

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT GA1002

Port of Savannah, Georgia

Introduction

Coastal Mapping Program (CMP) Project GA1002 provides highly accurate digital shoreline data for key areas of change for the port of Savannah in the Savannah River, Georgia. 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 GA1002 was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for updates to the NOAA Electronic Navigational Chart (ENC) series. 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 25, 2010 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 October 25, 2009 with the NOAA Citation (N52RF) aircraft. A total of six strips of RGB (color) and black/white infrared (IR) imagery were acquired (272 images) utilizing an Applanix DSS-439 dual camera system (two 60mm lenses) at a nominal altitude of 10,000 feet, resulting in an approximate ground sample distance (GSD) of 0.35 m. The IR imagery was not used for this project. Though not strictly coordinated with local tides, the goal was to acquire all photographs at a stage of tide below Mean High Water (MHW).

GPS Data Reduction

GPS/IMU data was collected and processed by RSD personnel to yield precise positions and orientations of camera centers for application as photogrammetric control in the aerotriangulation phase. A local GPS base station was established for use as a reference station for kinematic GPS processing operations. The position of the base station was determined using the NGS Online Processing User Service (OPUS), which computed fixed baseline solutions from nearby CORS stations. The airborne kinematic data was

processed in June 2011 using POSPAC ver. 5.3. For further information refer to the Airborne Positioning and Orientation Report (APOR), on file with other project data within the RSD AB Project Archive.

Aerotriangulation

Routine softcopy aerotriangulation (AT) methods were applied to establish the network of precise camera positions as control for mapping, and to provide model parameters and orientation elements required for digital compilation. This work was completed by AB personnel in April 2013 utilizing a softcopy photogrammetric workstation. The color images were measured and adjusted as a single block using BAE Systems' SOCET SET (ver. 5.6) photogrammetric software in conjunction with the Multi-Sensor Triangulation (MST) module. Upon completion of the AT process, the simultaneous solve tool within MST provided the standard deviations for each aerotriangulated ground point, which were used to compute a predicted horizontal circular error of 0.5 meters based on a 95% confidence level. An AT Report was written and is on file with other project data within the RSD project archive. Positional data is based on the UTM Coordinate System (zone 17), and referenced to the North American Datum of 1983.

Compilation

The data compilation phase of this project was accomplished by a member of AB in July 2013. Digital mapping was performed using a DPW in conjunction with the SOCET SET (ver. 5.6) Feature Extraction module. Feature identification and attribution within the GC were based on analysis of the digital imagery and information extracted from the appropriate NOAA nautical chart products and other ancillary sources. Feature attribution was assigned in compliance with 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. Selected features were further modified with additional descriptive information to refine general classification.

Spatial data accuracies for Project GA1002 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 1.0 meter at the 95% confidence level. This value was derived by doubling the circular error computed from the AT statistics in order to conservatively predict the accuracy of compiled well defined points.

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

Date	Time (UTC)	Roll #	Strip / Frame #s	~GSD	Tide Level*
10/25/2009	13:57-14:02	09NC13	50-005 / 4235-4267	0.35 m	0.9-1.0 m
10/25/2009	14:07-14:09	09NC13	50-006 / 4268-4281	0.35 m	1.1 m
10/25/2009	14:11-14:13	09NC13	50-003 / 4282-4295	0.35 m	1.0 m
10/25/2009	14:18-14:21	09NC13	50-002 / 4296-4317	0.35 m	0.9-1.2 m
10/25/2009	14:26-14:29	09NC13	50-001 / 4318-4336	0.35 m	0.9-1.2 m
10/25/2009	14:36-14:41	09NC13	50-004 / 4337-4370	0.35 m	1.2-1.3 m

* Tide levels are given in meters above MLLW and are based on actual observations recorded by the NOS gauge at Fort Pulaski, GA with corrections applied to various substations throughout the project area. The height of the MHW tidal datum in the project area ranges from 2.2 to 2.4 m above MLLW.

