provide County with notice of any material change or termination of any applicable insurance policy in accordance with the notice provisions of such policy. Contractor shall provide County with its standard certificate of insurance and a copy of the endorsement upon execution of this Contract, but shall not provide copies of its policies or disclose its deductibles.

Intellectual Property. County and Contractor acknowledge and agree that the work performed under this Contract does not constitute experimental, developmental or research work. Notwithstanding any other provision in this Contract, Contractor retains title to all intellectual property, patents, trademarks, know-how, copyrights, software, engineering and designs, models, production prints, drawings, work products, technical data, and other information and documents that relate to the goods and services sold to County. Unless specified by Contractor in writing to the contrary, all such intellectual property, information and documents disclosed or delivered by Contractor to County are to be deemed proprietary to Contractor and shall be used by County solely for inspecting, installing, operating and maintaining the goods and services sold to County and not used by County for any other purpose.

Limitation of Liability. Contractor's maximum aggregate liability under the Contract shall not exceed the total value of the Contract. Any action for breach of contract or otherwise must commence within one year after cause of action accrues.

Payment Terms. County shall pay all invoices within 30 days after receipt of such invoice.

Software Agreements. Any software, software maintenance, subscription services (i.e. SaaS or hosting) and/or related services that may be included in or required for the goods or services provided under this Agreement, shall be provided to County pursuant to Contractor's standard software license, software support agreement, subscription agreement and/or other applicable agreements and such software and/or subscription services shall not be distributed, shared, sublicensed or extended to any third parties.

Software Escrow. County shall have no rights to any source code or documentation. Conditions of release on Software Escrow are limited to Contractor's (i) bankruptcy or (ii) cessation of business. County shall have no rights to use the source code unless and until release pursuant to the release conditions under the negotiated Software Escrow agreement.

Termination for Convenience. The lack of appropriation of funds shall be deemed a termination for convenience.

Termination for Default. In the event of a termination for default, County shall give Contractor written notice of such default and not less than thirty (30) days to cure such default. If Contractor does not so cure, County shall be entitled to obtain replacement goods or services substantially similar and functionally equivalent to those to be purchased pursuant to this Contract, and Contractor's sole liability shall be to pay the reasonable excess costs incurred by County in reprocurring such goods or services.

Waiver of Consequential Damages. Notwithstanding anything in this Contract to the contrary, to the fullest extent permitted by applicable law, Contractor shall not be liable under any theory of relief, arising out of or related to the Contract or Contractor’s acts or omissions in connection therewith for incidental, indirect, special or consequential damages of any nature, including, without limitation, loss of profits or contract, damage to property or loss of use, any business interruption or loss of profit, anticipated savings, data, contract, goodwill or the like that may be suffered by County or claimed against it.

Warranty. For a period of two years from the date of delivery of goods or performance of services by Contractor pursuant to this Contract and two years from the date user acceptance testing is made available for any software required under the Contract, Contractor warrants, to County, the goods manufactured by Contractor to be free from defects in material and workmanship and the services performed by Contractor to be in accordance with the specifications of this Contract. If within such period it shall be proven to Contractor’s reasonable satisfaction that any goods are defective or any services are nonconforming, such goods shall, at Contractor’s option, be repaired or replaced (F.O.B. Contractor’s factory, with all removal and installation to be at County’s expense) and such services corrected or a substitute obtained. This warranty shall not apply to (i) any loss or damage resulting from normal wear and tear or alteration, misuse, abuse or (ii) improper installation, operation or maintenance by County or a third party.

THE FOREGOING WARRANTIES ARE IN LIEU OF, AND CONTRACTOR EXPRESSLY DISCLAIMS, ALL OTHER WARRANTIES, EXPRESS OR IMPLIED IN FACT OR BY LAW, INCLUDING WITHOUT LIMITATION ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE. THE FOREGOING WARRANTIES STATE CONTRACTOR’S ENTIRE AND EXCLUSIVE LIABILITY AND COUNTY’S SOLE AND EXCLUSIVE REMEDY, IN CONNECTION WITH THE SALE OR FURNISHING OF MATERIALS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION, OPERATION OR OTHERWISE.

