

PALM BEACH COUNTY
BOARD OF COUNTY COMMISSIONERS
AGENDA ITEM SUMMARY

Meeting Date: August 17, 2010

Consent Regular
 Public Hearing Workshop

Department:

Submitted by: Information Systems Services

Submitted for: Countywide GIS

I. EXECUTIVE BRIEF

Motion and Title: Staff recommends motion to:

A) approve: Task Order No. 3 to Contract R2006-2516 with Surdex Corporation in the amount of \$249,658.58 to complete countywide digital ortho photography mapping, and

B) receive and file BAE Systems Task Order No. 4.

Summary: Three firms were selected using the Consultant Competitive Negotiations Act (CCNA) process, contracted on November 21, 2006 to perform digital ortho photography and planimetric mapping for the County (R2006-2516, R2006-2517, and R2006-2518). This Task Order No. 3 with Surdex Corporation, a Missouri-based company, that subcontracts approximately 8% of their work to PRISM Survey, Inc., a Palm Beach County firm, is to complete countywide digital orthos photography mapping in the amount of \$249,658.58 to be funded by a USGS ARRA Grant Award No. G10AC00135 received by Palm Beach County on March 23, 2010, R2010- 0437. BAE Systems (R2006-2517) Task Order No. 4, which was under \$100,000 and previously executed is submitted for receive and file purposes.

Background and Justification: In November 2006, contracts were established with Surdex Corporation, BAE Systems NSS Inc., and Woolpert, Inc. to provide mapping services. Planimetric mapping entails delineating a list of features, such as drainage, building outlines and edge of pavements, from aerial photos to within +/- 0.5 foot accuracy. Digital ortho photography is aerial photos rectified to match the earth's surface location. All Task Orders in excess of \$100,000 must be approved by the Board. The second one-year renewal option was approved by the Board of County Commissioners on November 17, 2009. Countywide (PK).

Attachments:

1. Task Order No. 3 for Surdex Corporation (2) originals
2. Receive and File Task Order No. 4 for BAE Systems, Inc. (1) original

Recommended By: Steve Bordelon 7/29/2010
Department Director Date

Approved By: [Signature] 8/5/10
County Administrator Date

II. FISCAL IMPACT ANALYSIS

A. Five Year Summary of Fiscal Impact:

Fiscal Years	2010	2011	2012	2013	2014
Capital Expenditures	0	\$249,866	0	0	0
Operating Costs	0	0	0	0	0
External Revenues	0	\$249,866	0	0	0
Program Income (County)	0	0	0	0	0
In-Kind Match (County)					
NET FISCAL IMPACT	0	0	0	0	0
# ADDITIONAL FTE POSITIONS (Cumulative)	0	0	0	0	0

Is Item Included In Current Budget? Yes X No _____

Budget Account No.: Fund 3901 Dept 491 Unit. M010 Sub Unit AI Object 3401

B. Recommended Sources of Funds/Historical Summary:

Capital Outlay Fund - GIS Project

Woolpert Task Orders

Task Order #1 \$235,000 (\$117,500 from Property Appraiser)

BAE Task Orders

Task Order #1 \$ 94,425 (from Env. Res. Mgmt. Coastal Project)

Task Order #2 \$165,000 (\$82,500 from Property Appraiser)

Task Order #3 \$ 99,359 (from Env. Res. Mgmt. Coasts and Inlets)

Task Order #4 \$ 99,359 (from Env. Res. Mgmt. Coasts and Inlets)

Total \$458,143

Surdex Task Orders

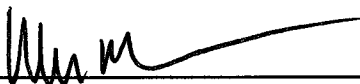
Task Order #1 \$220,000 (\$110,000 from Property Appraiser)

Task Order #2 \$ 95,600 (from Env. Res. Mgmt. Coastal Monitoring Project)

Task Order #3 \$249,866 (from ARRA USGS Grant Award)

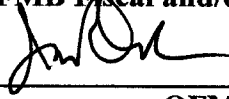
Total \$565,466

C. Departmental Fiscal Review

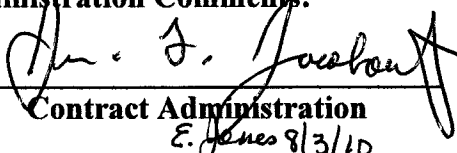


III. REVIEW COMMENTS

A. OFMB Fiscal and/or Contract Administration Comments:

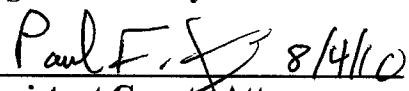


OFMB *8/7/10*
8/12/10



Contract Administration
E. Jones 8/3/10

B. Legal Sufficiency:



Assistant County Attorney

This item complies with current County policies.

C. Other Department Review:

Department Director

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

TASK ORDER

TASK ORDER # 3

CONSULTANT **Surdex Corporation**

ACCOUNT # **3901-491-M010-AI-3401**

CONTRACT **R2006-2516**

COUNTY PROJECT MANAGER **Kelly Ratchinsky** PHONE **355-3958**

PROJECT NAME **2010-11 Countywide Digital Orthophotography**

LOCATION **Palm Beach County including Lake Okeechobee**

TASK DESCRIPTION

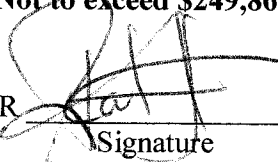
Color Digital Orthophotos .5' and 1' Resolution per attached specifications.

DELIVERABLES +/- **See Attached** DUE DATE **August 31, 2011**

TASK ORDER TYPE **Lump Sum** RETAINAGE **10%**

TOTAL AMOUNT **Not to exceed \$249,865.58 to be funded by ARRA Grant**

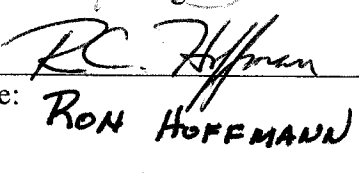
PROJECT MANAGER


Signature

DATE

7/28/10

CONSULTANT


Printed Name/Title: **RON HOFFMANN / PRESIDENT**

DATE

July 27, 2010

PALM BEACH COUNTY
BOARD OF COUNTY COMMISSIONERS

Burt Aaronson, Chair

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY

COUNTY ATTORNEY

APPROVED AS TO
TERMS AND CONDITIONS


ISS DEPARTMENT DIRECTOR

ATT. # 1



Date: 02/05/10

Contract No.

Palm Beach County 2010 Digital
Orthophotography

Re:

823

W912PB-07-D-0518

T.O. No. TBD

LABOR	Base Year	Rate	Unit	Qty	PRICE
Project Manager		3860	/hr	90	3,474.00
Quality Manager		3686	/hr	48	1,769.28
Supervisory Photogrammetrist		4280	/hr	66	2,824.80
Photogrammetric Technician		2622	/hr	425	11,143.50
Aerial Photography Pilot		2671	/hr	44	1,175.24
Aerial Photographer		2330	/hr	44	1,025.20
Airborne GPS Ground Engineer		1559	/hr	64	997.76
Photo Lab Supervisor		2871	/hr	35	1,004.85
Photo Lab Technician		1684	/hr	355	5,978.20
Software Technician		1967	/hr	916	18,017.72
GIS/CADD Technician		2622	/hr		0.00
Photo Interpreter		1967	/hr		0.00
Administrative Assistant		1494	/hr	75	1,120.50
(Classified) Project Manager		3860	/hr		0.00
(Classified) GIS Technician		2622	/hr		0.00
(Classified) Photogrammetric Technician		3067	/hr		0.00
(Classified) Security Administrator		3686	/hr		0.00
				2162	
SUBTOTAL					\$48,531.08

OVERHEAD RATES

Overhead on Direct Labor and General & Administrative Combined	180.00%				87,355.89
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SUBTOTAL \$87,355.89

DIRECT COSTS

Aircraft (single engine) w/ABGPS	182.88	/hr			0.00
Aircraft (twin engine) w/ABGPS	553.99	/hr			0.00
Aircraft (twin engine turbo) w/ABGPS	897.78	/hr		44	39,502.32
LIDAR sensor	658.77	/hr			0.00
Precision 6 inch 11 film camera	60.56	/hr			0.00
DMC Large format Digital Sensor	739.65	/hr		32	23,668.80
Precision film Scanner	19.40	/hr			0.00

TDY Pilot sensor w/ GPS Tech	135.00	day		24	3,240.00
Western Digital 1 TB USB 2.0 hard drive	159.99	each		4	639.96

SUBTOTAL \$67,051.08

PROFIT

12.00%

SUBTOTAL \$24,352.56

SUBCONTRACTED SERVICES

Innovative Mapping and Surveying Solutions					
30 primary control points and targets					21,500.00
SURDEX Management Fee (5%)					1,075.00

SUBTOTAL \$22,575.00

TOTAL PROJECT PRICE

\$249,865.58

Proposal Information Summary

Panel Designation (Check one): Orthoimagery Elevation (lidar)
(Orthoimagery and Elevation may NOT be combined on one proposal)

Name of the Cooperating Institution: Palm Beach County

Project Title: Palm Beach County Orthoimagery Mapping

Principal Investigator(s): Kelly W. Ratchinsky
Palm Beach County
301 N Olive Ave
West Palm Beach, FL 33401
561.581.3958, 561.242.7526, kratchin@pbcgov.org

Authorized Institutional Representative: Kelly W. Ratchinsky
Palm Beach County
Information Systems Services
301 N Olive Ave
West Palm Beach, FL 33401
561.581.3958, FAX 561.242.7526, kratchin@pbcgov.org

Areal extent of the collection: Florida, Palm Beach
Approx. 2,800 sq. mi.
Covering the entire area that is Palm Beach County with
An overlap of approx. 5,000 sq ft.

