

**PALM BEACH COUNTY  
BOARD OF COUNTY COMMISSIONERS  
AGENDA ITEM SUMMARY**

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<b>Meeting Date:</b> August 16, 2016	<input checked="" type="checkbox"/> Consent	<input type="checkbox"/> Regular
	<input type="checkbox"/> Public Hearing	<input type="checkbox"/> Workshop
<b>Department:</b>		
<b>Submitted by:</b> Information Systems Services (ISS)		
<b>Submitted for:</b> Countywide GIS Program		

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**I. EXECUTIVE BRIEF**

**Motion and Title:** Staff recommends motion to:

- A. **Approve** Task Order No. 3 for countywide aerial image capture and digital orthophoto mapping in the western area of the County (R2011-2052) with Surdex Corporation in the amount of \$155,570;
- B. **Approve** Task Order No. 5 for digital orthophoto mapping in the eastern areas of the County (R2011-2054) with Woolpert Inc. in the amount of \$55,000;
- C. **Receive and File** Task Order 3-A for contract R-2011-2054 with Woolpert Inc. to extend the due date of the Task Order to December 31, 2016; and
- D. **Receive and File** Task Order 3 for contract R-2011-2053 with BAE Systems, Inc. in the amount of \$12,500 to update the Digital Elevation Model (DEM); and

**Summary:** The above referenced firms were selected using the Consultant Competitive Negotiations Act (CCNA) process, with contracts entered into on December 20, 2011 to perform digital orthophotography and planimetric mapping for the County (R2011-2052; R2011-2053 and R2011-2054). These Task Orders are being put in place now to be ready to capture the imagery during optimal weather conditions. The Property Appraiser's Office is a long term partner with Countywide GIS and is providing a revenue contribution of \$105,285 towards this mapping project. Two Task Orders were previously approved and are submitted for receive and file. Task Order 3-A was initiated with Woolpert Inc., to extend the due date to complete a coastal mapping project delayed because of inclement weather, and Task Order 3 with BAE Systems, Inc. was issued to update the DEM used for orthophoto rectification. Both Task Orders were less than \$100,000 and authorized by the ISS Director. (Countywide) (PFK)

**Background and Justification:** In December 2011, contracts were established with Surdex Corporation, BAE Systems Inc., and Woolpert, Inc., to provide mapping services. On

*Continued on page 3...*

**Attachments:**

- 1. Task Order No 3 for Surdex Corporation (2) originals
- 2. Task Order No. 5 for Woolpert Inc. (2) originals
- 3. Task Order No. 3-A for Woolpert, Inc. (1) original
- 4. Task Order No. 3 for BAE Systems, Inc. (1) original

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<b>Recommended by:</b>	<u>Steve Bordelon</u>	<u>7-25-16</u>
	Department Director	Date
<b>Approved by:</b>	<u>Verdenea C. Baker</u>	<u>8/8/16</u>
	County Administrator	Date

**II. FISCAL IMPACT ANALYSIS**

**A. Five Year Summary of Fiscal Impact**

<b>Fiscal Years</b>	<b><u>2016</u></b>	<b><u>2017</u></b>	<b><u>2018</u></b>	<b><u>2019</u></b>	<b><u>2020</u></b>
Capital Expenditures	\$ 12,500	\$210,570	0	0	0
Operating Costs	0	0	0	0	0
External Revenues	(\$0)	(\$0)	(\$0)	(\$0)	(\$0)
Program Inc (County)	0	0	0	0	0
In-Kind Match (County)	0	0	0	0	0
<b>NET FISCAL IMPACT</b>	<b>\$12,500</b>	<b>\$210,570</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
# Additional FTE Positions (Cumulative)	0	0	0	0	0
Is Item Included in Current Budget	Yes <u>X</u>	No			

Expend Budget Number: Fund 3901 Dept 491 Unit M010 Objt 3401  
Expend Budget Number: Fund 3901 Dept 491 Unit I330 Objt 3401

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

C. Department Fiscal Review: *Robert Ross* 7/20/15

**III. REVIEW COMMENTS**

**A. OFMB Fiscal and/or Contract Development & Control Comments:**

*John P...* 7/26/15      *J. S. Jacobson* 8/5/16  
OFMB ~~ET~~ 7/25 *7/25*      Contract Administration *8/5/16*

**B. Legal Sufficiency:**

*Paul F...* 8/8/16  
Assistant County Attorney

**C. Other Department Review:**

\_\_\_\_\_  
Department Director

**THIS SUMMARY IS NOT TO BE USED AS A BASIS FOR PAYMENT.**

*Continued from page 1...*

**Background and Justification:** December 20, 2011 authorization was given to the County Administrator or his designee to negotiate and execute a series of task orders of less than \$100,000. All Task Orders in excess of \$100,000 must be approved by the Board of County Commissioners.

Digital orthophotography refers to aerial photos rectified to match the earth's surface location. Aerial photographs of Palm Beach County's land surface are accessible to the public via the *myGeoNAV* web application.

The mapping program and costs have been reviewed and approved by the GIS Policy Advisory Committee.

