

II. FISCAL IMPACT ANALYSIS

A. Five Year Summary of Fiscal Impact:

Fiscal Years	2007	2008	2009	2010	2011
Capital Expenditures	-0-	-0-	-0-	-0-	-0-
Operating Costs	\$26,600	-0-	-0-	-0-	-0-
External Revenues	-0-	-0-	-0-	-0-	-0-
Program Income (County)	-0-	-0-	-0-	-0-	-0-
In-Kind Match (County)	-0-	-0-	-0-	-0-	-0-
NET FISCAL IMPACT	\$26,600	-0-	-0-	-0-	-0-

ADDITIONAL FTE POSITIONS (Cumulative) _____

Is Item Included in Current Budget? Yes _____ No X
 Budget Acct No.: Fund _____ Dept. _____ Unit _____ Object _____
 Program _____

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

County Transportation Trust Fund
 Traffic Operations/Crash Data Entry System
 Professional Services/Data Processing Software/Accessories

C. Departmental Fiscal Review: R. J. Ward 2/16/07

III. REVIEW COMMENTS

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

John D. ... 3/19/07
 OFMB
 3/19/07
 3/15/07
Contract Dev. and Control 3/20/07

B. Approved as to Form and Legal Sufficiency:

Marlene R. ... 3/22/07
 Assistant County Attorney

This Contract complies with our contract review requirements.

C. Other Department Review:

 Department Director

This summary is not to be used as a basis for payment.

RESEARCH AGREEMENT

THIS AGREEMENT effective this _____ day of _____ by and between **PALM BEACH COUNTY BOARD OF COUNTY COMMISSIONERS**, with offices located at 301 N. Olive Avenue, West Palm Beach, FL 33401, (hereinafter referred to as "Sponsor") and the **UNIVERSITY OF FLORIDA BOARD OF TRUSTEES**, an educational institution of the State of Florida ("University"), located at 219 Grinter Hall, Gainesville, FL 32611.

WITNESSETH

WHEREAS, the research program contemplated by this Agreement is of mutual interest and benefit to University and to Sponsor, will further the instructional and research objectives of University in a manner consistent with its status as a non-profit, tax-exempt, educational institution, and may derive benefits for both Sponsor and University through inventions, improvements and/or discoveries;

NOW, THEREFORE, in consideration of the premises and mutual covenants herein contained, the parties hereto agree to the following:

Article 1 - Definitions

As used herein, the following terms shall have the following meanings:

- 1.1 "Project" shall mean the description of the project described in Appendix A hereof, under the direction of Dr. Ilir Bejleri, as principal investigator (University project director).
- 1.2 "Contract Period" is the date first hereinabove written through December 31, 2007, subject to budget availability.
- 1.3 "University Intellectual Property" shall mean individually and collectively all inventions, improvements and/or discoveries which are conceived and/or made by one or more employees of University in performance of Project.

Article 2 - Research Work

- 2.1 University shall commence the performance of Project promptly after the effective date of this Agreement, and shall use reasonable efforts to perform such Project substantially in accordance with the terms and conditions of this Agreement. Anything in this Agreement to the contrary notwithstanding, Sponsor and University may at any time amend Project by mutual written agreement.
- 2.2 In the event that the Principal Investigator becomes unable or unwilling to continue Project, and a mutually acceptable substitute is not available, University and/or Sponsor shall have the option to terminate said Project.

Article 3 - Reports and Conferences

- 3.1 Written program reports shall be provided by University to Sponsor every three months, and a final report shall be submitted by University within thirty (30) days of the conclusion of the Contract Period, or early termination of this Agreement.
- 3.2 During the term of this Agreement, representatives of University will meet with representatives of Sponsor at times and places mutually agreed upon to discuss the progress and results, as well as ongoing plans, or changes therein, of Project to be performed hereunder.

Article 4 - Costs, Billings and Other Support

- 4.1 It is agreed to and understood by the parties hereto that, subject to Article 2, total costs to Sponsor hereunder shall not exceed the sum of Twenty Six Thousand Six Hundred Dollars and 00 Cents (\$26,600). Payment shall be made by Sponsor according to Appendix A.