EXHIBIT B
ATTACHMENT A
DETAILED PRICE PAGE
Contract No. F-19-056/SS

Palm Tran Payment Milestones

Milestone	Description	Milestone Completion Date	Notes	Milestone Payment	Amount	NTP - March 10, 2020
MS-1.	Project Documentation Approval	NTP + 3 Weeks	Contractor needs to have submitted for Palm Tran's review/approval at least 5 days prior	MS-1.	2.5% \$ 158,969.28	3/31/2020
MS-2.	Conceptual Design Review Phase Approved	NTP + 4 Weeks	Contractor needs to have submitted for Palm Tran's review/approval at least 5 days prior	MS-2.	2.5% \$ 158,969.28	4/7/2020
MS-3.	Preliminary Design Review Approval	NTP + 7 Weeks	Contractor needs to have submitted for Palm Tran's review/approval at least 5 days prior	MS-3.	2.5% \$ 158,969.28	4/28/2020
MS-4.	Final Design Review Approval	NTP + 10 Weeks	Contractor needs to have submitted for Palm Tran's review/approval at least 5 days prior	MS-4.	2.5% \$ 158,969.28	5/19/2020
MS-5.	First Article Testing Approval	NTP + 12 Weeks	Contractor needs to have submitted First Article Test Procedures for Palm Tran's review/approval at least 5 days prior	MS-5.	5.0% \$ 317,938.55	6/2/2020
MS-6.	Design Qualification Testing Approval	NTP + 15 Weeks	Contractor needs to have submitted Design Qualification Test Procedures for Palm Tran's review/approval at least 5 days prior	MS-6.	5.0% \$ 317,938.55	6/23/2020
MS-7.	Production Acceptance/Pre-shipment Testing Approval	NTP + 20 Weeks	Contractor needs to have submitted Production Acceptance/Pre-shipment Testing Test Procedures for Palm Tran's review/approval at least 5 days prior	MS-7.	5.0% \$ 317,938.55	7/28/2020
MS-8.	Pilot Test Approval	NTP + 25 Weeks	Contractor needs to have submitted Pilot Test Procedures for Palm Tran's review/approval at least 5 days prior	MS-8.	10.0% \$ 635,877.11	9/1/2020
MS-9.	Complete Rollout*	NTP + 27 Weeks	Installed units will have been commissioned and placed into Revenue Service Mode successfully. * Palm Tran would like to have the entire FARE SYSTEM in revenue service by this milestone; however, recognizing the aggressive nature of the schedule, at minimum, the Contractor MUST have all Fareboxes and TVMs installed by this date. If Proposers are separating out other components, these MUST be clearly indicated in their proposed schedule, AND this and the subsequent Milestones will be split 50/50; i.e., first half for the fareboxes/TVM; second half for the remainder of the system. (NOTE: To account for the Open Payment Software being delivered at a later date, \$200,000 will be withheld from the MS-9 payment and will be paid upon the completion of this milestone for the open payment implementation).	MS-9.	20.0% \$ 1,271,754.21	9/15/2020
MS-10.	Reliability, Maintainability and Accuracy Test	NTP + 31 Weeks	Contractor needs to have submitted Reliability, Maintainability and Accuracy Test Procedures for Palm Tran's review/approval at least 10 days prior	MS-10.	10.0% \$ 635,877.11	10/13/2020
MS-11.	System Acceptance Test Approval	NTP + 35 Weeks	Contractor needs to have submitted System Acceptance Test Procedures for Palm Tran's review/approval with Reliability, Maintainability and Accuracy Test Procedures	MS-11.	10.0% \$ 635,877.11	11/10/2020
MS-12.	Successful Closeout of Punch list Items	NTP + 40 Weeks	1. Resolve all blocker and major issues. 2. Resolved Minor/Cosmetic issues in collaboration with Palm Tran priorities.	MS-12.	10.0% \$ 635,877.11	12/15/2020
MS-13.	Palm Tran Acceptance of FARE SYSTEM/Start of Contractor Warranty	NTP + 44 Weeks	Predicated on Milestones MS – 1 though MS – 12 having been approved by Palm Tran	MS-13.	10.0% \$ 635,877.11	1/12/2021
MS-14.	End of Contractor Warranty Period	MS – 13 + 2 years	Per Contract Warranty Terms and Conditions	MS-14.	5.0% \$ 317,938.52 *	1/10/2023
Total:				100.0%	\$6,358,771.05	

*remaining amount of total based contract to be paid

EXHIBIT C
SUBSCRIPTION, LICENSE, AND SUPPORT AGREEMENT
Contract No. F-19-056/SS

EXHIBIT C
GENFARE SUBSCRIPTION AND SOFTWARE SUPPORT SERVICES

1. Definitions

- 1.1 "Affiliated Users" means organizations, entities, affiliates or partners of COUNTY and to which access to the Services is approved and desired by COUNTY.
- 1.2 "Agreement" means the contract for Fare Payment and Collection System (Contract No. F-19-056/SS) to which this Exhibit C is attached and made a part hereof. In the event of a conflict between the terms of the Agreement and this Exhibit C, the Agreement shall control over this Exhibit C.
- 1.3 "Attachment" means the document that sets forth the subscription details for the Services and the Software, and any product specific terms applicable to COUNTY's subscription as set forth in this Exhibit C.
- 1.4 "Documentation" means certain Genfare documentation that describes the use, functions, features, or purpose of the Services or any component thereof, in any medium, which is delivered to COUNTY by Genfare under this Exhibit C, including Genfare's user manuals, training materials, program listings, data models, flow charts, logic diagrams, functional specifications, instructions, and complete or partial copies of the foregoing.
- 1.5 "Equipment" means certain equipment purchased by COUNTY from Genfare under the Agreement which is to be used or owned by COUNTY in connection with the Services.
- 1.6 "Initial Subscription Term" means ten (10) years from the date MS-9 as set forth in Attachment B of the Agreement is completed.
- 1.7 "Permitted Users" means (a) COUNTY's employees (including Palm Tran Inc. employees, temporary employees and contract employees) authorized by COUNTY but not recommended or retained by Genfare or one of its affiliates to access and use the Services on COUNTY's behalf, and (b) for COUNTY whose SaaS Services include the "Organizational Module", the applicable Affiliated Users authorized for such access in Attachment B.
- 1.8 "Renewal Subscription Term" means any extension to the Services provided under this Exhibit C, commencing upon the expiration of the Initial Subscription Term or any extensions thereto, as provided in this Exhibit or otherwise in an Attachment.
- 1.9 "SaaS" means the software as a service subscribed to by the COUNTY. The SaaS Services being subscribed to by COUNTY are more specifically detailed in Attachment B.
- 1.10 "Services" means the SaaS listed on Attachment B and Support specified on Attachment A.
- 1.11 "Software" means Genfare's proprietary software that is to be installed on COUNTY's computer system, including Network Manager, and/or the Garage Data System, and/or software that may be embedded on the Equipment.
- 1.12 "Subscription" means the COUNTY's payment to access, use and obtain the benefit of the Services.
- 1.13 "Subscription Fees" means the fees set forth in Attachment B for providing the Services.

