

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT FL0903A-CM-N

South Amelia River, Nassau Sound to Crane Island, Florida

Introduction

NOAA Coastal Mapping Program (CMP) Project FL0903A-CM-N provides a highly accurate digital shoreline data for South Amelia River, from Nassau Sound to Crane Island, and is a subproject of a larger project, FL0903-CM-N which extends from Amelia Island to Coon Key, in Florida. 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

Project FL0903-CM-N was designed by the Requirements Branch (RB) of the Remote Sensing Division (RSD) formulated the photographic mission instructions for this project following the guidelines of the Photo Mission Standard Operating Procedures. The instructions discussed the project's purpose, geographic area of coverage, scope and priority, image requirements, flight line priority, Global Positioning System (GPS) data collection procedures and guidelines, instructions for data recording and handling, and contact and communication information. RB created a Project Layout Diagram, flight maps and input files for the aircraft flight management system.

Field Operations

The field operations for the FL0903-CM-N project consisted of the collection of static and kinematic GPS data and Inertial Measurement Unit (IMU) data, the acquisition of natural color (RGB) and near-infrared (NIR) digital aerial imagery, and ground surveys performed by TerraSurv, Inc., a subcontractor to Fugro Geospatial, Inc.

Aerial survey operations included the acquisition of nine strips of RGB and NIR imagery at both the MLLW and MHW tide stages, and five strips of RGB and NIR imagery collected below the MHW tide stage. Only portions of seven of the MHW and MLLW tide-coordinated strips were used for the FL0903A-CM-N subproject. The images were acquired using the DSS-439 camera system in 2010 through 2012. All aerial imagery acquisition was accomplished with NOAA's King Air aircraft (N68RF) flying at an altitude of 10,000 feet. Please refer to the FL0903 Acquisition Summary report for additional information and specific dates concerning the aerial survey operations.

Fugro was contracted by NGS to perform field operations limited to the surveying of ground control points (GCPs) and check points (CPs). The National Spatial Reference System (NSRS) was used to provide control for the network. As a subcontractor to Fugro, TerraSurv Inc. established 14 photo identifiable survey points in November 2017. Of the 14 collected points, 9

were successfully located and used as ground control in the final block adjustments, and 4 were successfully located and used as check points. Refer to TerraSurv's [FL0903-FL1421 Report of Survey](#) for more information on ground survey operations.

GPS Data Processing

All GPS/IMU data processing tasks were completed by NGS and the final processed data was supplied to Fugro Geospatial, Inc. GPS and IMU data were collected and processed by RSD personnel to yield precise positions and orientations of camera centers as a means of rendering accurately georeferenced digital images. For further information refer to the multiple Airborne Positioning and Orientation Reports (APOR) on file within the RSD Electronic Data Library.

Aerotriangulation

Fugro Geospatial, Inc. performed routine softcopy aerotriangulation (AT) methods that were applied to establish the network of precise camera positions and other control for mapping, and to provide model parameters and orientation elements required for digital compilation. The RGB and NIR images were measured and adjusted as two separate blocks. This work was completed in March 2018 using a softcopy photogrammetric workstation. The softcopy system hardware consisted of a high-end Dell Precision Workstation with the Windows 7 Professional operating system, and stereo viewing capability. SOCET SET (ver. 5.6) was used for project setup, point measurement, and AT.

Upon successful completion of the AT process, the overall RMS data for all of the adjusted ground point's standard deviations (both x & y) were used to compute a predicted horizontal circular error (95% confidence level) of 0.27 meters for the RGB adjusted block solution and 0.25 meters for the NIR solution.

The project database consists of project parameters and options, camera calibration data, interior orientation parameters, ground control parameters, adjusted exterior orientation parameters, and positional listing of all measured points. Positional data is referenced to the North American Datum of 1983 (NAD83). An AT Report was completed and is on file with other project data within the RSD Electronic Data Library.