Article 5 - Publicity

- 5.1 Sponsor will not use the name of University, nor of any member of University's Project staff, in any publicity, advertising, or news release without the prior written approval of an authorized representative of University. University will not use the name of Sponsor, or any employee of Sponsor, in any publicity without the prior written approval of Sponsor.

Article 6 - Publications

- 6.1 Sponsor recognizes that under University policy, the results of University Project must be publishable and agrees that Researchers engaged in Project shall be permitted to present at symposia, national, or regional professional meetings, and to publish in journals, theses or dissertations, or otherwise of their own choosing, methods and results of Project, provided, however, that Sponsor shall have been furnished copies of any proposed publication or presentation at least three (3) months in advance of the submission of such proposed publication or presentation to a journal, editor, or other third party. Sponsor shall have three (3) months, after receipt of said copies, to object to such proposed presentation or proposed publication because there is patentable subject matter which needs protection. In the event that Sponsor makes such objection, said Researcher(s) shall refrain from making such publication or presentation for a maximum of three (3) months from date of receipt of such objection in order for University to file patent application(s) with the United States Patent and Trademark Office and/or foreign patent office(s) directed to the patentable subject matter contained in the proposed publication or presentation.

Article 7 - Intellectual Property

- 7.1 All rights and title to University Intellectual Property under Project shall belong to University and shall be subject to the terms and conditions of this Agreement.
- 7.2 Rights to inventions, improvements and/or discoveries, whether patentable or copyrightable or not, relating to Project made solely by employees of Sponsor shall belong to Sponsor. Such

inventions, improvements, and/or discoveries shall not be subject to the terms and conditions of this Agreement.

- 7.3 University will promptly notify Sponsor of any University Intellectual Property conceived and/or made during the Contract Period under Project. If Sponsor directs that a patent application or application for other intellectual property protection be filed, University shall promptly prepare, file, and prosecute such U.S. and foreign application in University's name. Sponsor shall bear all costs incurred in connection with such preparation, filing, prosecution, and maintenance of U.S. and foreign application(s) directed to said University Intellectual Property. Sponsor shall cooperate with University to assure that such application(s) will cover, to the best of Sponsor's knowledge, all items of commercial interest and importance. While University shall be responsible for making decisions regarding scope and content of application(s) to be filed and prosecution thereof, Sponsor shall be given an opportunity to review and provide input thereto. University shall keep Sponsor advised as to all developments with respect to such application(s) and shall promptly supply to Sponsor copies of all papers received and filed in connection with the prosecution thereof in sufficient time for Sponsor to comment thereon.
- 7.4 If Sponsor elects not to exercise its option or decides to discontinue the financial support of the prosecution or maintenance of the protection, University shall be free to file or continue prosecution or maintain any such application(s), and to maintain any protection issuing thereon in the U.S. and in any foreign country at University's sole expense.

Article 8 - Grant of Rights

- 8.1 Pursuant to Article 7.3, University grants Sponsor the first option, for consideration, a non-exclusive license or an exclusive license with a right to sublicense, on terms and conditions to be mutually agreed upon. The option shall extend for a time period of 90 days from the date of disclosure to Sponsor.

Article 9 - Term and Termination

- 9.1 This Agreement shall become effective upon the date first hereinabove written and shall continue in effect for the full duration of the Contract Period unless sooner terminated in accordance with the provisions of this Article. The parties hereto may, however, extend the term of this Agreement for additional periods as desired under mutually agreeable terms and conditions which the parties reduce to writing and sign. Either party may terminate this agreement upon ninety (90) days prior written notice to the other.
- 9.2 In the event that either party hereto shall commit any breach of or default in any of the terms or conditions of this Agreement, and also shall fail to remedy such default or breach within ninety (90) days after receipt of written notice thereof from the other party hereto, the party giving notice may, at this option and in addition to any other remedies which it may have at law or in equity, terminate this Agreement by sending notice of termination in writing to the other party to such effect, and such termination shall be effective as of the date of the receipt of such notice.