## TASK ORDER

TASK ORDER # 3

CONSULTANT **Surdex Corporation**

ACCOUNT #

CONTRACT **R2011-2052**

COUNTY PROJECT MANAGER **Kelly Ratchinsky** PHONE **355-4252**

PROJECT NAME **2016-17 Digital Orthophotos – Western Palm Beach County and Countywide Aerial Capture**

LOCATION **Palm Beach County**

TASK DESCRIPTION

**Color Digital Orthophotos .5 foot and 1.0 foot GSD per attached proposal.**

DELIVERABLES +/- **See Attached** DUE DATE **September 30, 2017**

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

TOTAL AMOUNT **Not to exceed \$155,570**


PROJECT MANAGER

  
Kelly Ratchinsky

DATE

7/13/16

CONSULTANT

  
Printed Name/Title: **RONALD C. HOFFMANN**  
**PRESIDENT**

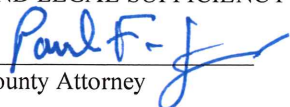
DATE

7/5/16


PALM BEACH COUNTY  
BOARD OF COUNTY COMMISSIONERS

\_\_\_\_\_  
Mary Lou Berger, Mayor

APPROVED AS TO FORM  
AND LEGAL SUFFICIENCY

  
County Attorney

APPROVED AS TO  
TERMS AND CONDITIONS

  
ISS Department Director





## Fee Schedule: Palm Beach County

**Date:** June 10, 2017  
**To:** Kelly Ratchinsky  
**From:** Ed Turner  
**Project Name & Location:** Palm Beach County 2017 Orthophoto  
Rectification – West Project Area

Service	Price
Image Processing	\$2,390.00
Aerotriangulation	2,750.00
Ortho Production	35,280.00
<b>Total:</b>	<b>\$40,420.00</b>
<b>Project Specifications and Deliverables</b>	
■ All deliverables will meet Palm Beach, State of Florida and USGS Datum Coordinates and Metadata requirements.	
■ Final West Project Area orthophotography delivery date: August 31, 2017	
■ Pilot images will be provided for Palm Beach County approval prior to orthophoto production.	
■	
■	

Customer is responsible for all applicable taxes – including Sales Tax.

## TASK ORDER

TASK ORDER # 5

CONSULTANT **Woolpert, Inc.**

ACCOUNT #

CONTRACT **R2011-2054**

COUNTY PROJECT MANAGER **Kelly Ratchinsky** PHONE **355-4252**

PROJECT NAME **2016-17 Digital Orthophotos – Eastern Palm Beach County**

LOCATION **Palm Beach County East**

TASK DESCRIPTION

**Color Digital Orthophotos .5 foot per attached proposal.**

DELIVERABLES +/- **See Attached** DUE DATE **September 30, 2017**

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

TOTAL AMOUNT **\$55,000**

PROJECT MANAGER

  
Kelly Ratchinsky

DATE

7/13/16

CONSULTANT

Printed Name/Title:

  
JOHN CESTNICK, SENIOR ASSOCIATE

DATE

2016-07-07

PALM BEACH COUNTY

BOARD OF COUNTY COMMISSIONERS

\_\_\_\_\_  
Mary Lou Berger, Mayor

APPROVED AS TO FORM  
AND LEGAL SUFFICIENCY

  
County Attorney

APPROVED AS TO  
TERMS AND CONDITIONS

  
ISS Department Director

## TASK ORDER

TASK ORDER # 5

CONSULTANT **Woolpert, Inc.**

ACCOUNT #

CONTRACT **R2011-2054**

COUNTY PROJECT MANAGER **Kelly Ratchinsky** PHONE **355-4252**

PROJECT NAME **2016-17 Digital Orthophotos – Eastern Palm Beach County**

LOCATION **Palm Beach County East**

TASK DESCRIPTION

**Color Digital Orthophotos .5 foot per attached proposal.**

DELIVERABLES +/- **See Attached** DUE DATE **September 30, 2017**

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

TOTAL AMOUNT **\$55,000**

PROJECT MANAGER

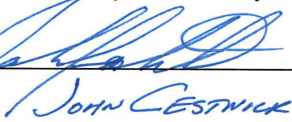
  
Kelly Ratchinsky

DATE

7/13/16

CONSULTANT

Printed Name/Title:

  
JOHN CESTNICK, SENIOR ASSOCIATE

DATE

2016-07-07

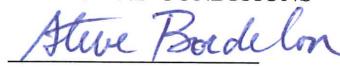
PALM BEACH COUNTY  
BOARD OF COUNTY COMMISSIONERS

\_\_\_\_\_  
Mary Lou Berger, Mayor

APPROVED AS TO FORM  
AND LEGAL SUFFICIENCY

  
County Attorney

APPROVED AS TO  
TERMS AND CONDITIONS

  
ISS Department Director



May 23, 2016

Kelly Ratchinsky  
Director Platform Services  
Palm Beach County  
301 N Olive Ave, 4th Floor  
West Palm Beach, FL 33401

Dear Kelly:


Thank you for the opportunity to respond to your Request for Proposals (RFP) for the 2016 Palm Beach County Urban Orthoimagery Project. Attached we have provided a cost effective Scope of Services and technical approach based upon our past project experience and the intimate knowledge of the County's expectations.