Compilation

The compilation for FL0903A-CM-N was done by Fugro, Inc. in May of 2018. Digital mapping was performed using SOCET SET (ver. 5.6) stereo softcopy workstations with the SOCET for ArcGIS module and ArcGIS (ver. 10.3). Feature identification and attribution within the GC were based on image analysis of project photographs and information extracted from the appropriate NOAA nautical charts, US Coast Guard Light List 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 FL0903A-CM-N were determined according to standard Federal Geographic Data Committee (FGDC) practices. The cartographic features were compiled to meet a horizontal accuracy of 0.5 meters at the 95% confidence level. This predicted

accuracy of compiled, well-defined points is derived by doubling the circular error derived from AT statistics.

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

Date	Time (UTC)	Color Imagery		Infrared Imagery		Tide Level*
		Roll	Strip/Images	Roll	Images	
4/2/2010	20:50 – 20:54	10NC42	50-001 / 17855 – 17885	10NR33	15251 – 15281	0.0
4/2/2010	21:01 – 21:06	10NC42	50-002 / 17898 – 17928	10NR33	15294 – 15324	0.0 – 0.1
4/2/2010	21:28 – 21:33	10NC42	50-003 / 17966 – 17996	10NR33	15362 – 15392	-0.1 – 0.1
3/17/2011	18:38 – 18:39	11NC09	50-007 / 2094 – 2101	11NR01	0010 – 0017	-0.2 – -0.1
3/17/2011	18:49 – 18:51	11NC09	50-006 / 2130 – 2139	11NR01	0046 – 0055	-0.1 – 0.0
3/17/2011	18:59 – 19:01	11NC09	50-005 / 2157 – 2169	11NR01	0073 – 0085	-0.1 – 0.0
3/19/2011	13:33 – 13:37	11NC10	50-001 / 2192 – 2222	11NR02	0108 – 0138	1.6 – 1.7
3/21/2011	14:54 – 14:59	11NC11	50-002 / 2256 – 2286	11NR03	0172 – 0202	1.6 – 1.8
3/22/2011	15:36 – 15:37	11NC12	50-007 / 2340 – 2347	11NR04	0256 – 0263	1.5 – 1.9
3/22/2011	16:40 – 16:42	11NC12	50-005 / 2366 – 2378	11NR04	0282 – 0294	1.4 – 1.8
3/22/2011	16:51 – 16:53	11NC12	50-006 / 2413 – 2422	11NR04	0329 – 0338	1.3 – 1.8
3/23/2011	16:25 – 16:30	11NC13	50-003 / 2441 – 2471	11NR05	0357 – 0387	1.3 – 1.7
3/23/2011	16:36 – 16:40	11NC13	50-004 / 2484 – 2514	11NR05	0400 – 0430	1.3 – 1.8
1/20/2012	16:21 – 16:25	12NC03	50-004 / 0505 – 0535	12NR02	0164 – 0194	0.1 – 0.2

* Tide levels are given in meters above MLLW and were calculated using the Pydro software tool with a TCARI grid referenced to verified water level observations at the time of photography from various NOS gauges in the vicinity of the project. The elevation of the MHW tidal datum in the project area varies between 0.90 – 1.99 meters above MLLW.

Quality Control / Final Review

Quality Control tasks were conducted during all phases of project completion by a senior member of the Fugro compilation team. The final QC review was completed in June 2018. The review process included analysis of 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 software. All project data was evaluated for compliance to CMP requirements.

Comparisons of the largest scale NOAA nautical charts with natural color photographs and compiled project data resulted in creation of the Chart Evaluation File (CEF). The following nautical charts were used in the comparison process for FL0903A-CM-N:

- 11488, Amelia Island to St. Augustine, FL, 29th Ed., Oct. 2017
- 11489, St. Simons Sound, GA to Tolomato River, FL, 41st Ed., Oct. 2019

End Products and Deliverables

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

Remote Sensing Division Electronic Data Library

- Ground Survey Report
- Airborne Positioning and Orientation Reports (APOR)
- AT Report
- Project database
- GC11335 in shapefile format
- Project Completion Report (PCR)
- CEF in shapefile format