Amount Requested: USGS Funds: \$249,865.58
Matching Funds, if applicable:

Proposed Project Period 10/01/2010 through 06/30/2011
(The project start date must no earlier than
February 1, 2010, and end no later than
September 15, 2011)

**Number and types of jobs created
or retained, labor hours and
anticipated duration for each:** 0

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Proposed Budget

Budget Summary

Project Title: Palm Beach County Orthoimagery Mapping

Principal Investigator(s): Kelly W. Ratchinsky

Cost Category	Federal Funding Requested	Non-Federal/Matching Funds Identified	TOTAL
1. Salaries and Wages	\$0	\$17,662.00	\$17,662.00
2. Fringe Benefits/ Labor Overhead	\$0	\$0	\$0
3. Equipment	\$0	\$0	\$0
4. Supplies	\$0	\$0	\$0
5. Services or Consultants	\$250,000.00	\$0	\$250,000.00
6. Travel	\$0	\$0	\$0
7. Other Direct Costs	\$0	\$0	\$0
8. Total Direct Costs (sum of 1-7)	\$250,000.00	\$17,662.00	\$267,662.00
9. Indirect cost/G&A	\$0	\$0	\$0
10. Amount Proposed (8 + 9)	\$250,000.00	\$17,662.00	\$267,662.00
11. Total Project Cost (Federal + non-Federal amounts)			\$267,662.00

Budget Details

We have broken this project into 7 objectives, they are;

1. Project Management and Administration
2. Image Acquisition
3. Image Processing
4. Survey
5. Aerotriangulation
6. Ortho Production
7. Quality Control/Quality Assurance

Items 1 and 7 above will be Palm Beach County staff Salaries/benefits while items 2 thru 6 will be Consultant services paid for using ARRA grant funds.

Salaries and wages

Kelly Ratchinsky will be the Project Manager for this project. We are allocating 160 hours over the 10 months for project management and administration. Brian Rock will be doing the Quality Control on the Imagery as we receive deliverables from our contractor. We estimate 320 hours will be needed to review the imagery.

- | | |
|--|------------|
| 1. Project Management and Administration | \$8,979.00 |
| 2. Quality Control/Quality Assurance | \$8,683.00 |

Fringe benefits/labor overhead

None

Equipment

None

Supplies

None

Services and Consultant

We will be using one of our Aerial Mapping consultants, already under contract with us, to perform the orthoimagery production. All of these costs will be using ARRA Grant funds.

The break down for costs is as follows;

1. Image Acquisition	\$102,000.00
2. Image Processing	\$ 24,000.00
3. Survey	\$ 28,000.00
4. Aerotriangulation	\$ 21,000.00
5. Ortho Production	\$ 75,000.00
Total	\$250,000.00

Travel

None

Other direct costs

None

Palm Beach County Orthoimagery Mapping

Indirect Cost/general and administrative (G&A) cost
None

Executive Summary

Palm Beach County proposes to capture digital orthoimagery at multiple scales, covering the entire area of the County containing 2,740 square miles. The proposal includes 917 sq. miles of higher resolution imagery, +/- 6 inches, in all coastal developed municipality and service areas; and 1,823 sq. miles of lower resolution imagery, +/- 1 foot, in the rural and agricultural areas of the county. Palm Beach County has been identified as a priority collection area for USGS under DOI. It is also considered a High Priority Hazards area and contains Priority Ecosystem areas with intersecting Hazard and Priority Ecosystem targeted areas.

All of the data captured under this initiative, including the 917 sq. miles of new higher resolution orthoimagery will be provided to USGS for their Orthoimagery Dataset as a result of this project. This project supports both the USGS mission to protect property and lives, and it serves the day-to-day needs of a large county through Palm Beach County's geographic data sharing partnerships. Access to this imagery is provided to every employee in Palm Beach County to use for land planning, code enforcement, property appraisals, engineering projects, citizen concerns, sexual predator mapping, county real estate management, environmental planning and management, first responder activities, emergency response, water management and more.

In addition to providing access to orthoimagery to all the County agencies, Palm Beach County also makes the imagery available to over twenty other municipalities and public agencies such as the Solid Waste Authority and the South Florida Water Management District. Palm Beach County serves as a clearinghouse for County geographic data to Palm Beach County organizations and neighboring counties as well. Partnerships through inter-local agreements are leveraged to standardize on a common base map for the purposes of sharing geographic data to ensure the most up-to-date and accurate information and to perform meaningful analysis of the data.

Project Narrative

The Project Manager for the project has developed the attached set of specifications for this imagery project. These specifications meet the USGS requirements for data collection and delivery as stated in the grant documentation. These specifications will be provided to one of Palm Beach County's three mapping vendors approved under the Consultant's Competitive Negotiation Act (CCNA), all of which are currently under contract with Palm Beach County through November 21, 2010, with the ability to issue a one-year renewable option to complete this project. Each of the three companies under contract with the County is a national company

Palm Beach County Orthoimagery Mapping

and has previously completed projects of this type and scale. A quote will be requested from the first vendor. If after negotiating with the consultant the Project Manager is not satisfied with the approach, cost and timeline to complete the work outlined under this grant, the Project Manager will move to the next vendor until a satisfactory negotiation is achieved. Palm Beach County will provide in-kind services at an estimated value of \$17,662.00 for project management, to facilitate quality assurance review of the imagery, and to distribute the data to the grant providers and existing data sharing partners in a timely manner as required.

The Project Manager under this grant will be Kelly Ratchinsky. Kelly has worked in Geographic Information Systems (GIS) for 24 years and with Palm Beach County for the last 11 years. He has previously worked in the private sector for a mapping company and is fully skilled in all aspects of developing orthoimagery, including ground control, surveying, image capture and scanning, ortho rectification and image distribution formats for project and web environments. In his position as Countywide GIS Coordinator, he frequently oversees projects of this magnitude, sitting in on procurement and consultant selection committees and interfacing with end users. He is currently overseeing a countywide addressing project, working closely with the U.S. Census Bureau to provide up-to-date information for the upcoming census. Mr. Ratchinsky has previously managed the capture of digital orthoimagery and planimetric mapping in Palm Beach County. He also has a degree in Survey Engineering from the University of Calgary, Canada.

Palm Beach County's enterprise GIS is housed in the Emergency Operations Center and includes a server with available storage space to support the project, estimated to require approximately a gigabyte of space. The County's Information Systems Services Department (ISS) has 24 x 7 support for data back-up, servers, databases and the high speed network. Based on the attached specifications, 2,740 square mile project area map, and previous projects, it is anticipated that the cost of providing the orthoimagery as stated will be \$267,662.00 of which we are request \$250,000.00 from the USGS. Work will be started in the November/December 2010 timeframe and be completed no later than August 30, 2011.

The following specifications will be used to meet both the needs of Palm Beach County and the USGS minimum specifications. It should be noted that we will receive delivery of all imagery clipped and projected as required by USGS minimum standards in addition to the clip areas and projection required for Palm Beach County. There are three Orthoimagery specifications referenced below to cover the two scales of mapping and USGS needs.

**Number 1: Palm Beach County Digital Orthophoto Specification for 1"=100'
scale Mapping**
May 15th, 2008

For the purpose of this project we have include three(3) sets of specifications, all of which must be met. Please be sure to review all three specifications and deliverable requirements to ensure compliance with this task order.

Specifications

All photogrammetric mapping products are to meet National Map Accuracy Standards (NMAS).

The United States Army Corps of Engineers' interpretation is as follows;

"For NMAS orthophotos, 90 percent of all photographic details on the orthophotography shall be accurate to within at least 1/30 in. of true position, as determined by test surveys, and none of the photographic details shall be displaced by more than 1/15 in. from true coordinate position. Since the orthophoto process rectifies images at the ground elevation of a DTM scan, accuracy standards must exclude objects above and below the scan elevation, such as tops of buildings, poles, trees, and other like objects."

Publication scale: 1"=100'
Pixel Resolution: ½ foot
Photo type: Color

Therefore, for this project, 1/30 of an inch at publication scale equates to +/-3.33' for the 1"=100' maps.

We believe that our DEM surface, provided to you for this project, will support this accuracy. This DEM in combination with your survey control plan must meet the above stated NMAS accuracy.

Use of digital camera for data collection will be preferred. The project area to be mapped is shown in Exhibit A.