**Project Summary:**

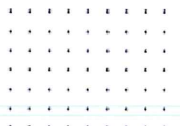
1. Palm Beach County will provide Woolpert the survey ground control, the aerial imagery, and building footprints (if available). It is expected that Surdex will be the actual source of the survey ground control and the aerial imagery.
2. Woolpert will:
  - a. Complete project-wide aerial triangulation
  - b. Make minor edits to the DEM as necessary
  - c. Process and complete Digital Orthoimagery for a Pilot Area for Palm Beach County's review and acceptance
  - d. Provide professional project management to control the project and schedule
  - e. Actively manage the schedule
  - f. Finalize all project deliverables according to the Scope of Services
3. Woolpert's estimated project fee for the attached Scope of Services is \$55,000 (lump-sum to be billed monthly according to status report percent complete).
4. Woolpert will need approximately five (5) months to complete the final deliverables, depending upon the actual authorization date, and a review of staff allocation based upon a Notice To Proceed date.

Upon your review, should you have any questions or concerns, please never hesitate to call me at any time at 305.351.2936, or cell 305.903.4335.

Sincerely,  
**Woolpert, Inc.**

  
John Cestnick, PSM, IAM  
Senior Associate

Woolpert, Inc.  
10900 NW 25th Street, Suite 100  
Miami, FL 33172-1922  
305.418.9370







## Scope of Services: 2016 Palm Beach County Urban Orthoimagery Project

### Project Understanding

Woolpert understands that Palm Beach County's goal is to produce new color 1" = 100' scale digital orthoimagery with a 0.5-foot pixel resolution for the urban portion of the County. The following data will be provided by Palm Beach County to support the 1" = 100' scale 0.5-foot digital orthoimagery:

- Ground Control (via Surdex)
- Aerial Imagery Acquisition (via Surdex)
- Building Footprints (if available)

### Project Area

The project area consists of the +/- 825 square mile urban developed area along the east coast of the county. The project consists of +/- 917 5,000' x 5,000' tiles (see attached map).

### Ground Control (County-Owned Task)

Palm Beach County will provide Woolpert with the ground control survey data such as – control diagrams, point descriptions, diagrams, log sheets, X,Y,Z coordinates etc. needed to support the aerial triangulation. The horizontal datum will be the Florida State Plane Coordinate System East Zone (NAD 1983, 1990 Adjustment).

### Aerial Imagery Acquisition /Airborne GPS (County-Owned Task)

Palm Beach County will provide Woolpert with the aerial acquisition data such as – flight maps, aerial log sheets, control diagrams, ADS100 aerial imagery and airborne GPS data needed to support the aerial triangulation and orthoimagery production. The imagery and associated image data needs to be delivered in non-modified Leica raw format. Also the camera files and a calibration report, along with GPS and IMU lever arms.

### Building Footprints (County-Owned Task)

Palm Beach County will provide building footprint polygons (if available) to support the orthoimagery mosaicking process. The building footprint polygons can be in .dgn, .dxf, or shapefile format.

### Aerial Triangulation

Triangulation will be performed using GPro and ORIMA by Leica GeoSystems triangulation software. We will use the APM software module, which incorporates automatic pass point selection, numbering, and measurement in one batch process. Pass point selection uses autocorrelation algorithms to select multiple pass points in an image strip. Any pass point exceeding tolerances will be filtered out. Control points are manually measured by a photogrammetrist using the latest survey field information. Woolpert uses the CAP-A module of ORMIA software for the initial blunder detection, to catch any obvious errors in data input or mensuration; corrects; and then reprocesses for the final bundle adjustment. Once any obvious problems have been solved, the software performs a series of quality assurance steps to detect any slight errors in mensuration. Woolpert will provide a triangulation report.

### Pilot Project

Woolpert proposes a pilot project to test the production methods required for this project, and it ensures that the final delivery will meet Palm Beach County's expectations. We recommend completing aerial triangulation for the entire

project, and then performing the remainder of the orthoimagery production steps for the pilot area. This pilot project gives Palm Beach County a chance to: approve the production process; approve the deliverables; test QC methods; perform field accuracy checks; and modify the scope of services if necessary. Once the pilot area is approved, Woolpert will continue with full production.

### *Image Aesthetics*

As part of the image processing procedure, Woolpert will provide a minimum of three different image data sets for the pilot project area. Woolpert's image specialist will prepare each data set with various color balance, tone, density, contrast, and brightness qualities. Woolpert will meet with Palm Beach County to determine the appropriate image sample to be used as a guideline for the pilot project. During the review of the pilot, further refinement of the image settings may take place before implementing full production.