Quality Control / Final Review

The final QC review was completed in July 2013 by a senior member of RSD. The review process included analysis of the AT 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 9.3 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:

RSD Applications Branch Archive

- Hardcopy of the Airborne Positioning and Orientation Report (APOR)
- Hardcopy of the Aerotriangulation Report
- Hardcopy of the Project Completion Report (PCR)
- Page size graphic plot of GC10971 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

Remote Sensing Division Electronic Data Library

- GC10971 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

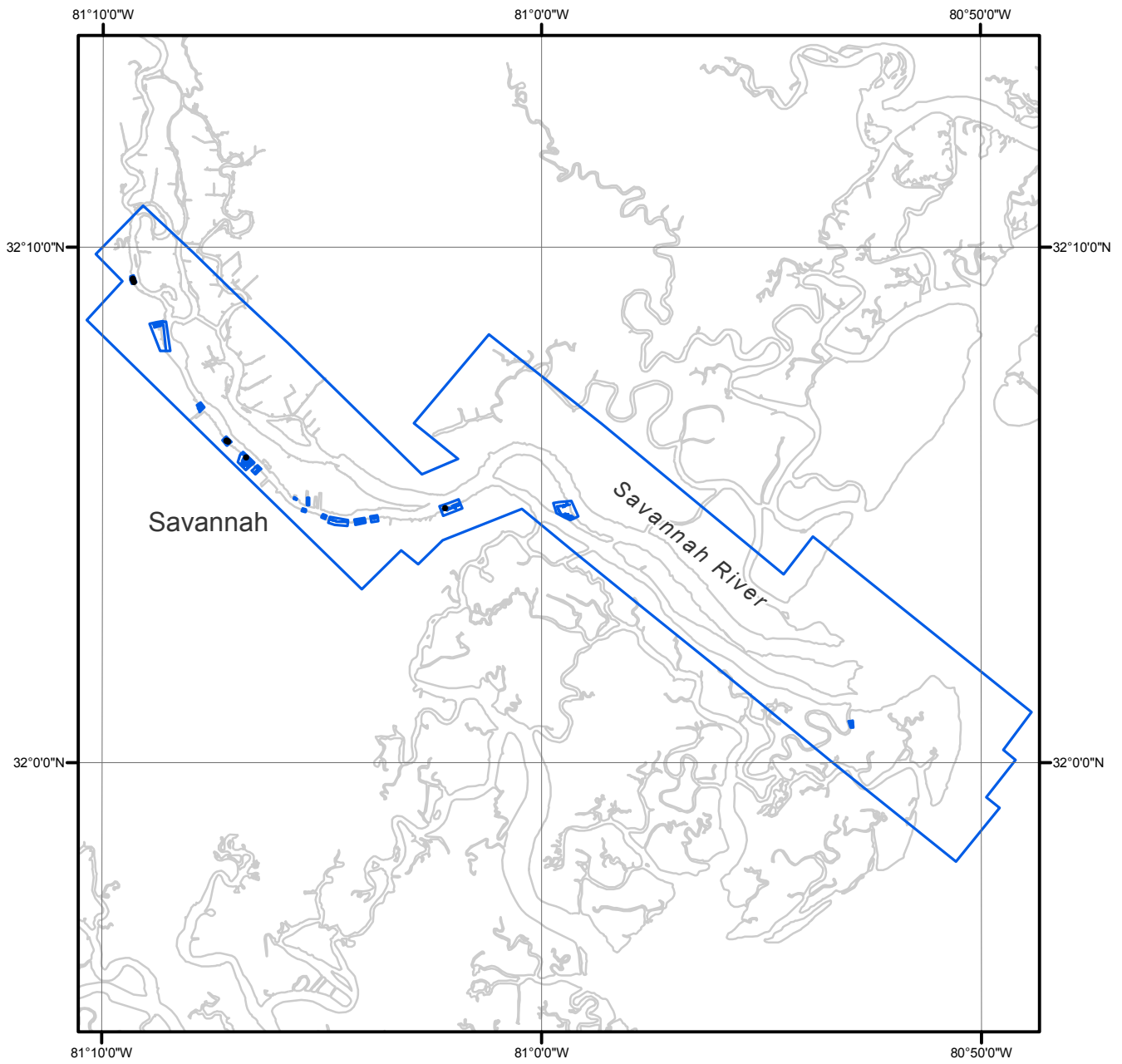
NOAA Shoreline Data Explorer

- GC10971 in shapefile format
- Metadata file for GC10971
- Digital copy of the PCR in Adobe PDF format

End of Report

PORT OF SAVANNAH

GEORGIA



Overview



GA1002

GC10971