- 1.14 "Subscription Term" means the Initial Subscription Term together with any Renewal Subscription Terms.
- 1.15 "Support" means those support services to be provided by Genfare pursuant to and in accordance with the terms and conditions set forth herein, as more particularly described in Attachment A attached hereto.
- 1.16 "Term" means the term of this Exhibit C which begins on the date of Initial Subscription Term and continues until the earlier of (i) the termination of this Exhibit C By County as provided herein or (ii) the expiration of this Exhibit C as provided herein.

2. Access Rights, License and Services

- 2.1 Subject to the terms of this Exhibit C and during the Subscription Term, Genfare grants COUNTY and its Permitted Users a limited, non-exclusive, non-transferable, nonrevocable, non-sublicensable right to access and use the SaaS Services solely for COUNTY's internal business purposes; provided however, Genfare may revoke the above granted license if COUNTY substantially breaches the terms of this Exhibit C.
- 2.2 Subject to the terms of this Exhibit C, Genfare grants COUNTY a limited, non-exclusive, non-transferable, nonrevocable, non-sublicensable license to install and/or use the Software solely for COUNTY's internal business purposes.
- 2.3 COUNTY's rights granted under this Exhibit C may not be leased, sublicensed or otherwise transferred or made available for use by unaffiliated third parties, in whole or in part, by COUNTY without Genfare's prior written consent or as expressly permitted in this Agreement. COUNTY shall not use or attempt to use the Services in a manner that would exceed the scope of the rights granted under this Exhibit C, or facilitate any such unauthorized access for any third party.
- 2.4 COUNTY shall not without the express written consent of Genfare: (a) reverse engineer, reverse assemble, decompile, or disassemble any technology underlying the Services and Software; (b) otherwise attempt to discover the source code to the Services or Software; (c) translate or migrate the Services or Software into another format, language, or hardware platform; (d) make the Services or Software available to anyone other than Permitted Users; (e) alter or remove any copyright, trademark or other proprietary notices on or within the Services, Software or Documentation; (f) create derivative works based upon the Services or Software in whole or in part; (g) develop or modify any software based on processes or materials incorporated into the Services or Software, or (h) permit any third party to do any of the foregoing.
- 2.5 Genfare may audit COUNTY's use of the Services or Software to verify compliance with the terms of this Exhibit C. COUNTY agrees to cooperate with such audit and provide Genfare with reasonable assistance and access to information.
- 2.6 COUNTY acknowledges and agrees that Genfare and its licensors are not responsible for: (i) the accuracy or integrity of any data submitted by COUNTY or its Permitted Users, (ii) the performance of COUNTY's or its Permitted User's equipment, (iii) delivery of services or connectivity provided by third parties to COUNTY and its Permitted Users, so long as such third parties are not required by or contracted by Genfare, or (iv) any downtime, loss or

corruption of data that occurs as a result of transmitting or receiving data or viruses via the Internet, except to the extent resulting from the negligent or intentional acts or omissions of Genfare or its agents or employees.

- 2.7 **PCI Compliance.** Genfare agrees that at the time of installation, any SaaS or Software that will capture, store, transmit or process payment card data will be certified compliant with all applicable PCI standards, either by Genfare or by the original equipment manufacturer (as applicable).

3. **Payment**

- 3.1 **Fees:** COUNTY shall pay Genfare the fees set forth in Attachment B as set forth herein. Such fees include the following:

3.1.1 **Implementation Fee:** This fee is a one-time fee for the set-up and implementation of the Services.

3.1.2 **Annual Subscription Fees:** This fee is payable annually in advance for COUNTY's access to the Services. The annual Subscription Fees for the first year of the Subscription Term will be invoiced upon the commencement of the Subscription Term. The annual Subscription Fees for all subsequent years of the Subscription Term will be payable prior to the anniversary date of the start of the Subscription Term.

3.1.3 **Transaction Fees:** COUNTY agrees to pay Genfare Transaction Fees set forth in Attachment B. Payment of Transaction Fees must be made no later than forty-five (45) days from the invoice date.