## Digital Elevation Model

Woolpert will use the Palm Beach County existing 2009 DEM to support the orthoimagery processing. Woolpert will perform minor DEM modifications as necessary to support the orthoimagery. Woolpert does not expect a comprehensive update of the DEM surface, more of minor adjustments to prevent unsightly smearing or distortions in the orthoimagery. However, several years have passed since the DEM surface was produced in 2009. Because of the area's continual growth and change Woolpert cautions a new DEM surface may be needed. Concerns over physical landscape, both manmade and natural, change over a seven-year period. Changes such as new buildings, residential subdivisions, commercial and industrial complexes, and transportation features result in excavation to the ground surface. Sometimes this physical change to the surface does not affect the accuracy of the orthoimagery, however, if significant, this change can affect the accuracy and image quality. Woolpert will review the existing DEM to determine if performing minor modifications will be sufficient to produce the orthoimagery. If we determine that areas of the existing DEM are not capable of supporting the project specifications, Woolpert will provide Palm Beach County with said areas to determine the next appropriate action.

### *Digital Orthoimagery Production*

After the completion of the DEM, Woolpert will use a systematic approach to produce the digital orthoimagery. This approach will have QA/QC procedures integrated throughout the entire process.

### *Image Rectification*

Woolpert will match the DEM data to a photo image through Leica GPro software to create a digital orthoimage. The relevant DEM data will be merged with the orientation parameters and the original digital image. A complete differential rectification is carried out with a set of algorithms that remove image displacement due to topographic relief and the tip and tilt of the aircraft at the moment of exposure. Woolpert will use cubic convolution algorithms for the rectification process. In contrast to nearest-neighbor interpolation or bilinear interpolation, cubic convolution process provides the best image quality.

### *Mosaicking and Radiometry*

Woolpert will use Orthovista and ZI Orthopro software along with automated and interactive techniques for tone balancing and image mosaicking. Woolpert will incorporate the existing building footprint polygons into our mosaicking process. The digital orthoimagery will be seamless and have uniform, balanced color. Tiles will be mosaicked so the images appear to be seamless, except at mosaic lines on bodies of water. Special attention will be given to the placement of mosaic lines in developed areas so as not to bi-sect buildings and bridges. Other man-made structures not at ground level such as power lines, trees, etc. may have mosaick mis-matching. Woolpert image specialists will take special care around bridges and overpasses to correct excessive distortion. Bridges and overpasses will not appear to be warped or skewed. Overpasses/bridges along roadways shall retain location and geometry as much as possible. Radiometric adjustment will include color balancing, overall tone adjustment and brightness and contrast enhancements of the imagery over the entire project. Tiles will then be clipped from the mosaicked image. All adjacent tiles will edge match with surrounding tiles. Tiles are then run through a visual QA/QC to validate that the orthoimagery meets the project specifications.



## Final Product

The resulting digital orthoimages will have pixel resolutions with accurate X, Y ground coordinates, and RGB scale values from 0 to 255. The project-wide imagery will be delivered in .tif and .tfw format based on Palm Beach County's tiling system. The 6-inch imagery will be based on the 5,000 x 5,000 modular tile grids. A MrSID data set will be delivered for each 5,000 x 5,000 tile at a 30x compression and additional MrSID files based on the County's existing 8 tile layout at a 30x compression will also be produced.

## Accuracy

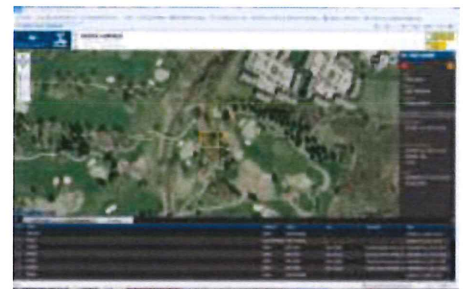
The orthoimagery will meet or exceed the National Map Accuracy Standards for 1" =100' scale. The horizontal accuracy will be +/- 3.33 – feet at a 90 % confidence level.

## Metadata

Metadata will be created for each .tif world file as per Palm Beach County's specifications.

## Quality Assurance/Quality Control

Woolpert offers a streamline QA/QC tracking application known as SmartView™ Connect (SVC). SmartView™ Connect is an Open Geospatial Consortium (OGC) compliant imagery and vector service that allows internet viewing access to all the project imagery deliverables. SVC is a website that was built and is maintained by Woolpert. It continues to be used by current clients for preliminary imagery and QC process. It will preclude the need, cost, and time consumed for preparing and shipping of draft data products from Woolpert to Palm Beach County and vice versa. Immediately preceding the creation of the orthoimagery deliverables, our staff will publish the data to SmartView™ Connect and alert the relevant parties that the data is ready for review. Palm Beach County will then log onto the site and immediately access the orthoimagery via a web browser. All that is necessary is a web browser that supports Adobe Flash. Once all issues have been reported to Woolpert, we will work diligently to resolve each and every one. Upon completion of the issue resolution phase of the project, Woolpert will create an issue resolution report and post the final, revised data to the SVC website. After Woolpert and Palm Beach County are satisfied that all issues and concerns have been addressed, Woolpert will package the final orthoimagery for delivery. This final delivery will also contain a geodatabase of all issues, along with the history of each issue, to serve as a permanent record of what was reported to Woolpert, what fixes were made, and who accepted the final imagery.



