

# **NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT**

## ***PROJECT SC1501-CS-N***

### ***Port of Georgetown, South Carolina***

#### **Introduction**

Coastal Mapping Program (CMP) Project SC1501-CS-N provides highly accurate digital shoreline data for key areas of change within the Port of Georgetown and Winyah Bay, South Carolina. The Geographic Cell (GC) may be used in support of the NOAA Nautical Charting Program (NCP) as well as geographic information systems (GIS) for a variety of coastal zone management applications.

#### **Project Design**

The design of Project SC1501-CS-N was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for expedited updates to the NOAA chart suite in key ports. Project requirements were formulated as a result of analysis conducted within the Coast and Shoreline Change Analysis Program (CSCAP), in which NOAA nautical chart products are compared to contemporary high resolution imagery in order to ascertain the need for more current shoreline data. Orthomosaics from aerial photography were utilized for the CSCAP analysis. A Chart Evaluation File (CEF) was forwarded to the Applications Branch (AB) of RSD once the change analysis was complete. Refer to the RB CSCAP memorandum of March 20, 2015 for details of the chart comparison process.

#### **Field Operations**

Field operations consisted of the collection of static and kinematic Global Positioning System (GPS) data and Inertial Measurement Unit (IMU) data, and the acquisition of aerial imagery. Aerial survey operations were conducted on January 17, 2015 with the NOAA King Air (N68RF) aircraft. A total of six strips of digital RGB (color) images were acquired (113 images) with an Applanix DSS-439 medium format digital camera at a nominal altitude of 10,500 feet.

#### **Direct Georeferencing Data Processing**

GPS/IMU data were processed by RSD personnel to yield precise camera positions and orientations for direct georeferencing (DG) of the imagery. A nearby CORS station (KNS6) was used as a reference station for kinematic GPS processing operations. The airborne kinematic data was processed using Applanix POSPac MMS 6.2 software in February 2015. For further information refer to the Airborne Positioning and Orientation Reports (APOR) on file with other project data within the AB Project Archive.

The processed GPS/IMU data were used to derive precise exterior orientation (EO) values of the camera centers required for digital feature extraction. The predicted

horizontal accuracy of the imagery was determined by propagating sensor EO and image measurement uncertainties through the photogrammetric collinearity equations using an Excel spreadsheet based EO Total Propagated Uncertainty (TPU) tool developed by NGS. Using this tool, the predicted horizontal uncertainty at the 95% confidence level was calculated to be 1.0 meters.

NGS third order geodetic control points were used to test the horizontal integrity of the DG data. Image measurements were made within the orthomosaics used in the CSCAP analysis.

## **Compilation**

The data compilation phase of this project was accomplished by a member of the RSD Applications Branch (AB) in October 2015. Digital feature data was compiled in Esri shapefile format from the orthomosaics utilized in the CSCAP analysis, using Esri's ArcGIS (ver. 10.2.2) desktop GIS software. Feature attributes were established using the Coastal Cartographic Object Attribute Source Table (C-COAST), which provides the definition and attribution scheme for the full range of cartographic features pertinent to the CMP.

Spatial data accuracies for Project SC1501-CS-N were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features extracted from the orthomosaics were compiled to meet a horizontal accuracy of 2.0 meters at the 95% confidence level. This predicted accuracy of compiled, well-defined points is derived by doubling the horizontal uncertainty value derived from the DG data.

The following table provides information on the imagery used to complete this project:

<b>Date</b>	<b>Time (UTC)</b>	<b>Roll #</b>	<b>Strip / Frame #s</b>	<b>Orthomosaic Resolution</b>	<b>Tide Level</b>
1/17/2015	14:52 – 14:56	15NC02	53-001 / 114-139	0.5 m	n/a
1/17/2015	15:01 – 15:05	15NC02	53-002 / 140-164	0.5 m	n/a
1/17/2015	15:09 – 15:13	15NC02	53-003 / 165-189	0.5 m	n/a
1/17/2015	15:19 – 15:20	15NC02	53-004 / 190-198	0.5 m	n/a
1/17/2015	15:26 – 15:28	15NC02	53-006 / 199-211	0.5 m	n/a
1/17/2015	15:32 – 15:35	15NC02	53-005 / 212-226	0.5 m	n/a

## **Quality Control / Final Review**

The final QC review was completed in October 2015 by a senior member of RSD. The review process included analysis of the direct georeferencing results, and assessment of the identification and attribution of digital feature data within the GC according to image analysis and criteria defined in C-COAST. The quality control process concluded with an inspection of topological connectivity within the GC using ArcGIS software. The entire suite of project products was evaluated for compliance to CMP requirements.