4. **Term; Termination**

- 4.1 This Exhibit C shall be in effect for the Term (as defined above).
- 4.2 Genfare may terminate a Subscription, including any and all access and usage rights for the Services provided herein, for a substantial failure by the COUNTY to perform in accordance with the Agreement that is not cured within sixty (60) days after written notice of such substantial failure.
- 4.3 Unless Genfare terminated this Exhibit C pursuant to Sections 4.2, COUNTY may continue to utilize the Services for a transition period of up to ninety (90) days after termination of this Exhibit C, subject to payment of the applicable Subscription Fees (the "Transition Period"). Should COUNTY require further assistance during the Transition Period, Genfare may, in its sole discretion, offer additional transition services at Genfare's then-current rates. In any event, upon request from COUNTY, Genfare shall reasonably cooperate with COUNTY to export COUNTY's data from the Services in a delimited TXT file during the term of this Exhibit C and for a period of up to ninety (90) days after termination.

5. **Confidential Information**

- 5.1 "Confidential Information" means any trade secret or other information of Genfare whether of a technical, business, or other nature, which is disclosed by Genfare to COUNTY orally or in writing and that is marked "confidential" and is exempt under Florida law. Confidential Information does not include any information that: (a) was known to COUNTY before

receiving it from Genfare; or (b) becomes part of the public domain through no breach of this Exhibit C by COUNTY.

- 5.2 Subject to Section 5.3, COUNTY will: (a) use the Confidential Information of Genfare solely for the purpose for which it is provided; (b) not disclose such Confidential Information to any third party, and (c) protect such Confidential Information from unauthorized use and disclosure to the same extent that it protects its own Confidential Information of a similar nature, but using no less than a reasonable degree of care. However, COUNTY may disclose Confidential Information to its employees, agents or contractors who need to know such Confidential Information in order to obtain the Services hereunder so long as COUNTY limits the scope of disclosure of Confidential Information to only that which is necessary under the circumstances, such third parties are subject to written confidentiality obligations substantively similar to this Exhibit C and are restricted to using the Confidential Information for the sole purpose of obtaining the Services. Each Party will be responsible for any improper disclosure of Confidential Information by such Party's employees, agents, or contractors.
- 5.3 COUNTY may disclose Confidential Information of Genfare to the extent required to satisfy any legal requirement of a competent governmental or regulatory authority or applicable law, including applicable Public Records or Open Records statutes and regulations, provided that (to the extent permitted by law) it promptly advises Genfare prior to making such disclosure and provides Genfare a reasonable opportunity to file an injunction to prevent its disclosure or take such other action as it considers appropriate to protect the Confidential Information. Genfare shall act promptly to prevent COUNTY's disclosure of any trade secret or other information of Genfare which Genfare claims is confidential and exempt.
- 5.4 Within thirty (30) days of the termination of this Exhibit C, COUNTY will return or destroy (and provide certification of such destruction) any materials in any medium that contains or refers to Genfare's Confidential Information to the extent such is permitted under Florida law. Subject to the confidentiality obligations herein, COUNTY may retain copies of Genfare's Confidential Information to the extent required to document its performance or for compliance with applicable laws or regulations.

6. Ownership; Restricted Rights

- 6.1 If possible, COUNTY shall permanently erase or otherwise destroy the Software contained therein before recycling, discarding, or disposing of any media or hardware that contain any installed Software.
- 6.2 COUNTY retains ownership of all COUNTY specific data entered into and/or generated by COUNTY and its Permitted Users' use of the Services (the "COUNTY Data"). Genfare shall reasonably cooperate with COUNTY to export COUNTY's data from the SaaS in a delimited TXT file at COUNTY's request. Genfare shall have no ownership rights to any COUNTY data entered into or generated by COUNTY or Genfare during the performance of the Agreement and any renewal or extensions thereof.
- 6.3 COUNTY hereby grants Genfare a limited license to aggregate and/or anonymize the COUNTY Data during the Term of the Agreement and a revocable license to use, reproduce, and distribute such aggregated and/or anonymized COUNTY Data for any legal purpose.

7. Miscellaneous

- 7.1 Custom Branding. Certain features of the Services may require the use of COUNTY's name, logo, trademarks, and/or tradenames ("COUNTY Branding"). Should COUNTY's use of the Services require COUNTY Branding, COUNTY grants Genfare a license to reproduce, copy, distribute and use such COUNTY Branding solely in Genfare's provision of the Services. By submitting, posting or displaying COUNTY Branding through the Services or to Genfare, COUNTY grants Genfare a limited, royalty-free, and non-exclusive license to use, copy, encode, store, archive, reproduce, edit, adapt, modify, translate, transmit, publish, publicly display, and distribute the COUNTY Branding for the limited purpose of providing COUNTY the Services during the Term of the Agreement. COUNTY REPRESENTS AND WARRANTS THAT COUNTY HAS THE RIGHT TO LICENSE THE COUNTY BRANDING TO GENFARE AND ITS VENDORS AND SERVICE PROVIDERS.

Certain portions of the Services may be branded with Genfare's or its vendors' or service providers' trademarks, logos and copyright notices. COUNTY agrees that it will not hide, remove, modify or otherwise change any such trademarks, logos or notices.