Aerial Photography (Color)

- Finalize the flight line and control layout maps and submit to the County for approval.
- Photography parameters include 60% Forward Overlap and 30% Sidelap; crab shall not exceed 5%; climatic conditions will be free of clouds and haze
- Aerial Photography will be acquired when the sun angle is at least 30% to minimize shadowing effects.

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- Extend all photography two full exposures, beyond the project limits.
- 1 set of contact prints to be delivered to Palm Beach County
- Prepare and submit the final flight line and control location maps in ArcInfo format.

Survey Control

- All control will be referenced horizontally to the Florida State Plane Coordinate System (East Zone) in NAD83/90, vertically to the North American Vertical Datum of 1988 (NAVD88), and performed by a Florida Registered Professional Land Surveyor.

Fully Analytical Aerial Triangulation (FAAT)

- The FAAT shall meet all requirements for final products to meet NMAS specifications.

Digital Orthophotography

- Submit to Palm Beach County (PBC) for approval
- All tiles will be delivered in World TIFF format and delivered on external harddrive.
- All tiles will be delivered in MRSID format at 30x compression
- The County will provide the tile layout with tile names in an ArcInfo format (.shp)
- Provide additional MRSID files based on the County's existing 8 tile layout at a 30x compression, tiles will be provided by PBC.
- Metadata incorporated into each TIFF World file as per PBC Specification. An example .tfw will be provided.

Number 2: Palm Beach County Digital Orthophoto Specification for 1"=400' scale Mapping

October 17, 2006

Specifications

All photogrammetric mapping products are to meet National Map Accuracy Standards(NMAS).

The United States Army Corps of Engineers' interpretation is as follows;

"For NMAS orthophotos, 90 percent of all photographic details on the orthophotography shall be accurate to within at least 1/30 in. of true position, as determined by test surveys, and none of the photographic details shall be displaced by more than 1/15 in. from true coordinate position. Since the orthophoto process rectifies images at the ground elevation of a DTM scan, accuracy standards must exclude objects above and below the scan elevation, such as tops of buildings, poles, trees, and other like objects."

Publication scale: 1"=400'
Pixel Resolution: 2 foot
Photo type: Color

Therefore, for this project, 1/30 of an inch at publication scale equates to +/-13.33' for the 1"=400' maps.

We believe that our DEM surface, provided to you for this project, will support this accuracy. This DEM in combination with your survey control plan must meet the above stated NMAS accuracy.

Aerial Photography (Color)

- Finalize the flight line and control layout maps and submit to the County for approval.
- Photography parameters include 60% Forward Overlap and 30% Sidelap; crab shall not exceed 5%; climatic conditions will be free of clouds and haze
- Aerial Photography will be acquired when the sun angle is at least 30% to minimize shadowing effects.
- Extend all photography two full exposures, beyond the project limits.
- 1 set of contact prints to be delivered to Palm Beach County
- Prepare and submit the final flight line and control location maps in ArcInfo format.

Survey Control

- All control will be referenced horizontally to the Florida State Plane Coordinate System (East Zone) in NAD83/90, vertically to the North American Vertical Datum of 1988 (NAVD88) , and performed by a Florida Registered Professional Land Surveyor.

Fully Analytical Aerial Triangulation (FAAT)

- The FAAT shall meet all requirements for final products to meet NMAS specifications.

Digital Orthophotography

- Submit to Palm Beach County (PBC) for approval.
- All tiles will be delivered in World TIFF format and delivered on external harddrive.
- The County will provide the tile layout with tile names in an ArcInfo format (.shp)
- Provide MRSID files based on the County's existing layout at a 30x compression on on external harddrive.
- Metadata incorporated into each TIFF World file as per PBC Specification. An example .tfw will be provided.

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Number 3: USGS Base Orthoimagery Specification

For projects funded under the
American Recovery and Reinvestment Act of 2009
U.S. Geological Survey Program Announcement
10HQPA0014

This set of specifications for 30-centimeter, high-resolution orthoimagery is based on a draft high-resolution imagery specification under development at the U.S. Geological Survey. It is being used for the collection of orthoimagery funded by the American Recovery and Reinvestment Act of 2009 programs to insure consistency and usability by a wide range of orthoimagery data users.

Many Federal, State, and local programs use high-resolution orthoimagery for various applications including critical infrastructure management, vector data updates, land use analysis, natural resource inventory, and extraction of data by means of photogrammetric measurements. The complex nature of large-area orthoimagery datasets, combined with the broad interest in orthoimagery which is of consistent quality and spatial accuracy, requires high-resolution orthoimagery to meet or exceed format and content outlined in this specification.

**The following specifications, guidelines, and requirements are
minimum parameters.**

It is expected that local conditions in any given project area, specialized applications for the data, or the preferences of cooperators, may mandate more stringent requirements. The USGS encourages the collection of more detailed, accurate, or value-added data.

I. General

1. **Geographic Extent:** Each high-resolution *project* shall cover the assigned area with a minimum 300 (± 30) meter buffer on all exterior project edges. Extents shall be computed by projecting the geographic corners and side midpoints to the appropriate projection, then adding the buffer on each side of the resulting minimum bounding rectangle (or polygon, if the project has an irregular shape). If a project contains multiple, non-contiguous polygons, the 300 meter buffer will apply to each polygon in the project. The orthoimagery shall be divided into 1500m by 1500m tiles. The tile extent and grid shall be approved per project area.
2. **Non-image data:** Orthoimagery tiles shall not contain any non-image data. Non-image data includes photographic frame borders, fiducial marks, artifacts, and titling.

Palm Beach County Orthoimagery Mapping

3. **Datums and Coordinates:** All high-resolution orthoimagery shall be projected in the North American Datum of 1983 (NAD83), using the corresponding native Universal Transverse Mercator (UTM) zone representing the predominance of the project area (see Figure B- 1, UTM Zones) with coordinates in meters, adjustment to be specified on a project by project basis. The vertical datum for **the supporting elevation data used to create** high-resolution digital orthoimagery shall be North American Vertical Datum of 1988 (NAVD88). The project will be controlled using the latest available NGS control adjustment of the project area, unless another adjustment is specifically requested and described by the customer.
4. **Image Mosaicking:** Orthoimagery may be created using multiple digital images (“chips”) to produce the final product. Specular reflections and other artifacts should be minimized, especially in developed areas, by patching the area using chips from other imagery.
 1. **Radiometry Balance.** When a mosaic of two or more chips is made, the brightness and color values of the other chips will be adjusted to match that of the principal chip. The seamlines between the overlapping chips will be chosen to minimize tonal variations. Localized adjustment of the brightness and color values will be done to reduce radiometric differences between join areas. Changes in color balance across the project, if they exist, shall be gradual. Abrupt tonal variations between tiles are not acceptable.
 2. **Edge-Matching.** Excessive horizontal displacement along seamlines or at tile boundaries is not allowed. The maximum allowable mis-join between transportation features or other well defined linear features is ± 3 pixels.

II. Sensor & Acquisition: The following specifications are for the collection and provision of the required high-resolution natural-color aerial imagery. All USGS collections will be digital images. Other users of this specification may, at their discretion, request either film-based photographs or digital images. If film is selected, requirements in section IIA (below) should be observed.

- A. **Film:** If imagery is captured on aerial film, Kodak 2444 Aerocolor III film or equivalent, or AGFA X100 film or equivalent shall be used. Data providers may choose a film that processes to either a negative or positive image.
- B. **Special Collection Conditions:**
 1. **Acceptable Window:** The acceptable window for the data collection shall be specific to the project areas based on geographic location and project requirements.

2. **Time of Day and Year:** Imagery shall be collected during minimal shadow conditions. Image collection shall occur when the sun angle is greater than 30-degrees. In urban areas containing many high-rise structures, the sun angle should be sufficiently high to minimize shadows.
3. **Collection Conditions:** Imagery shall be collected under conditions free from clouds and cloud shadows, smoke, haze, light streaks, snow, foliage, flooding, and excessive soil moisture. Leaf-off imagery is preferred but leaf-on projects will be considered on a project-by-project basis.
4. **Image Coverage:** The extent of image coverage over the project area shall be sufficient to ensure void areas do not exist in resulting 1500 meter x 1500 meter orthophoto tiles. Full image tiles that meet or exceed the 300 meter buffer specified in section I.A., above, are required. Partial tiles are not considered acceptable.
5. **Calibration:** Aerial Sensors/Camera(s) used to collect project imagery shall have current USGS certification, or in the case of digital sensors a current USGS digital aerial sensor type certification.