- 9.3 Subject to Article 8, termination of this Agreement by either party for any reason shall not affect the rights and obligations of the parties accrued prior to the effective date of termination of this Agreement. No termination of this Agreement, however effectuated, shall affect the Sponsor's rights and duties under Article 7 hereof, or release the parties hereto from their rights and obligations under Articles 4, 5, 6, 7, 8, and 10.
- 9.4 Unless the University is in breach of this Contract, the University shall be paid for research services through the date of termination. After receipt of a Termination Notice and except as otherwise directed by the COUNTY the UNIVERSITY shall:
- A. Stop work on the date and to the extent specified.
 - B. Terminate and settle all orders and subcontracts relating to the performance of the terminated work.
 - C. Transfer all work in process, completed work, and other materials related to the terminated work to the COUNTY.

Article 10 - Independent Contractor

- 10.1 In the performance of all services hereunder:
- 10.1.1 University shall be deemed to be and shall be an independent contractor and, as such, University shall not be entitled to any benefits applicable to employees of Sponsor;
 - 10.1.2 Neither party is authorized or empowered to act as agent for the other for any purpose and shall not on behalf of the other enter into any contract, warranty, or representation as to any matter. Neither shall be bound by the acts or conduct of the other.

Article 11 - Insurance

- 11.1 University warrants and represents that University has adequate liability insurance, such protection being applicable to officers, employees, and agents while acting within the scope of their employment by University, and University has no liability insurance policy as such that can extend protection to any other person.
- 11.2 Each party hereby assumes any and all risks of personal injury and property damage attributable to the negligent acts or omissions of that party and the officers, employees, and agents thereof.

Article 12 - Governing Law

- 12.1 This Agreement shall be governed and construed in accordance with the laws of the State of Florida.

Article 13 - Assignment

- 13.1 This Agreement shall not be assigned by either party without the prior written consent of the parties hereto.
- 13.2 This Agreement is assignable to any division of Sponsor, any majority stockholder of Sponsor, and/or any subsidiary of Sponsor in which 51 percent of the outstanding stock is owned by Sponsor.

Article 14 - Agreement Modification

- 14.1 Any agreement to change the terms of this Agreement in any way shall be valid only if the change is made in writing and approved by mutual agreement of authorized representatives of the parties hereto.

Article 15 - Notices

- 15.1 Notices, invoices, communications, and payments hereunder shall be deemed made if given by registered or certified envelope, postage prepaid, and addressed to the party to receive such notice, invoice, or communication at the address given below, or such other address as may hereafter be designated by notice in writing:

If to Sponsor

Motasem Al-Turk, Ph.D., P.E.
Assistant Director,
Traffic Division
2300 N Jog Road, 3rd Floor
West Palm Beach, FL 33411

If to University:

Dr. Thomas E. Walsh, Director
Sponsored Research
University of Florida
219 Grinter Hall
Gainesville, FL 32611-2037

If Technical Matter:

Dr. Ilir Bejleri
Urban & Regional Planning
454 Architecture Building
PO Box 115706
Gainesville, FL 32611

Article 16 – Annual Appropriation

Each party's performance and obligation to pay under this agreement is contingent upon an annual budgetary appropriation by its respective governing body for subsequent fiscal years.

IN WITNESS WHEREOF, the parties have caused these presents to be executed in duplicate as of the day and year above written.