- 7.2 Public Announcements. Genfare and its affiliates shall have no right to use COUNTY's name, logo, trademarks and/or trade names in press releases, product brochures, internal reports, shareholder reports, proposals and demos indicating that COUNTY is a customer of Genfare unless COUNTY approves of such use in writing.
- 7.3 Survival. Neither expiration nor termination of this Exhibit C shall terminate those obligations and rights of the Parties pursuant to provisions of this Exhibit C which by their express terms are intended to survive and such provisions shall survive the expiration or termination of this Exhibit C. Without limiting the foregoing, the respective rights and obligations of the Parties under Sections 2.4, 4.3, 5, and 6.1 shall survive the expiration or termination of this Exhibit C regardless of when such termination becomes effective.

Attachment A Service Level Agreement

The support services described in this Attachment A apply to the Genfare provided Services and Software.

1. Scope of Work

- Diagnostic services for all Errors
- All fixes, upgrades and patches required for the Services or Software (as defined in Exhibit C) to function in accordance with the specifications
- 24/7 support
- Access to the Issue Resolution Timeline, as described below in Section 6.4
- Support for the Processing Services are expressly excluded from this Attachment A

2. Definitions

“Error” means any situation where the Services or the Software (a) does not operate in accordance with the Documentation; and/or (b) does not produce correct results; and/or (c) encounters any other problems or issues set out in the chart in Section 6.4 of this Attachment A.

“Resolution” or “Resolve” refers to actions taken to correct or provide a reasonable work-around for a reported issue by delivering new code or otherwise restoring the Services to a functional state. In the case of a work-around as a solution, Genfare shall continue working to more permanently resolve the Error until such Error is fully resolved.

“Standard Service Hours” are defined as Monday through Friday beginning at 8:30 a.m. and ending at 5:00 p.m. Central Time, excluding federal, COUNTY, and Genfare holidays.

“Telephone Support” means oral responses by Genfare technicians to questions regarding (a) the functions of the Services and Software, (b) the steps for COUNTY to follow in operating the Services, (c) the proper format for the input of COUNTY’s data or information, (d) steps to improve the efficiency of operation of the Services, (e) the interface of the Services, and any related system in COUNTY’s current technical environment, (f) the interface of the Services and other software, (g) the Documentation relating to the Services, and/or (h) changes to the operation of the Services due to the provision of a maintenance and/or support service to COUNTY.

3. SaaS or Software patches and upgrades

- 3.1 Genfare shall (i) develop, test, provide and/or implement all applicable “patches” or updates that become necessary to remedy the Errors in the Services or the Software and (ii) provide all version updates, software patches and error corrections necessary for the Services and the Software to maintain functionality.

- 3.2 Applicable Software updates will be made available to COUNTY, at no cost to the COUNTY as they are released. COUNTY's involvement may be required as Genfare may need access to certain COUNTY equipment or systems to effectuate updates.
- 3.3 For errors in the Software, prior to implementing any patches or upgrades, Genfare shall first notify COUNTY's IT department in advance to schedule a time and date for the installation. Depending on the scope of the change, COUNTY may wish to back-up their Services prior to the software upgrade.
- 3.4 Genfare Support includes new features in modules subscribed to by the COUNTY, but does not include modules not subscribed to or new modules developed by Genfare. Genfare shall support APIs created by Genfare.

4. Exceptions

- (a) Genfare's obligations for Support under this Attachment A shall not apply to issues arising from the negligence of COUNTY, its employees, or representatives,
 - (b) any loss or damage resulting from a force majeure event (as set forth in Article 20 of the Agreement),
 - (c) alteration, misuse, or abuse of the Services or Software,
 - (d) use of the Services or Software contrary to the terms of the Agreement, or the instructions in any Documentation provided to the COUNTY,
 - (e) the combination of the Services or Software with any third party hardware or software not expressly recommended or approved by Genfare,
 - (f) any improper installation, operation or maintenance of the Services or Software by the COUNTY or a third party (unless such third party is contracted or required by Genfare), including use of non-OEM parts in the Services and a COUNTY's failure to promptly install all patches, error corrections and updates provided by Genfare,
 - (g) COUNTY's failure to report a known Error in a timely manner (no more than seven (7) business days from identification of such Error), or
 - (h) a hardware failure (except to the extent that such hardware is under warranty).
- 4.2 Genfare will not provide Support or any associated services for the COUNTY's Oracle database environment. Oracle database adjustments, enhancements and/or recommendations will be communicated and passed to COUNTY for implementation. Genfare is not responsible for executing updates to maintenance for the network manager/Oracle database virtual environments, operating systems, database version, database allocation or similar COUNTY-provided resources.

5. Genfare and COUNTY Duties

Although Genfare shall be responsible for the Support, COUNTY shall be the Party that initially responds to all Errors. Genfare agrees to assist the COUNTY, as required and contracted by the COUNTY.