Woolpert's SmartView™ Connect

## Schedule

Once Woolpert receives all of the necessary data and information from Palm Beach County, Woolpert will need approximately five (5) months to complete the final deliverables. Woolpert will be able to provide a more detailed schedule prior to a Notice To Proceed, and after we finalize the allocation of project resources.

## Deliverables

- One set of orthoimagery tiles will be delivered in World geoTIFF format (Florida State Plane Coordinate System (East Zone) in NAD83/90)
- One set of orthoimagery tiles will be delivered in World geoTIFF format (Florida State Plane Coordinate System (East Zone) in NAD83/2007) – *for FDOR Delivery*
- One set of orthoimagery tiles will be delivered in MrSID format at 30x compression (Florida State Plane Coordinate System (East Zone) in NAD83/90)
- One set of orthoimagery tiles will be delivered in MrSID format at 30x compression based upon the County's 8 tile layout (Florida State Plane Coordinate System (East Zone) in NAD83/90)
- Metadata incorporated into each TIFF World file
- All data will be delivered on an external hard drive

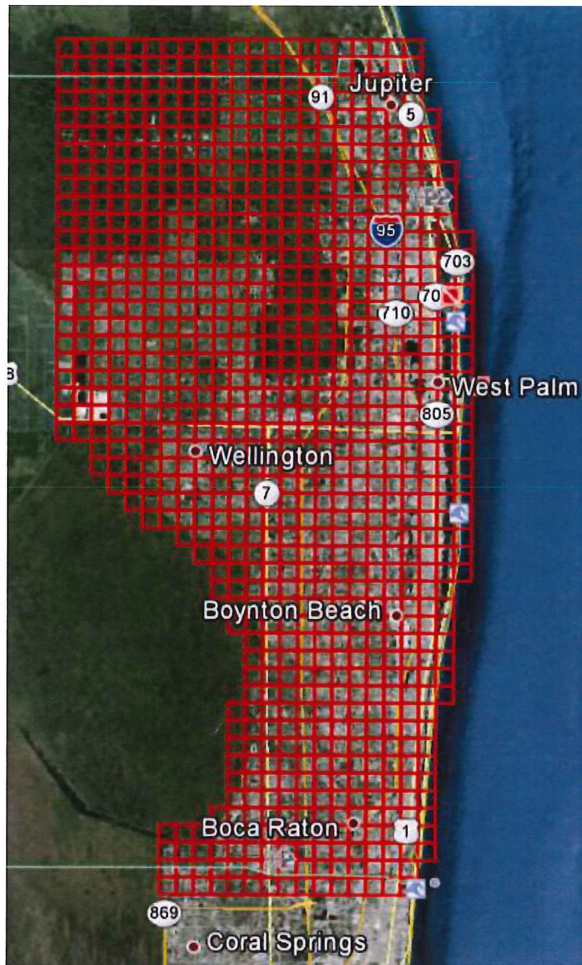
## Fee

Lump-Sum Project Fee.....\$55,000.00

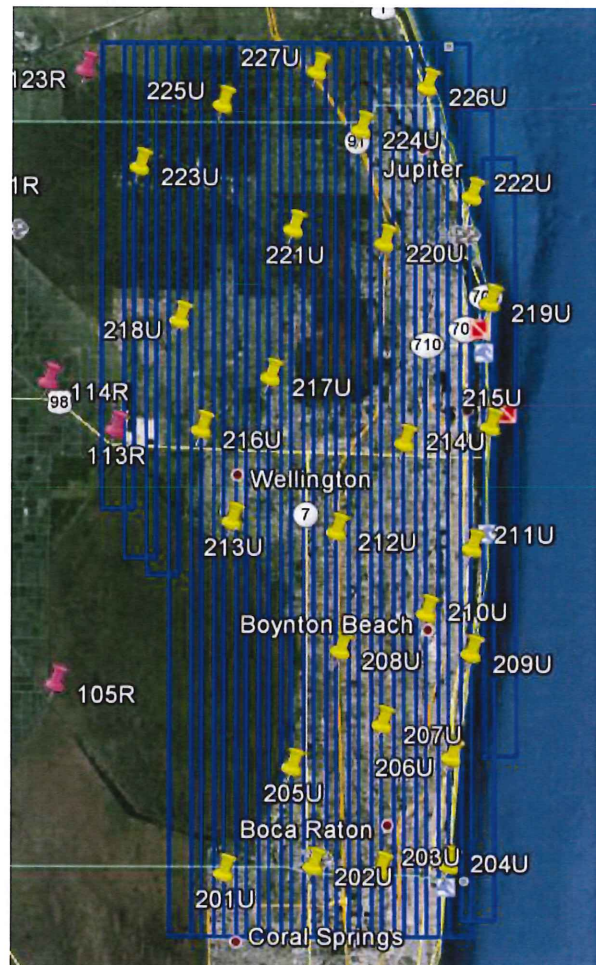
*Woolpert will invoice each month according to percentage complete. Woolpert will provide via e-mail an invoice and progress report with each month's activity.*



## Attachment "A"



Project Area based on County 5,000 x 5,000 foot grid  
(provided by Palm Beach County)



Project Flight Lines and Ground Control  
(provided by Surdex)

## TASK ORDER

TASK ORDER # 3-A

CONSULTANT Woolpert, Inc.