PALM BEACH COUNTY, FLORIDA,
a Political Subdivision
of the State of Florida

By: ITS BOARD OF COUNTY
COMMISSIONERS

By: ~~Tony Masilotti, Chairman~~
Addie L. Greene, Chairperson

ATTESTED:
Sharon R. Bock,
CLERK & COMPTROLLER

By: _____
Deputy Clerk

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY:

By: _____
Assistant County Attorney

APPROVED AS TO TERMS
AND CONDITIONS:

By: Matt Altmann for
Dan Weisberge, P.E.
Director, Traffic Division

UNIVERSITY OF FLORIDA

By: BP - 1/30/07

Title:
Brian Prindle
Associate Director of Research

January 15, 2007

**NEW GIS ANALYSIS AND VISUALIZATION FEATURES FOR ENHANCING THE
CRASH DATA SYSTEM**
for Palm Beach County Engineering and Public Works Traffic Division

1. Introduction

At present, the new crash data management system for Palm Beach County is in its final stages of completion of tasks planned in the first phase of the project. This document proposes new features that will extend the capabilities of the system to perform online crash analysis that will ultimately streamline the entire process of crash data collection, mapping, analysis and reporting. These new features presented below will advance the system even further with web based crash analysis functions that will assist the users of the system to identify and map the high crash locations based on aggregation of crashes to intersection and street segments using crash rates and crash severity index. In addition the new features will improve the analysis of the crash diagrams and crash reports with charts and user-friendly interface modifications. Further, the system will be modified to allow access to the all County agencies authorized and interested in crash data reports and crash analysis online. In this phase, the development team will work closely with the County Advisory Committee to explore options for integration of crash data collected digitally by Palm Beach County Sheriff's Office and integration with Cinema document repository.

2. Proposed Tasks

1 - Online crash data visualization

The current system links the crash data with the County GIS streets. This process is done during the data entry stage to ensure that the crash points can be mapped. However, at present the results of the online queries or the reports are not shown on maps. They can be mapped independently through GIS which would require additional work by County staff and require close collaboration with the GIS department. The purpose of this task is to enhance the system with the ability to visualize the results of queries on the online maps. In addition to the tabular data displayed by the system currently, this new feature will show the corresponding crash points on the map which will be generated at the same time as the crash tabular listing. The online map interface will include features that will allow users to click on map points for additional information about crash attributes, draw additional reference layers on the map such as shopping centers, bus stops, schools, hospitals etc., navigate the map to intersections, streets, points or areas of interest. By performing the online mapping, this task will streamline the entire process that starts with the data entry, data query, reporting and mapping by performing it all online without the need for external access to GIS software. As such, this feature will save the County staff and other users of the system a great deal of time that otherwise have to be spent to create maps of the crash data using standalone GIS software.

II - Spatial Crash Analysis

Crashes tend to cluster around intersections and other locations along the street networks. By analyzing crash aggregations users can determine the high crash intersections and high crash segments in order to prioritize funding for countermeasures. The purpose of this task is to develop functions for analyzing crashes based on aggregation to intersections and street segments. The results of aggregations will be displayed on the online maps showing the spatial distribution of high crash intersection and segments. This will be accomplished by using three kinds of measures: summarization of crashes at intersections, crash rates and crash severity index. Summarization of crashes to intersection/segments will count crashes at each intersection including crashes within a given distance from intersection e.g. 250 feet. By using graduated symbol/color type of GIS symbology the online map will show how crashes are clustered spatially on the map. Furthermore, additional factors need to be considered for relative comparison of intersections based on traffic volumes and crash severity levels. By using traffic volumes data for each crash segment, crash rates will be calculated for each crash intersection and crash segment which will be displayed spatially using similar symbology as crash summarization. Traffic volumes should be available for major roads and major intersections. Additionally, a measure of crash severity will be developed based on the number of fatalities, bodily injury and property damage. The variables of crash rate and crash severity index will inform users on the safety level of the street network to determine and develop engineering, enforcement and education countermeasures. For a more detailed comparative analysis this task will develop an additional new function that visualizes high crash intersection by a pie chart symbology that breaks down each intersection by any of the crash attributes e.g. a pie chart GIS symbology with 3 classes can be used to show the percentage of automobile, pedestrian and bicycle crashes for selected intersection. Other crash attributes that can be displayed using this method include crash severity, crash type, direction of travel etc.

The spatial analysis and their online visualization proposed in this task will provide users additional information for understanding clustering of crashes based not simply on the total number of crashes but also by factoring in traffic volumes and the severity of injuries when determining the high crash locations.