C. Camera Station Control:

1. **Airborne GPS:** Camera position (latitude, longitude, and elevation) shall be recorded at the instant of exposure with airborne GPS. Airborne GPS data shall be differentially corrected and organized as individual data sets grouped by corresponding film roll or flight line. Differentially corrected Airborne GPS positional data shall be stored on portable media, in a nonproprietary format acceptable to each organization. The horizontal root-mean-square error (RMSE) of the airborne GPS control data shall not exceed 20cm. The vertical RMSE of the Airborne GPS control shall not exceed 30cm.
 2. **Inertial Measurement unit (IMU) Exterior Orientation Data (Optional):** If IMU is included as a component of the camera station control; the contractor shall record the camera attitude at the instant of exposure. The IMU data shall be adjusted and organized as individual data sets grouped by corresponding film roll. The RMSE of the adjusted IMU data shall not exceed 30 cm.
- D. Supplemental Ground Control:** Differentially corrected GPS ground control, or conventionally surveyed first-order ground control, used to supplement the Airborne GPS positional adjustment shall be stored on portable media, in a non-proprietary format mutually agreeable to the USGS and the cooperator. The data provider shall publish and submit a Supplemental Ground Control report that contains narrative,

computations and field notes/photos for all points used in the supplemental ground control solution.

- E. **Photography Supplemental Report:** The report shall show the flight line numbers and exposure station or strip numbers. The USGS Aerial Photography Supplemental Report form shall be used for this purpose. An example of this form is included in Attachment B-2 of this document.
- F. **Titling:** If film is used, each exposure shall be clearly titled along the north edge (if flown north-south) or west edge (if flown east-west) of the photography. Each exposure shall be marked clearly with a numerical abbreviation of the month, day and year of exposure, the number of the roll, the number of the exposure on the roll, the photo scale expressed as a ratio, and the three letter designator, e.g. **BOS07** for rolls of film used on Boston MA project shall be numbered consecutively, beginning with number 1; and the exposures on each roll shall be numbered consecutively, beginning with the number 1. Coarse Airborne GPS position shall be included in the title as encoded in the camera data chamber. For cameras that do not have camera station positional encoders, the data provider shall manually add the coarse camera position on the opposite edge of the film from the roll exposure designator.
- G. **Resolution and Accuracy:** The natural color source imagery shall be of sufficient resolution to support production of digital orthorectified images to a ground pixel resolution of 30 centimeters and to the specifications contained in Section III, A through K, below.

III. Digital Orthophoto Production: Shall be produced consistent with the following requirements:

- A. **Aerotriangulation data:** Aerotriangulation (AT) data, if used in the orthorectification process, shall consist of a minimum of refined image coordinates and adjusted ground coordinates. If Aerotriangulation is performed, the data provider shall provide a comprehensive AT report.
- B. **Digital Orthorectified Image Datum:** Digital Orthorectified images shall be referenced to North American Datum 1983, Universal Transverse Mercator (UTM) meters. If a subset adjustment of NAD83 is desired, it must be specified.
- C. **Digital Orthorectified Image Color:** Images shall be natural color.
- D. **Spatial Resolution:** The spatial resolution will be 30 centimeter ground sample distance (GSD). Orthoimagery produced under this specification shall not be resampled from the original image, original scan or original capture, with resolution greater or less than the following numbers:

Palm Beach County Orthoimagery Mapping

Ground Sample Distance (GSD)	Original Image Resolution	
	Maximum	Minimum
30 centimeters	15 centimeters	32 centimeters

E. **Horizontal Accuracy:** All orthoimagery shall have 95% (NSSDA Confidence Interval) of all well-defined points tested fall within the specified distance listed below of true ground:

Ground Sample Distance (GSD)	Horizontal Accuracy
30 centimeters	5.19 meters

1. **Product Accuracy Information Reporting.** Product accuracy information shall be reported according to NSSDA guidelines which are available at: <http://www.fgdc.gov/standards/projects/FGDC-standards-projects/accuracy/part3/index.html>.
2. At a minimum, statements concerning source materials and production processes used must be provided at the project level sufficient to meet the requirement of section III.E of the guidelines.

F. **Digital Orthorectified Image Format:** Images shall be submitted in uncompressed, untiled, ArcGIS readable, GeoTIFF file format, Version 1.8.2, (<http://www.remotesensing.org/geotiff/spec/geotiffhome.html>) with no internal tiling or overviews. Data shall not be compressed during ANY PHASE of the production process. Presence of compression artifacts will be cause for rejection. GeoTIFF files shall include (as a minimum) the following GeoTIFF tags and keys:

- ModelTiepointTag
 - ModelPixelScaleTag
- OR**
- ModelTransformation Tag
- AND**
- GTModelTypeGeoKey
 - GTRasterTypeGeoKey
 - ProjectedCSTypeGeoKey

G. **Digital Orthorectified Image Tile Size:** Orthorectified GeoTIFF files shall represent "tiles" 1500 meters X 1500 meters cut at even 1500 meter grid lines with no tile overedge. Corner coordinates will be based on the UTM Grid and shall be evenly
Palm Beach County Orthoimagery Mapping

divisible by 1500 meters. Tiles shall be accompanied by an index sheet and shape file suitable for loading into ArcGIS. Index sheet shall include tile boundary and filename. The Index sheet collar shall include Latitude/Longitude reference coordinates.

H. **Digital Orthorectified Image Characteristics:** Relative join (misalignment) of transportation features between adjacent image chips/tiles shall not exceed 3 pixels. Orthophotos shall be tonally balanced to produce a uniform contrast and tone across the image tiles of the entire project. Changes in color balance across the project, if they exist, shall be gradual. Abrupt tonal variations between tiles are not acceptable. Building tilt shall be corrected to the extent that transportation features are not obscured. Ground features appearing in the orthophoto imagery, such as building roof tops, water towers, and radio towers, shall not be clipped at seamlines or between individual tiles. Image artifacts introduced during the scanning process and appearing in the final orthophotos are unacceptable, except for very minimal artifacts falling in noncritical coverage areas, e.g., a small piece of lint appearing in a timbered area.

I. **Radiometric Resolution**

1. **Color Imagery.** All color imagery shall be an 8-bit RGB image accordance with Section 6, RGB Full Color Images, of the TIFF Specification, Revision 6 (<http://www.remotesensing.org/geotiff/spec/geotiffhome.html>).

2. **Color Infrared Imagery.** All color infrared imagery shall be an 8-bit Near-IR, RG image in accordance with Section 6, RGB Full Color Images, of the TIFF Specification.

3. **4-Band Imagery.** All imagery that contains both natural color and near-IR shall meet the same requirements as color imagery specified in the paragraph above and shall have the bands saved in the following order: Red, Green, Blue, and Infrared.

4. Imagery with greater than 8 bits per pixel is allowed providing that the following TIFF tags are included in the image header::

- a. SampleFormat,
- b. MinSampleValue,
- c. MaxSampleValue.

J. **File Naming Convention:** The 1500 x 1500 ortho tile file name shall be derived from the southwest corner of each tile and shall be based on the U.S. National Grid. File names will include Grid Zone Designation (GZD), 100,000 meter block designator and X and Y grid coordinates truncated to 100 meters. Supplemental instructions for naming Digital Orthorectified Image tiles can be accessed at <http://www.fgdc.gov/usng>.

K. **Elevation data:** The elevation data created for use in the orthorectification process shall be submitted in a common or non-proprietary format.

IV. **Metadata:** Project and tile metadata describing the orthophoto production process shall be submitted as a product.

Federal Geographic Data Committee (FGDC) compliant metadata shall be provided in extensible markup language (.xml) format for each 1500-meter x 1500-meter orthorectified tile.

FGDC compliant metadata for orthoimage tiles shall be delivered on portable media.

This site contains the files that define and support production of FGDC compliant metadata: Download the following files from <ftp://ftpext.usgs.gov/pub/cr/mo/rolla/release/xmlinput/>

A. **XMLInput1_64.zip:** Contains an application (XMLInput) for creating and editing .xml metadata files. It is not mandatory that this software be used; it is merely available if needed. When the zip file is unzipped, it also contains a template (**133UAtemplate.xml**) and a dtd (**csdgm2.dtd**) to help with FGDC compliance. The **XMLInput.jar** is the executable.

B. **Help.pdf and XMLInput123.doc:** User's guide for XML Input. Use this guide to install and use XMLInput.

C. **metadata _overview.doc:** Additional information

V. **Use and Distribution Rights:** All imagery and data produced under this agreement shall become the property of the United States Government. All data and documentation shall be free from restrictions regarding use and distribution. Data and documentation shall be freely distributable by government agencies.

VI. **Products:**

A. **Source Imagery:**

1. **Natural Color Film:** If film is used, the original natural color film acquired for the project shall be provided. The standard USGS Film Can Label form.
2. **Calibration Reports:** Camera Calibration Report(s) for Aerial Camera(s), or in the case of digital sensors, a current Product Characterization Report of the instrument used shall be included as a product.
3. **Camera Station Control:**

- i. **Airborne GPS:** Positional data and a statistical summary report shall be submitted on portable media, in a non-proprietary format mutually agreeable to the Government and the producer. In addition, the producer shall produce a statistical report summarizing the results of the airborne GPS adjustment.

IMU Data: If IMU exterior orientation data are part of the Contractors Technical Proposal, the sensor orientation data and a statistical summary report shall be submitted on portable media, in a nonproprietary format mutually agreeable to the Government and the producer. The producer shall also produce a statistical report summarizing the overall accuracy of the adjusted IMU data.