5.1 Genfare SHALL:

- (a) Provide remote support for the Services and Software, as required by Exhibit C;
- (b) Respond to and Resolve any Errors in accordance with the chart in Section 6.4;
- (c) Perform the Support in a competent manner by qualified personnel;
- (d) Ensure that the Services or Software will operate and function with updates, upgrades, modifications or fixes, that are provided by Genfare, including without limitation, software patches or bug fixes;
- (e) Ensure that Genfare personnel or contractors are available to carry out the obligations of Genfare hereunder;
- (f) Provide contact information for Genfare personnel, available to receive notices of Errors under Section 7.2 of this Attachment A; and
- (g) Notify COUNTY of any identified indication of deliberate tampering or patterns of damage not consistent with normal usage.

5.2 Genfare SHALL NOT:

- (a) Be responsible for any malfunction of Equipment, servers, computer equipment, communications infrastructure, cabling, networking capability or any other element or Errors that are not attributable to Genfare or its personnel or contractors Services or Software; or
- (b) Pay any claim pertaining to work done by or on behalf of COUNTY for removing modules or Equipment to be shipped to Genfare for repair.

5.3 COUNTY SHALL:

- (a) Provide any information reasonably requested by Genfare to understand and describe an Error in order to allow Genfare to carry out its duties hereunder;
- (b) Provide any access to Equipment or systems as reasonably requested by Genfare to provide patches or updates to Software;
- (c) Perform all preventative maintenance of Software and Equipment according to the Documentation;
- (d) Be entitled to use any third party to carry out all or part of the hardware maintenance of the Services, or to carry out such maintenance itself (Genfare shall have no obligation to correct Errors attributable to such third-party or self-performed maintenance under this Attachment A);
- (e) Make all requests for support through a COUNTY's representative, or COUNTY's representative's substitute(s) or designee(s);
- (f) Provide appropriate personnel and support as is necessary for Genfare personnel to perform their duties, such as IT technical support, communications support, revenue service support and security personnel, flaggers and other proper personnel;
- (g) Inform Genfare of all COUNTY operating and security policies established for the safe, secure and proper interaction with the Services;

- (h) Be responsible for freight charges to Genfare, located in Elk Grove Village, IL, and all costs, expenses related thereto except for parts under warranty;
 - (i) Be responsible for any Genfare travel expenses for on-site support except for warranty repairs;
- All Genfare Travel expenses must conform to County PPM CW-F-009 and Florida Statute 112.061;
- (j) Promptly notify Genfare when any change is made to the Services; and
 - (k) Promptly (no later than 10 business days after receipt) install all patches, error corrections and updates provided by Genfare for Genfare products.

6. Support Response Time and Availability

6.1 Response Time

Genfare shall make available all personnel needed to ensure that the requirements hereunder, including, without limitation, all response times as described under Section 6.4, are met.

6.2 Initial Response.

Genfare shall provide an initial response (the "Initial Response") in accordance with Section 6.4 below. As part of the Initial Response Genfare shall:

- (a) Request access to the Services or any part thereof, other than to the actual TVM itself, in order to determine the nature of the reported Error. Genfare access must be coordinated through the primary COUNTY representative or his/her designee. Access will only be provided upon request and will be terminated upon Resolution of the Error. During said access, Genfare agrees to observation by COUNTY staff.
- (b) Determine the cause of the Error and the solution to the Error.
- (c) Provide COUNTY with an estimate of the time required to correct the reported Error in accordance with Section 6.4 below.

6.3 Support Availability. Telephone Support shall be available 24/7 via Genfare's support telephone numbers: 847.871.1231

6.4 Support Response Time and Availability

Error Priority Classification	Expected Action(s) & Response Times from Genfare
<p>Critical The Error is classified as Critical if an AFC component, the Services, equipment and/or Software produces a major or substantial business impact, or impact to normal operations, or fails such that any of the following, including issues of a similar severity to the following, occurs:</p> <ul style="list-style-type: none"> • loss of revenue or expense • loss of access to a critical back-office or other business applications • System operation at a severely degraded level, such that normal business operations cannot be conducted • System cannot be operated 	<p>Expected response: Genfare will provide an e-mail response stating the status and action plan in:</p> <p>Less than 3 hours from the time Genfare is notified of the Error.</p> <p>Genfare will make every attempt to Resolve the Error within 24 hours (i.e. allocate as many resources as are required to Resolve a problem ASAP).</p> <p>Genfare will give the highest scheduling priority and devote its best efforts and best available resources to the verification, analysis, response, temporary avoidance and Resolution of Errors in this category. If the problem is not Resolved within 3 hours, Genfare shall ensure that its most senior personnel are assigned to the work of Resolving the Error, on a full-time basis.</p>