ACCOUNT # ERM BAS

CONTRACT R2011-2054

COUNTY PROJECT MANAGER Kelly Ratchinsky PHONE 355-4252

PROJECT NAME 2016 Countywide Coastal Aerial Program

LOCATION Palm Beach County Coasts and Inlets

TASK DESCRIPTION Extend due date for completing: Color Digital Orthophotos 1"=100' horizontal accuracy, 0.5 foot ground resolution with additional ground control per attached proposal.

DELIVERABLES +/- See attached

DUE DATE December 31, 2016

TASK ORDER TYPE Lump Sum

RETAINAGE 10%

TOTAL AMOUNT \$88,288

PROJECT MANAGER

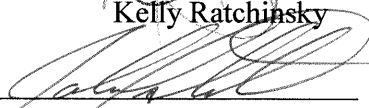
  
Kelly Ratchinsky

DATE

1/19/16

CONSULTANT

Printed Name/Title:

  
JOHN CESTNICK  
SENIOR ASSOCIATE

DATE

2015-12-29

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

## TASK ORDER

TASK ORDER # 3

CONSULTANT Woolpert, Inc.

ACCOUNT # ERM BAS

CONTRACT R2011-2054

COUNTY PROJECT MANAGER Kelly Ratchinsky PHONE 355-4252

PROJECT NAME 2015 Countywide Coastal Aerial Program

LOCATION Palm Beach County Coasts and Inlets

TASK DESCRIPTION Color Digital Orthophotos 1"= 100' horizontal accuracy, 0.5 foot ground resolution with additional ground control per attached proposal.

DELIVERABLES +/- See attached

DUE DATE December 31, 2015

TASK ORDER TYPE Lump Sum

RETAINAGE 10%

TOTAL AMOUNT \$88,288

PROJECT MANAGER

  
Kelly Ratchinsky

DATE


7/16/15

CONSULTANT

Printed Name/Title: John Cestnick, PSM, Project Manager  
Senior Associate

DATE 2015.07.13

PALM BEACH COUNTY  
BOARD OF COUNTY COMMISSIONERS

  
Steve Bordelon, Director of ISS

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COUNTY ATTORNEY

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TERMS AND CONDITIONS

  
ISS DEPARTMENT DIRECTOR



June 17, 2015

Penny L. Anderson  
Sr. Coordinator  
Palm Beach County ISS

RE: 2015 Coastal Orthophoto Proposal

Dear Penny:

Thank you very much for the opportunity to once again propose on the coastal orthophoto development. The 2015 Technical Specifications were followed to develop our fee estimate, as well as the understanding that Palm Beach County wants to receive virtually the same service and deliverables as Woolpert provided in 2011, 2013, and 2014. Some items to note with our work plan are as follows:

- 1) As in past years, Woolpert proposes to acquire the RGB aerial imagery using a digital sensor – a Leica ADS80. This is a push-broom sensor, so it does not collect individual frames of imagery, but rather, collects imagery in continuous strips the length of the flight lines. Where the Technical Specifications define acquisition and delivery parameters in terms of a film or a frame camera, we'll fly and deliver as those criteria apply to the ADS80 sensor. More specifically:
  - a) Raw ground pixel resolution is specified to be 0.33 feet as captured with film at 1"=600' scale (3,600 feet above ground level). We are proposing the same option that was contracted in previous years, and that was to use Woolpert's ADS80 sensor and collect at the specified 0.33 feet raw ground pixel resolution (flown at 3,165 feet above ground level). This option will result in imagery that meets the final 0.5-foot ground resolution and will meet 1"=100' NMAS horizontal accuracy.
    - i) Publication scale: 1"=100'
    - ii) Pixel Resolution: 0.5-foot
    - iii) Photo type: Natural Color
    - iv) Horizontal Accuracy: +/-3.33' at 90 Percent
    - v) Imaging Sensor: ADS80 Digital Imaging Sensor
  - b) Specifications relating to 80% forward overlap do not apply because the push-broom sensor collects continuously. All orthophoto imagery is collected at nadir.