4. **Supplemental Ground Control:** Differentially corrected GPS Ground Control used to supplement the Airborne GPS positional data shall be provided on portable media, in a non-proprietary format mutually agreeable to the Government and the Contractor.
5. **Flight Diagram:** A Flight Diagram that illustrates the project area outline, the location of the flight lines and, if relevant, the approximate location of image centers shall be included as a product. This diagram shall be provided in hardcopy and softcopy in shape file format suitable for loading into ArcGIS.
6. **Photography and Supplemental Report(s):** A Photography Supplemental Report of all the imagery flown shall be produced for the project. The report shall show the flight line numbers and exposure station or strip numbers. The provider shall use the USGS Aerial Photography Supplemental Report form.

B. Digital Orthophoto Production:

1. **Aerotriangulation data:** Aerotriangulation data, if used in the orthorectification process, consisting of a minimum of refined plate coordinates, adjusted ground coordinates, and statistical summary report shall be submitted to the Government in both hardcopy and softcopy format.
2. **Elevation data:** Elevation data created or modified for use in the orthorectification process shall be submitted in a non proprietary format on portable media.
3. **Delivery Medium and Format:** Digital Orthorectified Images, in GeoTIFF format, shall be submitted on portable media. Image tiles shall be accompanied by an index sheet and shape file suitable for loading into ArcGIS.
4. **Metadata:** Metadata shall be delivered as described in Section IV.

VII. Quality Assurance:

A Quality Assurance shall be performed to ensure that all processes and procedures used, and metadata produced by the data provider were adequate to meet all specifications cited.

1. Visual inspection of the data will be performed for the following

- a Completeness of data to cover the specified geographic extent, with no omissions or corrupt data.
- b Tonal balancing problems across the block.
- c Ground Sample Distance to ensure that it meets the specified resolution.
- d Mis-joins between linear features greater than 3 pixels
- e Cloud cover, smoke/haze, corrupt data, and void areas.
- f Extreme tonal or color variation across seamlines.
- g Excessive horizontal displacement along seamlines in images (more than ± 3 pixels along transportation features, unless project specifications specifically state otherwise).
- h Excessive tilt in bridges, buildings, and other raised features.
- i Transportation features obstructed by buildings or shadows.
- j Clipping of features (e.g. radio towers, water tanks, buildings) at tile boundaries.
- k Building/structure warp that may indicate bad elevation data.
- l Smearing.
- m Evidence of oversaturation or undersaturation as a result of image processing or histogram manipulation.
- n Evidence of image compression.

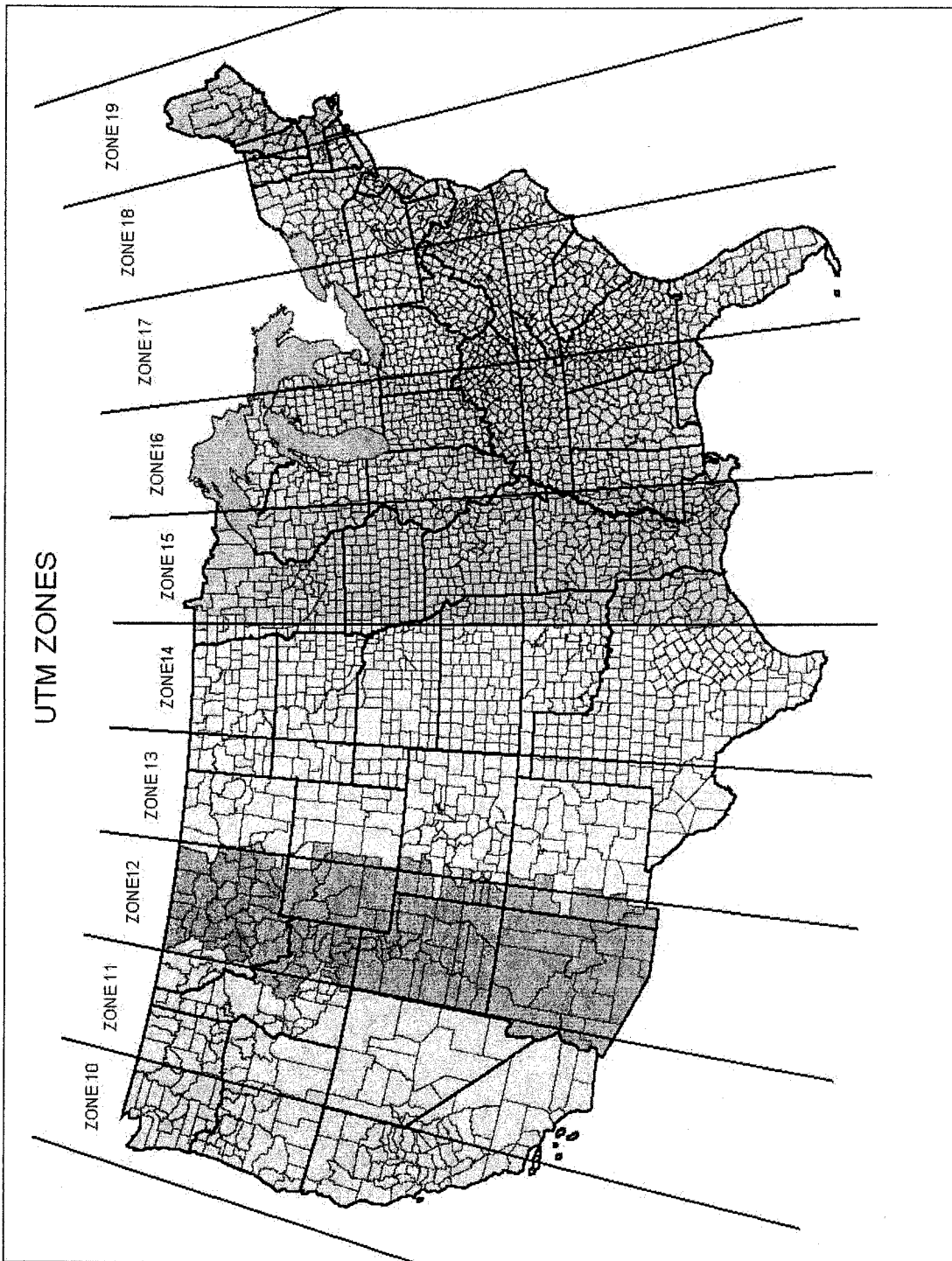
2. Horizontal Accuracy Testing

Testing is performed if suitable test-point control is furnished as part of the data product. Test-point control must be completely independent of control used during data production.