<p>High Priority The Error is classified as a High Priority Error if an AFC Component, the Services, equipment and/or Software produces a major or substantial business impact, or impact to normal operations, or fails such that any of the following, including issues of a similar severity to the following, occurs:</p> <ul style="list-style-type: none">• Significant negative customer experience• Limited access to a back-office application or other business applications• System operation at a degraded level, such that normal business operations cannot be conducted normally• Application or system experiencing continual or repeated issues• information is not being collected from equipment• reports are not being generated or are being generated incorrectly• the Software or any part or component thereof is not functioning in accordance with the Services Specifications.	<p>Expected response: Genfare will provide an e-mail response stating the status and action plan in: Less than 4 hours from the time Genfare is notified of the Error. Genfare shall provide a status report of the situation within 1 business day.</p> <p>Genfare will make every attempt and shall use commercially reasonable efforts to Resolve the Error within 24 hours (i.e. allocate as many resources as are required to Resolve a problem within this time). Genfare will give the second highest scheduling priority and devote high efforts and experienced and available resources to the verification, analysis, response, temporary avoidance and Resolution of Errors in this category. If the problem is not Resolved within 6 hours, Genfare shall assign its most senior personnel to resolve the Error, on a full-time basis.</p>
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<p>Low Priority</p> <p>The Error is classified as a Low Priority Error if a malfunctioning element of the Fare Collection System, the Services, equipment and/or Software cannot be fixed or resolved by the replacement of one or more components, or if a reasonable workaround has been provided. Additionally, Low Priority failures will include incidents that produce little or no business impact, or impact to normal operations, including but not limited to:</p> <ul style="list-style-type: none"> • Minor customer inconvenience • System operating at a degraded level such that normal business operations are minimally impacted 	<p>Expected response: Genfare will provide an e-mail response stating the status and action plan in:</p> <p>Less than 24 hours from the time Genfare is notified of the Error. Genfare shall provide a status report of the situation within five (5) business days.</p> <p>Genfare commits to 100% resolution of the Error within 20 business days or otherwise agreed to by both parties (i.e. allocate as many resources as are required to Resolve a problem within this time). Genfare will give the third highest scheduling priority and devote reasonable efforts and reasonably available resources to the verification, analysis, response, temporary amelioration and full Resolution and correction of Errors in this category. If the problem is not resolved within 12 hours, Genfare shall assign more senior personnel to the work of resolving the Error.</p>
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Telephone Support: As stated in 6.3, telephone support is 24/7, but divided into normal business and after-hours support; where normal business hours are defined as: 8:30 A.M. Central Time until 5:00 P.M. Central Time. Support calls placed within these times are conditioned as follows:

- Critical Errors – response time will be within 3 hours of call being received regardless of time received
- High Priority Errors – response time will be within 4 hours of call being received during normal business hours, and within 8 hours if received after-hours; and
- Low Priority Errors – response time will be within 24 hours regardless of time received

IN AREAS OF DISPUTE COUNTY HAS FINAL SAY ON ERRORS AFFECTING BUSINESS OPERATIONS, AND COUNTY WILL ASSIGN REASONABLE PRIORITY CLASSIFICATIONS. ALL RESPONSE TIMES CONTAINED IN THIS ATTACHMENT ARE CALCULATED FROM THE TIME COUNTY MAKES AN INITIAL CALL FOR ERROR RESOLUTION. RESOLUTION TIMES ARE DEPENDENT UPON HAVING ACCESS TO THE APPLICABLE SYSTEMS AS GRANTED BY THE COUNTY. THE TIME PERIOD FOR DETERMINING THE RESOLUTION TIME SHALL BEGIN ON COUNTY NOTIFICATION OF ERROR TO GENFARE AND ACCESS TO ITS SYSTEM IF REQUIRED. ACCESS SHALL BE REQUESTED BY GENFARE ON OR BEFORE THE PROVISION OF ITS STATUS AND ACTION PLAN.

7. Help Desk Services

Genfare will provide Help Desk Services to assist COUNTY with use of the Services and assistance in resolving problems encountered by COUNTY.

7.1 Help Desk Services

- (a) Help Desk Services Contact Details:
Phone: 847.871.1231
Email: genfare.customercare@spx.com
- (b) Ticketing Procedures
 - (i) Each inquiry will be documented, assigned a ticket number and a confirmation email will be sent to the originator to confirm the request has been received.
 - (ii) Each ticket will be assigned to a technical support engineer to follow up and resolve each issue.
 - (iii) A technical support engineer will make contact according to the contact information within the ticket to work on the ticket, or to schedule a time to work on the ticket.

7.2 COUNTY Representatives (name, title, email and phone number):

- (a) IT contact*:
Renato Paiva, Palm Tran Sr. IT Manager,
rpaiva@pbcgov.org, 561-841-4229

Chris Eaton, Palm Tran System Administrator,
ceaton@pbcgov.org, 561-841-4310

Dan Pace, Palm Tran System Administrator,
dpace@pbcgov.org, 561-841-4228

Arli Mukli, Palm Tran System Administrator
amukli@pbcgov.org, 561-841-4367
- (b) Maintenance*:
Robert Manzino, Palm Tran Superintendent of Maintenance,
rmanzino@pbcgov.org, 561-278-1166

Peter Skeete, Palm Tran Superintendent of Maintenance,
pskeete@pbcgov.org, 561-841-4267
- (c) Third party service contacts*:
*To update contacts, County can email the address listed in 7.1(a)

7.3 Communications protocol

- (a) In order to connect to the COUNTY's system and Resolve Errors in the Services or Software, Genfare must be able to reach the COUNTY Representative (or delegate), or Genfare will be unable to connect to the system to identify the root cause of, and subsequently Resolve, the reported Error.
- (b) Genfare may use the following tools to remotely access the COUNTY system:
 - (i) SecureLink. COUNTY shall, at COUNTY's sole cost and expense, provide access, training, and any licenses necessary for Genfare to use SecureLink. COUNTY REPRESENTS AND WARRANTS THAT COUNTY HAS ALL NECESSARY RIGHTS AND LICENSES TO GRANT GENFARE ACCESS OR RIGHTS TO USE SECURELINK.