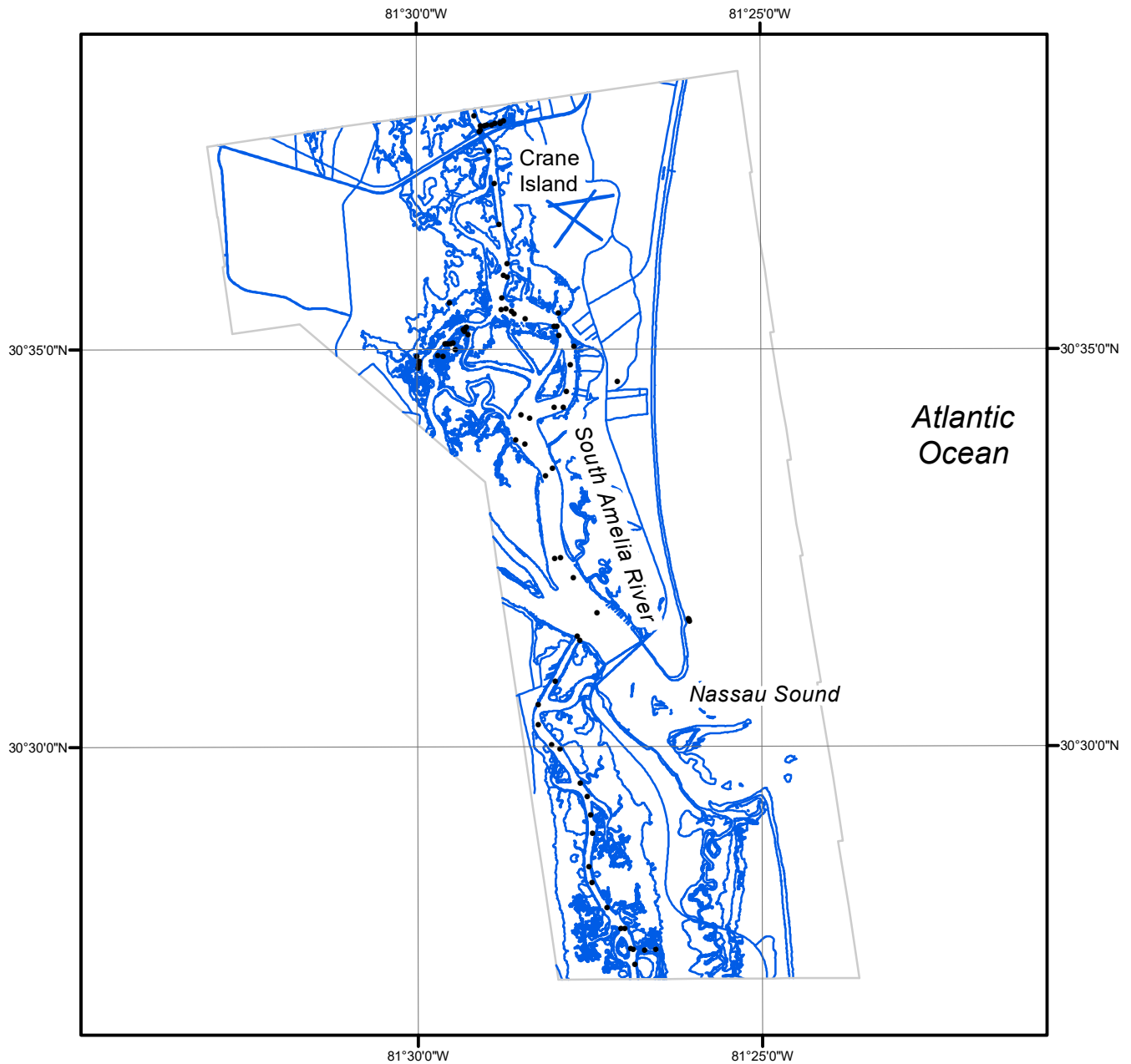
NOAA Shoreline Data Explorer

- GC11335 in shapefile format
- Metadata file for GC11335
- PCR in Adobe PDF format

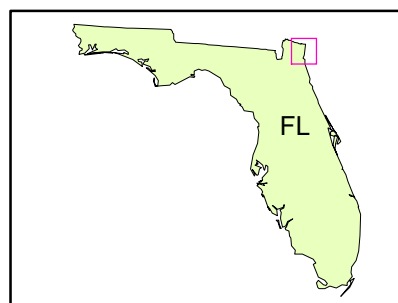
End of Report

SOUTH AMELIA RIVER, NASSAU SOUND TO CRANE ISLAND

FLORIDA



Overview



FL0903A-CM-N

GC11335