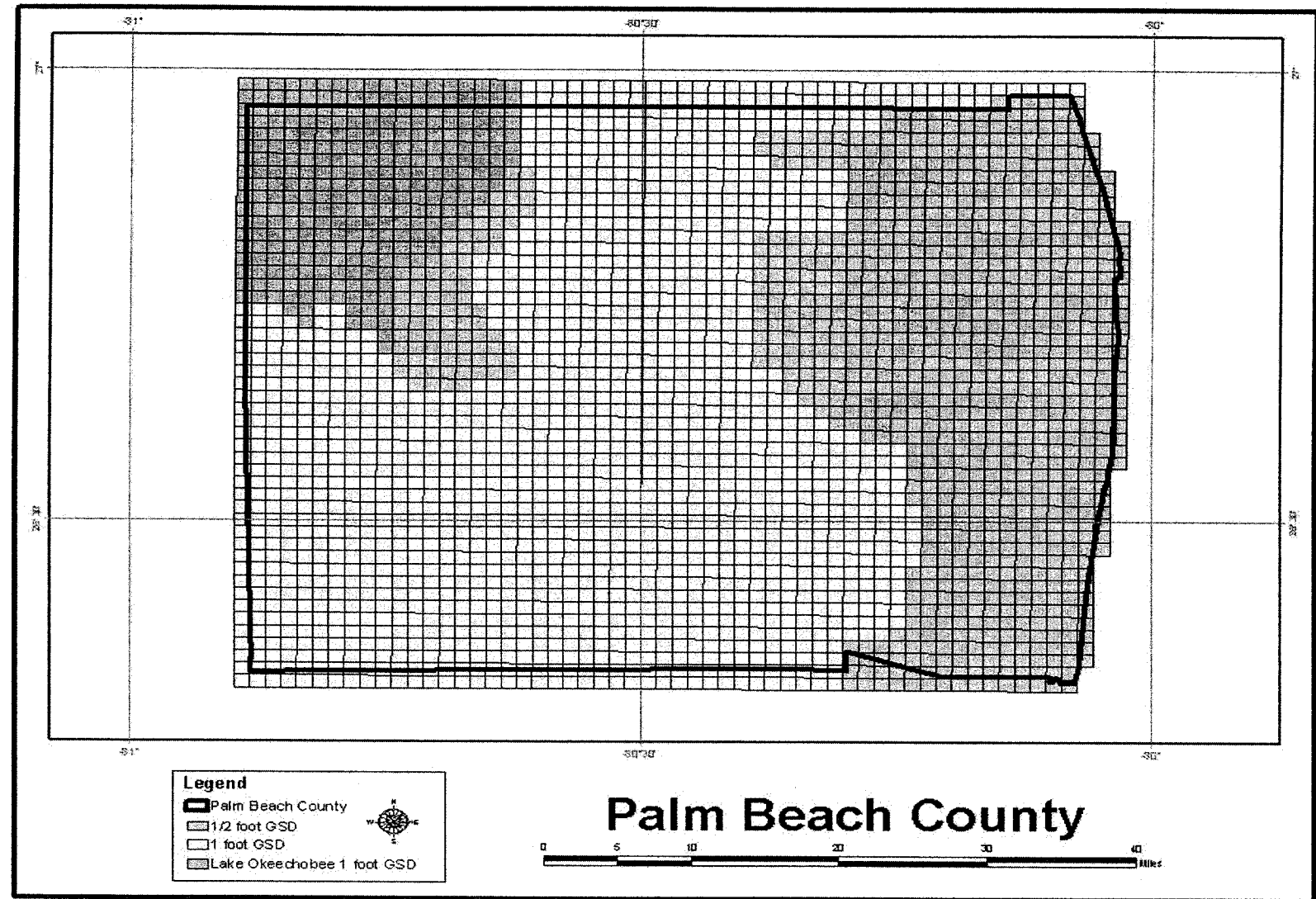
3. Verification of Metadata

Verify that accompanying metadata is complete as defined by FGDC metadata standards (<http://www.fgdc.gov/metadata>).

Figure B-1. UTM Zones



Site Location Map



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Curriculum Vitae

Kelly has worked in Geographic Information Systems (GIS) for 24 years and with Palm Beach County for the last 11 years. He has previously worked in the private sector for a mapping company and is fully skilled in all aspects of developing orthoimagery, including ground control, surveying, image capture and scanning, ortho rectification and image distribution formats for project and web environments. In his position as Countywide GIS Coordinator, he frequently oversees projects of this magnitude, sitting in on procurement and consultant selection committees and interfacing with end users. He is currently overseeing a countywide addressing project, working closely with the U.S. Census Bureau to provide up-to-date information for the upcoming census. Mr. Ratchinsky has previously managed the capture of digital orthoimagery and planimetric mapping in Palm Beach County. He also has a degree in Survey Engineering from the University of Calgary, Canada.

Other Relevant Supporting Documents

South Florida Water Management District (SFWMD)



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

3916 Gaze Club Road, West Palm Beach, Florida 33416 • (561) 696-6900 • F. FAX: 1-800-332-2645 • TDD: (561) 697-8204
Mailing Address: P.O. Box 26650, West Palm Beach, FL 33416-4500 • www.sfwmd.gov

November 20, 2009

Mr. Kelly Ratchinsky
Countywide GIS Coordinator
2300 N. Jog Road
West Palm Beach, FL 33411

Subject: New Digital Orthoimagery for Palm Beach County

Dear Mr. Ratchinsky:

This correspondence is to convey our support for Palm Beach County's efforts to update their digital orthoimagery. Our organization greatly benefits from the geographic data sharing that we have in place with Countywide GIS, and are able to accomplish our tasks better with up-to-date photography.

Due to limits in funding here at SFWMD, we have been unable to fund a district-wide aerial collection since 2004-05. We have relied heavily on imagery from the counties, and specifically Palm Beach County, to meet our business needs.

In these challenging fiscal times we are able to "do more with less" through our partnerships to keep our GIS data current and accurate. Thank you for your efforts in this endeavor.

Sincerely,

A handwritten signature in black ink, appearing to read "Sharon Trost".

Sharon Trost, P.G., AICP
Chief Information Officer
Director, Information Technology Department

Lake Worth Drainage District



10061 MILITARY TRAIL
WEST PALM BEACH, FLORIDA 33411-1160

Board of Directors
Thomas M. Albert (Chair)
D. David Goodlett
Jesse D. Kelly
Vincent H. Kalia
John L. Whitworth (Vice Chair)
John C. Brown
Herald V. Eason
Richard M. Gentry
Carol W. Gonnella
Terrence J. Hester
Dennis J. Jones
Patty S. Keith, P.E.

November 19, 2009

Mr. Kelly Ratchinsky
Countywide GIS Coordinator
2300 North Jog Road
West Palm Beach, Florida 33411

RE: New Digital Orthoimagery for Palm Beach County

Dear Mr. Ratchinsky,

Lake Worth Drainage District (LWDD) fully supports Palm Beach County's efforts to update their digital orthoimagery. LWDD finds it very beneficial in order to conduct thorough research by utilizing the geographic data contained in the Countywide GIS. Having up-to-date photography is critical to our needs and we wholeheartedly endorse the County's efforts.

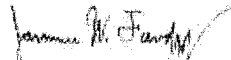
As you know, LWDD conducts intensive research with regards to Chancery Case 407 issues and property limits for owners. While we use many other sources to complete our research, we rely heavily on Palm Beach County's GIS data. Additionally, LWDD is in the process of developing an internal GIS system and will be sharing data with the County in order to complete this process.

As economic times have declined and budgets have been reduced, partnering with Palm Beach County has been essential for LWDD in utilizing the County's GIS data and being able to rely on it being updated and current is vital.

LWDD appreciates the efforts of Palm Beach County in this regard and hopes for a positive outcome.

Sincerely,

LAKE WORTH DRAINAGE DISTRICT


James W. Fandrey, P.E.
Director of Right-of-Way

West Palm Beach (U.S. Postal Facility) 33411-1160 • Highway 10061 & West Palm Beach, Fla. 33411-1160 • Fax (561) 495-2854
Website: www.lwdd.org

City of Palm Beach Gardens

Nov 23 00:00:53a VPT Project

5512331607

p
6/001/001



CITY OF PALM BEACH GARDENS

10500 N. MILITARY TRAIL, PALM BEACH GARDENS, FL 33410-4698

November 19, 2009

Mr. Kelly Ratchinsky
Countywide GIS Coordinator
2300 N. Jog Road
West Palm Beach, FL 33411

RE: New Digital Orthoimagery for Palm Beach County

Dear Mr. Ratchinsky,

This correspondence is to convey our support for Palm Beach County's efforts to update their digital orthoimagery. Our organization greatly benefits from the geographic data sharing that we have in place with Countywide GIS, and are able to accomplish our tasks better with up-to-date photography.

For some of our departments here at the city, having current and accurate data is essential to accomplishing their duties. Without the cooperation and intergovernmental leadership that has been formed by the Countywide GIS, this would not be possible.

In these challenging fiscal times, we are able to "do more with less" through our partnerships to keep our GIS data current and accurate. Thank you for your efforts in this endeavor.

Sincerely,

Arice Page
GIS Manager
City of Palm Beach Gardens
10500 N. Military Trail
Palm Beach Gardens, FL 33410

City of Jupiter

Nov 20 06 09:54a VPT Project

5612331607

p/

Nov 19 09 04:17p

Town Of Jupiter Utilities 5617412599

P.1



TOWN OF JUPITER

Thursday, November 19, 2009

Mr. Kelly Ratchinsky
Countywide GIS Coordinator
2300 N. Jog Road
West Palm Beach, FL 33411

RE: New Digital Orthoimagery for Palm Beach County

Dear Mr. Ratchinsky,

This correspondence is to convey our support for Palm Beach County's efforts to update their digital orthoimagery. Our Town greatly benefits from the geographic data sharing that we have in place with Countywide GIS, and are able to accomplish our tasks better with up-to-date photography. Most of our Town business processes are supported by our GIS and the availability of updated digital orthophotography is a critical enhancement for us.