ATTACHMENT B
GENFARE LINK & MOBILE LINK SERVICES

SaaS Services	<p>Genfare Link</p> <p>Mobile Link</p>
One-Time Implementation Fee	<p>Genfare Link: \$411,098</p> <p>Mobile Link: \$50,000</p>
Genfare Link Annual Subscription Fees	<p>Year 1: \$84,048</p> <p>Year 2: \$86,569.44</p> <p>Year 3: \$89,166.52</p> <p>Year 4: \$91,841.52</p> <p>Year 5: \$94,596.76</p> <p>Year 6: \$97,434.67</p> <p>Year 7: \$100,357.71</p> <p>Year 8: \$103,368.44</p> <p>Year 9: \$106,469.49</p> <p>Year 10: \$109,663.58</p> <p>Option Year 11: \$112,953.48</p> <p>Option Year 12: \$116,342.09</p> <p>Option Year 13: \$119,832.35</p> <p>Option Year 14: \$123,427.32</p> <p>Option Year 15: \$127,130.14</p> <p>Option Year 16: \$130,944.05</p>
Transaction Fees	<p>Transaction fees as follows:</p> <p>5% of each transaction + \$00.05 of each transaction</p>
Payment Terms	<p>Genfare Link Implementation Fee will be due within forty-five (45) days of the Subscription Start Date.</p> <p>Mobile Link Implementation Fee will be due within forty-five (45) days of the Subscription Start Date</p> <p>Annual Subscription Fee will be invoiced to COUNTY by Genfare within forty-five (45) days prior to the end of the then-current subscription year. COUNTY shall remit payment in accordance with the terms of Exhibit C.</p>

	Software License Fee shall be paid prior to the Software being delivered to COUNTY. Transaction Fees are payable in accordance with the terms of Exhibit C.
Subscription Start Date	The date MS-9 as set forth in Attachment B of the Agreement is completed.
Genfare Link and Mobile Link Initial Term	10 years from the Subscription Start Date
Renewal Terms	The SaaS Services shall automatically renew for two (2) periods of three (3) years unless either Party gives the other written notice of intent not to renew at least sixty (60) days notice prior to the end of the then-current term. Notwithstanding the forgoing, all renewals are subject to availability of funding by the COUNTY at the time of renewal.
Maximum Number of Affiliated Users	The maximum number of Affiliated Users is 25
Affiliated Users	[List entities which currently may have access to Genfare Link under the COUNTY's subscription]
Payment Processor	Provided by COUNTY

Additional Mobile Link Terms:

- 1. Support Services.** Notwithstanding the terms of Attachment A, Palm Beach County and Palm Tran Inc. shall provide the first level of support to its employees, staff, agents, contractors, riders or its Client's riders using Mobile Link.

EXHIBIT D
DBE Utilization Report, Exhibit 4-C
Final DBE Utilization Report, Exhibit 4-D
Contract No. F-19-056/SS

DBE UTILIZATION REPORT

EXHIBIT 4-C

Report No. _____

CONTRACT #:	CONTRACT AMOUNT: \$	DATE FORM SUBMITTED:	
PROJECT DESCRIPTION:	PROJECT COMPLETION DATE:		
PRIME CONTRACTOR:	PERIOD ENDING:		
CONTACT PERSON:	TELEPHONE #:	FAX #	

SUBCONTRACTING INFORMATION

TO BE SUBMITTED WITH EVERY PAY APPLICATION TO COUNTY'S CONTRACT REPRESENTATIVE AND PALM TRAN'S DBE LIAISON (csalazar@pbctgov.org)

DBE Subcontractor	Original Agreed Price	Revised Agreed Price	% of Work Completed To Date	Amount Paid This Period	Amount Paid To Date	Gender		Ethnic Category				
						M	F	B	H	A	NA	W

I attest that the information submitted in this report is in fact true and correct to the best of my knowledge

Signature	Title	Date
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Note: The information provided herein is subject to verification by Palm Tran's DBE Liaison.

FINAL DBE UTILIZATION REPORT

EXHIBIT 4-D

(To be submitted with the final invoice)

CONTRACT #:		CONTRACT AMOUNT:	DATE FORM SUBMITTED:	
PROJECT DESCRIPTION:			PROJECT COMPLETION DATE:	
PRIME CONTRACTOR:			PERIOD ENDING:	
CONTACT PERSON:			TELEPHONE #: ()	FAX # ()

SUBCONTRACTING INFORMATION

All payments made to DBE subcontractors must be reported on this form.

DBE Subcontractor	Description of Work	Original Amount (Agreed to Price)	Final Subcontract Amount	Total Amt Paid	Gender		Ethnic Category				
					M	F	B	H	A	NA	W
	TOTALS:										

I attest that the information submitted in this report is in fact true and correct to the best of my knowledge

Signature	Title	Date
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Note: The information provided herein is subject to verification by Palm Tran's DBE Liaison