III - Charting, Enhancements of Crash Diagrams and other Interface Improvements

This task includes a number of miscellaneous items that will extend the system with new features and improve the current crash diagram and the data query interface. The results of the queries at present are displayed in tabular format. To enhance the interpretation of the tabular data this task will develop new functions that will display the results in charts right beside tabular data. This feature can be specifically useful for users that are interested in understanding quickly the general trends in the data without external processing in spreadsheets or database programs. The benefits of automatic charting include time saving and easier understanding of information.

Crash diagram will be enhanced with labeling of streets, a legend for the crash types and the crash type icons will be displayed in a new field in the tabular data shown below the diagram. Additionally, a pie chart can be displayed on the side of the table. Both the column with the

crash type icon and the pie chart can contribute to easier understanding of the crash diagram information visually.

Additional interface improvement will be made to the analysis interface sections. The different categories of crash query criteria are at present visible even if they are not used in the query. The new interface will make them collapsible and expandable. This will visually shorten the list of criteria, reduce the need for scrolling vertically between criteria and help simplify the query process to allow users build queries of interest quickly. This will improve the user-friendliness of the system which will encourage users to make use of the system more frequently.

Additional interface changes will be required to accommodate maps that will be developed tasks 1 and 2.

IV - Agency Access and Integration with Other Systems

Although the system is designed for various categories of users such as administrator, data entry and viewer, at this time the system is only available to the County staff of the traffic engineering division. It is envisioned that many external agencies in the County will be interested in having access to the system in order to query, and analyze the crash data for their needs. To provide access to the external agencies, in the 'viewer' capacity, the system will need to include additional architectural changes. The benefits of these changes include reduced time for the County personnel to respond to requests for information from the external sources and faster and more efficient information sharing.

This task will include efforts to integrate with crash data management system with other sources of data. First, it will explore the possibility of integrating the system with the scanned crash reports of the Cinema document repository and implement this feature in the crash database management system. This will give users access to full crash report information for detailed analysis. Second, this task will explore options for importing the Palm Beach County Sheriff's Office's digital crash data directly into the system, thus avoiding the manual data entry. This will require meetings with Sheriff's Office representatives, evaluation of their data collection system and making recommendation for potential automatic import solutions.

3. Development period

The tasks above will be developed during a period of 6 months. Each task will include testing by the County Advisory Committee and adjustment of the system based on findings from testing. The diagram below shows the estimated development time for each task. The testing period for each task is included.

Tasks	Months					
	1	2	3	4	5	6
Crash Data Visualization	■	■	■	■	■	■
Spatial Crash Analysis	■	■	■	■	■	■
Charts, Interface	■	■	■	■	■	■
Agency Access and Integration	■	■	■	■	■	■

Table 1 - Schedule

4. Development team

The system will continue to be developed by a team of faculty, staff and students of University of Florida directed by Dr. Ilir Bejleri. Periodically the Advisory Committee will be involved in meetings with the development team, for feedback and consultations to ensure that the system meets the needs of the County.

5. Budget and Billing

The estimated budget needed to develop the proposed tasks includes salaries and fringe benefits for faculty, staff and students, student tuition, CPU time, supplies and travel as needed. Students' rates including benefits will be between 12\$/hour and \$20/hour depending on qualifications and project needs. Staff will be paid rates between \$20/hour and \$32/hour based on qualifications and project needs including the benefits. Faculty member Ilir Bejleri will be paid using his current University rate plus benefits of \$47.23/hour. Students, staff and faculty work will be spread through the academic year and summer period. The projected budget is shown in the next page. The rates used for students and staff are average rates in the range mentioned above. The rates include the benefits. Actual staffing of the project and rates may change within the range presented above based on the availability of students and staff within the total projected budget.

The County will be billed in lump sums periodically upon completion of each task as shown in Table 2 below. A progress report will be submitted for each task along with the invoice. The development team will be in continuous contact with the Advisory Committee to present the progress for each phase of the project. The detailed budget is presented in the next page.