Woolpert, Inc.  
10900 NW 25th Street, Suite 100  
Miami, FL 33172-1922  
305.418.9370

- c) Raw digital orthorectified imagery will be provided in images strips as collected. We will break the strips down into multiple segments so the file sizes are no larger than approximately 1GB.
  - d) For the Photo Mosaic Index, we will provide MrSID format mosaics of the image strips as collected. We may wish to either increase the level of compression (1:100, for example) or break the area into multiple MrSID mosaics to keep file sizes manageable.
  - e) As provided in previous years, Woolpert will include the Statistical Validation Report identified within the deliverables, within our Aerial Triangulation Report.
- 2) As provided in previous years, for the Spot Index Map, we will provide a layout for each imagery product showing the outlines of each image file – an orthophoto index in both AutoCAD .dwg and ArcGIS .shp file formats.
- 3) Survey Control & Targeting: Woolpert will need approximately ten (10) new photo control stations, evenly spaced throughout the project area, to properly complete the aerial triangulation. If Palm Beach County can provide the necessary control, Woolpert will utilize it so that no additional fieldwork will be necessary. However, if the necessary control does not already exist, Woolpert can provide the field surveying service to set and survey ten new photo control stations. The fee to provide the necessary survey ground control is \$4,360.
- 4) Imagery Acquisition: Woolpert’s fee proposal includes no more than two mobilizations to the project site by the flight team. If additional mobilizations to the project site are necessary to complete the imagery acquisition, additional fees will have to be authorized. The fee for each additional site mobilization will be a lump-sum fee of \$18,250. This fee includes all costs including: aircraft, ADS80 sensor, fuel, labor, imagery acquisition and on-site direct expenses.

Woolpert, Inc.     . . . . .  
10900 NW 25th Street, Suite 100     . . . . .  
Miami, FL 33172-1922     . . . . .  
305.418.9370     . . . . .

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**Woolpert's Fee Proposal Breakdown:**

• Imagery Acquisition and Processing	\$ 43,575
• Film scanning	Not Applicable
• Aerial Triangulation	\$ 9,857
• Orthophoto Mapping	\$ 30,496
<b><u>TOTAL PROPOSAL FEE</u></b>	<b><u>\$ 83,928</u></b>

**OPTIONS / ADDITIONAL SERVICES:**

• Ground control survey & targeting	\$ 4,360
• Additional Mobilization (flight team)	\$ 18,250

Thank you once again for the opportunity to propose on this project. We look forward to your response and to working with you again. Should you have any questions at all, please never hesitate to call me at any time.

Sincerely,  
Woolpert, Inc.



John Cestnick, PSM  
Senior Associate

Woolpert, Inc.	.	.	.	.	.
10900 NW 25th Street, Suite 100	.	.	.	.	.
Miami, FL 33172-1922	.	.	.	.	.
305.418.9370	.	.	.	.	.

## TASK ORDER

TASK ORDER # 3

CONSULTANT BAE Systems

ACCOUNT #

CONTRACT R2011-2053

COUNTY PROJECT MANAGER Kelly Ratchinsky PHONE 233-5321

PROJECT NAME Eastern Area Digital Elevation Model Updates

LOCATION Palm Beach County East

TASK DESCRIPTION Updates and repairs to current model.

DELIVERABLES +/- See Attached DUE DATE January 31, 2016

TASK ORDER TYPE Lump Sum RETAINAGE 10%

TOTAL AMOUNT \$12,500

PROJECT MANAGER   
Kelly Ratchinsky


DATE 1/7/16

CONSULTANT

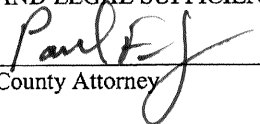
  
Printed Name/Title: KEN W. MARTIN - CONTRACTS


DATE 1/5/16

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

BAE Systems  
124 Gaither Drive, Suite 100  
Mount Laurel, NJ 08054  
(856) 793-4316

**BAE SYSTEMS**

August 17, 2015

Palm Beach County  
301 N. Olive Ave., 4<sup>th</sup> Floor  
West Palm Beach, FL  
Attn: Kelly Ratchinsky  
Director Platform Services

*Reference – 2015 Palm Beach County Orthophoto Project (Eastern Half of County)*

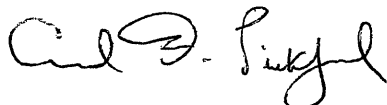
Dear Mr. Ratchnisky,

BAE Systems would like to request additional funding in the amount of \$12,500. This stems from our Scope of Work dated November 10, 2014. This was an additional/optional line cost item. In our Scope of Work, we state that BAE Systems will have to utilize this additional line item cost if the County supplied DEM is not suitable to meet the required project accuracies. We had to exhaust the \$12,500 to fix, repair and edit the existing DEM to make sure it meets the accuracies of the current project.

We are kindly asking the County to exercise this additional cost for this effort. Please feel free to contact me if you have any questions or concerns.

Thank you very much and we look forward to continuing our successful working relationship with Palm Beach County.

Sincerely,  
**BAE Systems**



Andrew F. Pickford, CP, GISP  
Business Development Manager



**Palm Beach County**

**Florida**

**2015 Palm Beach County Orthophoto Project**  
**(Eastern Half of County)**  
***REVISED***

**Scope of Work**

November 10, 2014

**Provided by BAE SYSTEMS**

**BAE SYSTEMS**

---

November 10, 2014

Mr. Kelly Ratchinsky  
Director Platform Services  
Palm Beach County  
301 N. Olive Avenue, 4<sup>th</sup> Floor  
West Palm Beach, FL 33401

Reference: 2015 Palm Beach County Orthophoto Project (Eastern Half of County)

Dear Mr. Ratchinsky,

BAE SYSTEMS is pleased to submit this proposal for providing Color Digital Orthophotography for the eastern half of Palm Beach County. This proposal is based on the mapping boundary in Exhibit A sent by the County via e-mail.