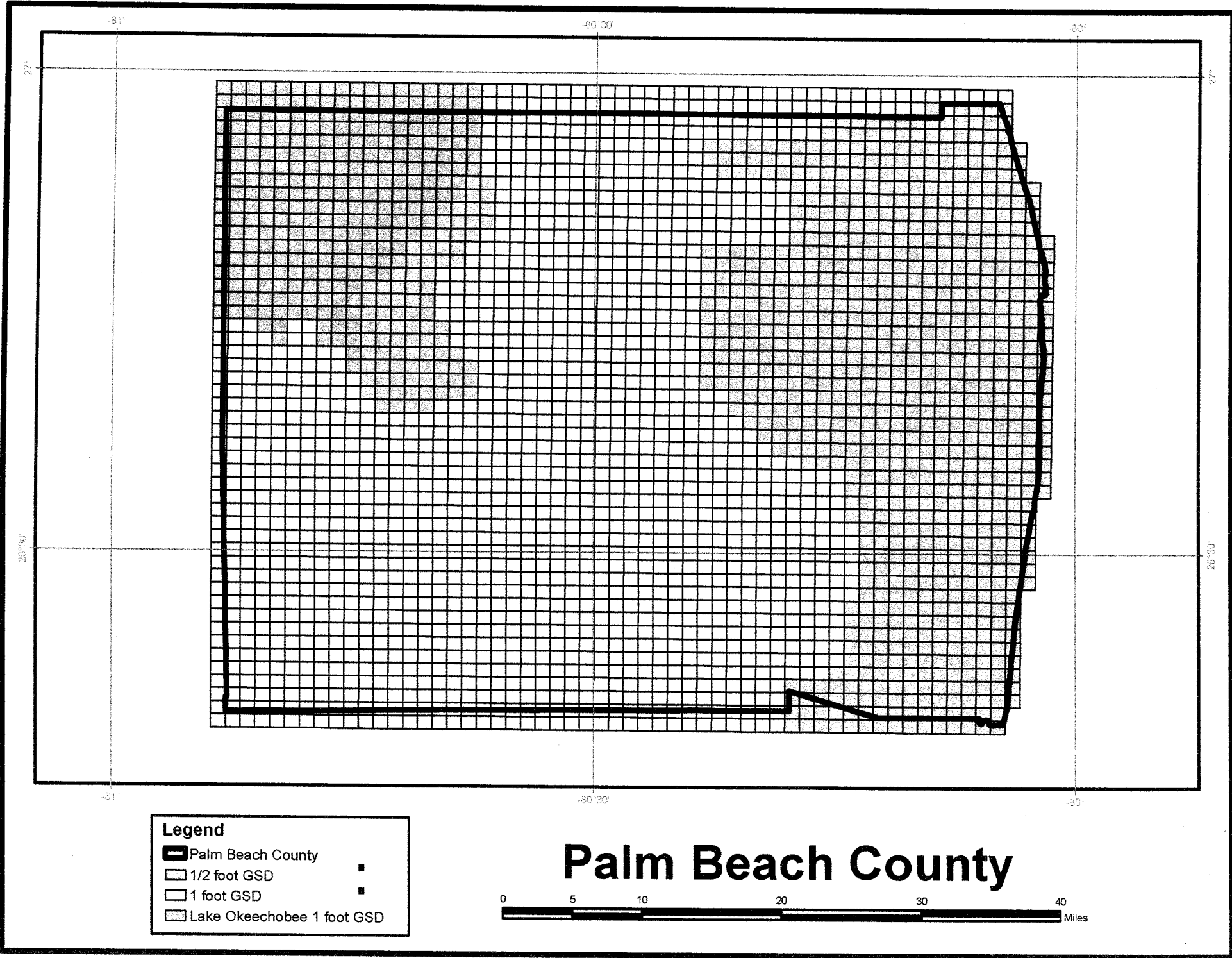
In these challenging fiscal times we are able to "do more with less" through our partnerships to keep our GIS data current and accurate. Thank you for your efforts in this endeavor.

Sincerely,





Lee Harding
GIS Manager
Town Of Jupiter

210 Military Trail • Jupiter, Florida 33458 • www.jupiter.fl.us • Phone (561) 746-5194

Palm Beach County Orthoimagery Mapping



Legend

-  Palm Beach County
-  1/2 foot GSD
-  1 foot GSD
-  Lake Okeechobee 1 foot GSD



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TASK ORDER

TASK ORDER # 4

CONSULTANT **BAE Systems**

ACCOUNT # **3901-491-M010-6508**

CONTRACT **R2006-2517**

COUNTY PROJECT MANAGER **Kelly Ratchinsky** PHONE **355-3958**

PROJECT NAME **2010 Palm Beach County ERM Environmental Aerials**

LOCATION **Palm Beach County Coasts and Inlets**

TASK DESCRIPTION

Color Digital Orthophotos 1"=600' scale, 0.5 foot pixel resolution per attached specifications.

DELIVERABLES +/- **See Attached**

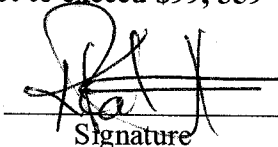
DUE DATE **November 21, 2010**

TASK ORDER TYPE **Lump Sum**

RETAINAGE **10%**

TOTAL AMOUNT **Not to exceed \$99,359**

PROJECT MANAGER


Signature

DATE 5/18/10

CONSULTANT



DATE 5-12-10

Printed Name/Title:

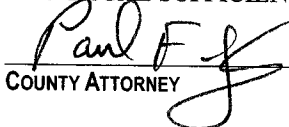
Didi Ruffer, Contracts Manager

PALM BEACH COUNTY
BOARD OF COUNTY COMMISSIONERS

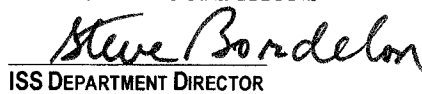


Steve Bordelon, Director of ISS

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY


COUNTY ATTORNEY

APPROVED AS TO
TERMS AND CONDITIONS


ISS DEPARTMENT DIRECTOR

ATT.# 2
32

Palm Beach County

Florida

Environmental Aerial Photography Acquisition

For

Palm Beach County Coasts & Inlets

Scope of Work

February 2, 2010

Provided by BAE SYSTEMS

BAE SYSTEMS

February 2, 2010

Mr. Kelly Ratchinsky
Countywide GIS Coordinator
Palm Beach County ISS
2300 N. Jog Road, 4th Floor
West Palm Beach, FL 33411

Reference: Environmental Aerial Photography Acquisition For Palm Beach County Coasts & Inlets

Dear Mr. Ratchinsky,

BAE SYSTEMS is pleased to submit this proposal for Color Digital Orthophotography and related services for the entirety of the Palm Beach County Coastline located in Palm Beach County, Florida, from the Martin County line to the Broward County line. The coastal and nearshore coverage includes all inlets as follows:

- Jupiter Inlet – West to Alternate A1A
- Lake Worth Inlet – West to the Port of Palm Beach
- South Lake Worth Inlet – West to the Boynton boat ramp
- Boca Raton Inlet – West to Palmetto Park Road

Coastal coverages, at a minimum, will match the imagery provided by prior contractors for 2007, 2008, & 2009 and will include no less than 2,000' from shore and land mass sufficient for aerial triangulation and orthorectification of the photographs. Relative to the flight conditions described in Paragraph 3 of the County's Technical Specifications, approximately 1/3 of the photo frame will be land mass and 2/3 ocean.

All of the products and services described below will be completed under the direct supervision of certified photogrammetrists, licensed surveyors and other geospatial professionals and will meet or exceed the standards and specifications for Palm Beach County.

SCOPE OF SERVICES

Project Management

Ms. Debra Taylor will be your overall project manager for this project. She will be BAE SYSTEMS primary point of contact and will have overall management responsibility. Ms. Taylor will produce and distribute all status reports and should be used as the central point for communication. Ms. Taylor will prepare Palm Beach County Contract Management a written report to track the status of production and to note milestones and/or issues that require resolution. BAE SYSTEMS will also prepare and submit monthly invoices.

Aerial Photography

BAE SYSTEMS will acquire new color aerial photography for this project only on days when conditions are considered optimal for collection of aerial photography. Other factors during aerial photography acquisition include:

- Sun angle is between 15 degrees and 35 degrees from the horizon
- Flown on a rising tide, at least 2 hours after low tide and no later than 1 hour after high tide to ensure clear water inside the inlets

- Calm seas and clear water are essential for acceptable images
- Acquisition area is free of haze, smoke and/or fog
- Conditions are considered cloud-free
- Tilt shall not exceed 5 degrees for any one photography or 2 degrees for any 10 or more photographs in a line or one degree for the entire project.
- Crab shall not exceed 10 degrees as measured from the flight line, as indicated, by two or more consecutive photographs.

This new aerial photography will be flown at 3600' AMT. The negative scale of the aerial photography is 1" = 600', with 80% forward overlap and 30% sidelap. There will be a total of (10) flight lines with (551) exposures.

PBC shall approve all photography prior to orthorectification. We will furnish aerial film of a quality that is equal or superior to Kodak color 2444 negative film.

We understand that PBC requires that photography capture will start on the north end of the County. We will attempt to capture the entire coastline during each photo mission. Factors which may keep this from occurring would be acts of God, clouds below the aircraft, rain or high winds.

Logs will be maintained and provided to PBC for the following:

- A. A flight log representing aircraft flight time shall be maintained on an hourly basis. The time of takeoff, start of photographs, end of photographs, and landing shall be recorded to the nearest of 0.1 of an hour.
- B. A daily weather log shall be maintained for each flight window to substantiate any delays due to inclement weather. The weather log shall include date, location, weather report, and weather forecast from the U.S. Weather Bureau. This information may be supplemented by direct observation.
- C. A tide log shall include the date, time, the location of the nearest NOAA tide station(s) being reported, and the tide elevation at the beginning, middle, and end of data collection as calculated for photo collection location (through interpolation between adjacent tide stations). All reported tide elevations shall be referenced to NAVD 1988.

Ground Control Surveys & Targeting

We will incorporate the most recent aerotriangulation block, to be provided by PBC, in place of running our own control network. We understand that PBC will approve this method toward meeting the NMAS 1" = 100' standards. No other control should be necessary to attain the specified accuracy requirements. Offshore control is not required.