## **End Products and Deliverables**

The following specifies the location and identification of end products generated during the completion of this project:

### **Remote Sensing Division Electronic Data Library**

- GC11181 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format
- Digital copy of the Acquisition Summary
- Digital copy of Airborne Positioning and Orientation Report (APOR)

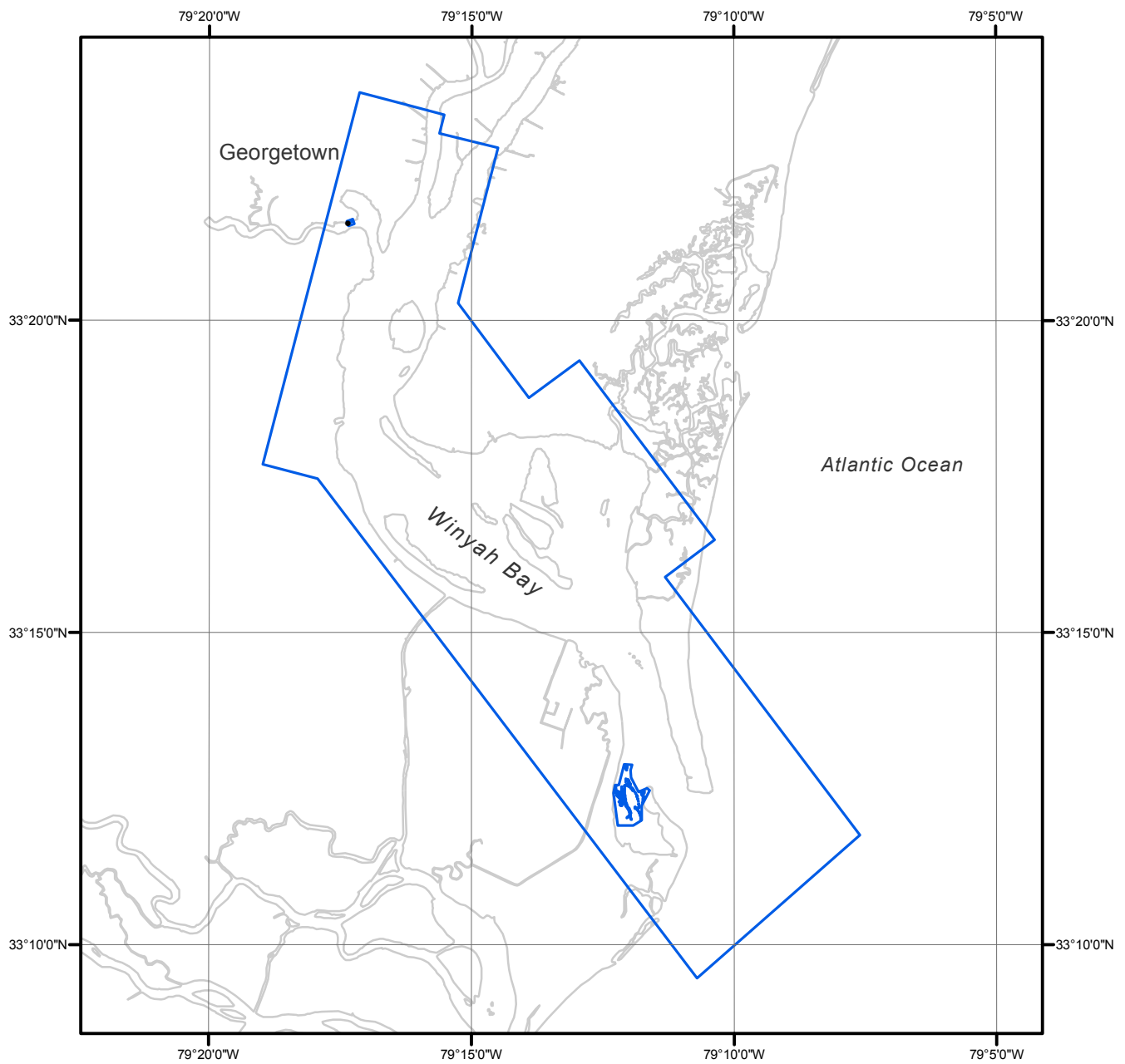
### **NOAA Shoreline Data Explorer**

- GC11181 in shapefile format
- Metadata file for GC11181
- Digital copy of the PCR in Adobe PDF format

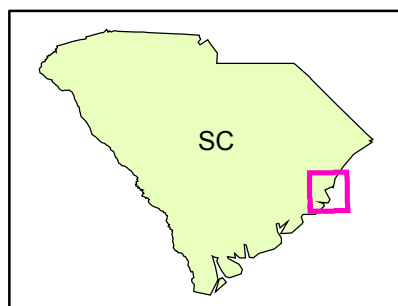
## **End of Report**

# PORT OF GEORGETOWN

## SOUTH CAROLINA



Overview



SC1501-CS-N

GC11181