All of the products and services described below will be completed under the direct supervision of our Florida PSM, certified photogrammetrists, GIS professionals 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 based on percent complete.

#### **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. Flight will be done using digital cameras incorporating ABGPS receivers and an IMU as integrated components of the system. Other factors during aerial photography acquisition include:

- 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 images, beyond the project limits.

This new digital imagery will consist of (30) flight lines and (3,438) exposures for the .5' imagery.

November 10, 2014

Mr. Kelly Ratchinsky  
Director Platform Services  
Palm Beach County  
301 N. Olive Avenue, 4<sup>th</sup> Floor  
West Palm Beach, FL 33401

Reference: 2015 Palm Beach County Orthophoto Project (Eastern Half of County)

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- Extend all photography two full images, beyond the project limits.

This new digital imagery will consist of (30) flight lines and (3,438) exposures for the .5" imagery.

**Survey Control**

Palm Beach County Geodetic Survey will establish (12) new horizontal & vertical ground control target locations. In addition, BAE SYSTEMS will utilize the existing geodetic control network that is already in place for the County as best as possible. We also understand that all control is referenced horizontally to the Florida State Plane Coordinate System (East Zone) in NAD83/90, vertically to the NGVD29 datum, and will be performed by a Florida Registered Professional Land Surveyor.

**Analytical Triangulation**

We will perform softcopy analytical triangulation to extend and densify the ground control survey points, and establish orientation parameters for each image. Softcopy analytical triangulation is an entirely digital process. 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**

BAE SYSTEMS will receive and utilize the existing DEM that is already in place for the County. The County states: "we believe that our DEM surface, provided to you for this project, will support this accuracy." If the preceding statement does prove to be true, BAE Systems will provide DEM repair/updates and will have to enact the additional / optional line item below our base cost on page 5 of this Scope of Work and an Addendum will have to be issued by the County.

**Digital Orthophotography**

Digital orthorectification will include a spatial and radiometric transformation from line / sample space into the specified ground coordinate system. Inputs into the orthorectification process are the digital 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 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.

Color and tone will be defined during the Pilot phase of this project. The final output will be at a 1" = 100' for the .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 tile 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.

**Project Accuracies**

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.”

Therefore, for this project, 1/30 of an inch at publication scale equates to  $\pm 3.33'$  for the  $1" = 100'$  maps. We understand that the County believes that their DEM surface, supplied to us for this project, will support this accuracy. We understand that this DEM in combination with our survey control plan must meet the above stated NMAS accuracy.

### 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.

### Delivery Items

- Finalize the flight line layout maps and submit to the County for approval
- Prepare and submit the final flight line map in ArcInfo format
- All tiles will be delivered in World geoTIFF format and delivered on external hard drive.
- 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. (Exhibit B)
- Submit imagery to FDOR per FDOR specifications as outlined in the following document:  
<ftp://sdrftp03.dor.state.fl.us/Map%20Data/00%20Mapping%20Data%20Information/AerialPhotographyContract.pdf>  
Charles Russell, CFE  
Property Tax Oversight  
Room 2-3200  
2450 Shumard Oak Blvd.  
Tallahassee, Florida 32399-0126  
Tel: (850) 617-8867  
Fax: (850) 617-6113  
[russellc@dor.state.fl.us](mailto:russellc@dor.state.fl.us)

“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.”

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Charles Russell, CFE  
Property Tax Oversight  
Room 2-3200  
2450 Shumard Oak Blvd.  
Tallahassee, Florida 32399-0126  
Tel: (850) 617-8867  
Fax: (850) 617-6113  
[russellc@dor.state.fl.us](mailto:russellc@dor.state.fl.us)

**Project Schedule**

Based on the timing of the Task Order approval, BAE Systems will work with Palm Beach County to develop a mutually agreeable project delivery schedule.

**Total Project Base Costs**

New Digital Photography	\$ 48,593
Project Management	\$ 25,239
Analytical Triangulation	\$ 26,377
Digital Orthophotography	<u>\$ 64,079</u>
<b>TOTAL</b>	<b>\$ 164,288</b>

**Additional / Optional Line Item Costs**

- |                               |           |
|-------------------------------|-----------|
| 1) New Ground Control Surveys | \$ 3,053  |
| 2) DEM Repair / Updates       | \$ 12,500 |

BAE Systems will have to utilize the optional / additional line item costs above for Item 1) if the County is unable to provide the new Ground Control Surveys and Item 2) if the County supplied DEM is not suitable to meet the required project accuracies. An addendum will have to be issued by the County.

**Payment Terms**

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

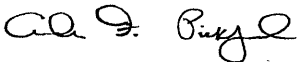
**Insurance Coverage**

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 (office), (215) 499-0983 (cell), or [andrew.pickford@baesystems.com](mailto:andrew.pickford@baesystems.com)

Very Truly Yours,

BAE SYSTEMS



Andrew F. Pickford, CP, GISP  
Business Development Manager