Coordinate Reference Frame

Survey Datum – NAD 83/90 (feet) Horizontal; NAVD 88 - Vertical

Scanning

BAE SYSTEMS fully recognizes the technical performance required in the conversion of analog aerial film to a digital form during scanning. Since all subsequent processing steps build upon the scanned imagery base, we maintain close control over the processing and quality of this digital imagery. We will scan directly from the film rolls into positive image files at a resolution of 14 microns or better.

Scanning will be performed in order to enhance feature detail, with special emphasis on the subsurface areas.

Analytical Triangulation

BAE SYSTEMS will use the most recent triangulation data to be provided by Palm Beach County. This will be used to obtain as many tie points as possible to control the new photography to a block that already exceeds NMAS and thereby eliminate the need for new ground control.

BAE SYSTEMS understands that PBC expects the analytical triangulation solution will support the required accuracy for this project (1" = 100' NMAS). We will perform Softcopy analytical triangulation to extend and densify the ground control survey points, and establish orientation parameters for each scanned image. Softcopy analytical triangulation is an entirely digital process using scanned images of the film negatives. Our softcopy workstations support sub-pixel accuracy and will be utilized for both compilation and orientation measurement. The results will be checked to make certain that they conform to National Map Accuracy Standards with respect to scale and RMSE.

DEM

PBC will provide the surface model necessary for orthorectification. We will be responsible for verifying the completeness and supplementing the collection, where required.

Digital Orthophotography

Digital orthorectification will include a spatial and radiometric transformation of the scanned image from line / sample space into the specified ground coordinate system. Inputs into the orthorectification process are the scanned image, the interior and exterior orientation parameters for each image, corrections for lens distortion, earth curvature & atmospheric refraction, camera calibration information, and the Digital Elevation Model (DEM). In the process, each pixel in the scanned image is geometrically transformed from a line/sample value to a geographic location. The interior and exterior orientation parameters are used to project each pixel into the ground coordinate system, while the DEM is used to correct for relief displacement. In order to better reveal subsurface features, a gamma stretch will be used. Color and tone will be defined during the Pilot phase of this project. The final output will be at both a 0.5' GPR and 1' GPR.

BAE SYSTEMS will provide the raw digital orthorectified imagery for each frame of photography. This will give PBC the opportunity to scrutinize image detail after it has been orthorectified, but before the images were mosaicked, cleaned up, color balanced, or feathered along cut lines. These will be at .5' GPR and delivered on USB2 or firewire external hard drive as .tif files.

Every frame of the 80% forward overlap photography will be utilized for this project to ensure that most of the final orthophotography imagery will be as close as possible to nadir in the direction of flight. This will result in less building lean, less subsurface displacement from water refraction, and less surface reflection from sunlight.

Using this approach, BAE SYSTEMS highly skilled and experienced staff will produce and deliver color digital orthophotos at a 0.5' pixel resolution. Once the images are ortho-rectified, they are checked for geometric accuracy, image quality, and tone balancing.

The final .5' pixel color digital orthophotography will be a seamless database of imagery delivered in section format to Palm Beach County. Achieving this goal requires that the tone of the imagery be

matched for consistency, and that the individual overlapping orthophotos be mosaicked together. Imagery along adjacent tile edges will not be displaced by more than one pixel.

Quality Control

BAE SYSTEMS sought and achieved certification by the International Standards Organization (ISO) in 1998.

ISO standards are a series of internationally recognized Quality System requirements that encompass all areas of corporate organization. BAE SYSTEMS Quality Program is an extensive set of processes and tested procedures that ensure our clients receive the highest quality products and services. The following statements summarize our Program:

- BAE SYSTEMS is committed to providing products and services that will meet or exceed the expectations of our customers.
- BAE SYSTEMS will achieve the goals of our Quality Program through our total and continuous dedication to world-class quality in all stages and phases of our production cycle, from beginning to end.
- BAE SYSTEMS will implement our Quality Program via thorough training of our employees to ensure that they understand our external and internal customers, as well as project requirements and deadlines, and can apply the proper procedures needed to meet those requirements on time and without error, each and every time.
- Providing quality products and services is the responsibility of everyone at BAE SYSTEMS.

PBC will return comments to us within (15) days of receipt of imagery. We will respond to PBC's comments or concerns within (15) days, either making necessary corrections or providing clarification.

Delivery Items

- Original roll(s) of aerial film negatives (to be stored by BAE SYSTEMS)
- One copy of the Analytical Triangulation Report in digital and hardcopy format (will include the current camera calibration report)
- One copy of the Image Processing and Quality Control Report in digital and hardcopy format (the report will include the film & scanning inspection report)
- One copy of the flight report signed by the pilot of the aerial photographer. The flight report will contain the flight, tide, and weather logs.
- We will provide within two (2) weeks from completion of aerial flights the digital raw scanned imagery at 14 microns or better to PBC.
- Raw digital orthorectified imagery provided on USB2 or firewire external hard drive as .tfw and .tif files produced at .5' GPR before they were mosaicked, cleaned up, or color balanced. We understand that they will only be used for PBC's internal purposes.
- (92) digital orthorectified tiles provided on USB2 or firewire external hard drive with .tfw and .tif files produced at both .5' GPR and 1' GPR
- Digital imagery provided in MrSID format in 3 segments, and these 3 images will be created at 20x compression for the 1' GPR images
- Digital spot index map with all sheets numbered and referenced in .dwg and .shp format
- Digital photo mosaic index in MrSID format upon completion of the analytical triangulation
- Federally compliant metadata in electronic format for each deliverable in item 7 bullet point above

- Updated DEM in uncompressed ArcInfo Generate if modified

Project Schedule

BAE SYSTEMS proposes to commence project mobilization upon Task Order approval. All deliverables will be sent to PBC ninety (90) days after completion of successful aerial photography. BAE SYSTEMS will submit a schedule for this project in Microsoft Project format (Gantt Chart) within (10) days after receipt of the Task Order.

Total Project Costs

New Aerial Photography	\$ 26,932
Project Management	\$ 4,336
Scanning	\$ 7,014
Analytical Triangulation	\$ 21,850
Digital Orthophotography	\$ <u>39,227</u>
TOTAL	\$ 99,359

Payment Terms

We will utilize the payment terms that are already in place as per our existing contract with Palm Beach County.

Insurance Coverage

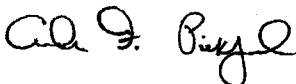
During the terms of any contract which might result from this proposal, BAE SYSTEMS will have in place the following types of insurance coverage: a) professional liability; b) statutory workman's compensation; c) valuable papers insurance; d) public liability protection; e) automobile insurance.

BAE SYSTEMS liability of any future claims relating to the services performed as part of this contract will be strictly limited to the total dollar value of the services specified within this proposal.


Thank you for the opportunity to submit this proposal. We look forward to working with you on this very important project. If you have any questions or comments concerning this proposal, please contact Andy Pickford at (856) 793-4316, or andrew.pickford@baesystems.com

Very Truly Yours,

BAE SYSTEMS



Andrew F. Pickford
Regional Manager



Didi Rufer
Manager Contracts II

BUDGET AVAILABILITY STATEMENT

REQUEST DATE: 02/16/2010

REQUESTED BY: Janet Phipps

PHONE: 233-2513

PROJECT TITLE: Countywide Coastal Aerial Photography

LOCATION:

Project NO:

ORIGINAL CONTRACT AMOUNT:

BCC RESOLUTION#

REQUESTED AMOUNT: \$99,359.00

DATE:

CSA/LOA CHANGE ORDER AMOUNT:

CSA/LOA CHANGE ORDER NUMBER:

CONTRACTOR/CONSULTANT NAME: BAE Systems

PROVIDE A BRIEF STATEMENT OF THE SCOPE OF SERVICES TO BE PROVIDED BY THE CONSULTANT/CONTRACTOR: Provide digital orthophotography in the coastal areas as describe on the attached specifications.

BUDGET ACCOUNT NUMBER (IF KNOWN):

FUND	DEPART	UNIT	OBJ	PROG	PG PERIOD	AMOUNT
3652	381	M045	3120	E045	CIP	\$3,050.50
3652	381	M028	3120	E028	CIP	\$5,665.21
3652	381	M037	3120	E037	CIP	\$4,139.96
3652	381	M044	3120	E044	CIP	\$3,486.28
3652	381	M015	3120	E015	CIP	\$5,665.21
3900	381	M700	3120	E700	CIP	\$5,883.10
3652	381	M041	3120	E041	CIP	\$6,754.67
3652	381	M039	3120	E039	CIP	\$3,486.28
3652	381	M051	3120	E051	CIP	\$3,050.50
3652	381	M016	3120	E016	CIP	\$2,614.71
3652	381	M100	3120	S102	M100	\$55,562.58

AD VALOREM

OTHER

FEDERAL

REVENUE:

ANTICIPATED DATE OF APPROVAL:

BAS APPROVED BY: *Janet Phipps* DATE: 3/25/10

REQUIREMENT: Invoice must be approved by ERM before submitting to ISS for payment.

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