Tasks	Amount
1. Crash Data Visualization	\$5,018
2. Spatial Crash Analysis	\$9,499
3. Charts, Interface	\$9,386
4. Agency Access & Integration	\$2,708
Total Budget	\$26,611

Table 2 – Billing by Task

Projected Budget

Tasks	Category 1 Students (2)					Category 2 Students (1)					Faculty (1)			Total
	Rate	Hrs	Labor	Tuition	Total	Rate	Hrs	Labor	Tuition	Total	Rate	Hrs	Total	
1. Crash Data Visualization	\$18.9	70	\$1,323	\$0	\$1,323	\$16.2	75	\$1,215	\$0	\$1,215	\$47.2	22	\$1,039	\$3,577
2. Spatial Crash Analysis	\$18.9	140	\$2,646	\$522	\$3,168	\$16.2	100	\$1,620	\$0	\$1,620	\$47.2	42	\$1,984	\$6,772
3. Charts, Interface	\$18.9	140	\$2,646	\$522	\$3,168	\$16.2	95	\$1,539	\$0	\$1,539	\$47.2	42	\$1,984	\$6,691
4. Agency Access & Integration	\$18.9	35	\$662	\$0	\$662	\$16.2	20	\$324	\$0	\$324	\$47.2	20	\$945	\$1,930
Subtotal Tasks		385	\$7,277	\$1,044	\$8,321		290	\$4,698	\$0	\$4,698		126	\$5,951	\$18,969
Secretarial						\$24.9	43	\$1,069		\$1,069				\$1,069
Travel														\$540
CPU														\$570
Materials														\$140
Subtotal														\$21,288
University overhead 25%														\$5,322
Total														\$26,611

6. Development environment

The system will continue to be developed by following the County ISS software development standards and technological components. In order to achieve this objective efficiently within the estimated project period, the development team will work closely with the County ISS department. It is expected that the ISS department provides the development team with sufficient information and documentation about the County software components that may be used for the needs of this project.

7. Product copyright

The Palm Beach County will have access to the product source code and will have rights to modify the source to meet their future needs. The University of Florida retains the copyright of the source code and the right to reuse the code and the knowledge for future work. The terms and conditions of the agreement take precedence over those in this proposal.

8. Technical Support

The obligation of the University of Florida team will be fulfilled after the system has been delivered and tested. Consideration should be given by the decision makers to any technical support that might be needed in the future. At this time, no budget is included for technical support beyond the testing period. Potential technical support is estimated to cost an average of \$50/hour for faculty, \$24-\$35/hour for staff and \$12-\$20/hour for students.

9. Contact

For more information about this proposal contact the Principal Investigator for this project, Dr. Ilir Bejleri, Assistant Professor with University of Florida, at 954-215-7885 or via email at ilir@ufl.edu.

2007 _____

BOARD OF COUNTY COMMISSIONERS
PALM BEACH COUNTY
BUDGET Transfer

FUND County Transportation

BGEX021507-1058

ACCOUNT NUMBER	ACCOUNT NAME	ORIGINAL BUDGET	CURRENT BUDGET	INCREASE	DECREASE	ADJUSTED BUDGET	EXPENDED/ ENCUMBERED AS OF 02/15/07	REMAINING BALANCE
<u>TRAFFIC CRASH DATA SYSTEM</u>								
1201-360-3226-5121	Data Processing Softwre/Access	80,000	80,000	26,600	0	106,600	68,680	37,920
<u>TRAFFIC OPERATIONS</u>								
1201-360-3220-3101	Professional Services	80,000	80,000	<u>0</u>	<u>26,600</u>	53,400		
				26,600	26,600			

SIGNATURE

DATE

By Board of County Commissioners
At Meeting of 04/10/07

Engineering & Public Works

R.D. Ward

2/15/07

Administration / Budget Approval

OFMB Department – Posted

Deputy Clerk to the
Board of County Commissioners