

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT FL1417A-CM-N

Port of Sanford, Florida

Introduction

NOAA Coastal Mapping Program (CMP) Project FL1417A-CM-N provides highly accurate digital shoreline data for the Port of Sanford, on the St Johns River, to the western end of Lake Monroe. FL1417A-CM-N is a subproject of a larger project, FL1417-CU-N which provides coverage of Crescent Lake and the St Johns River south to Lakes Harney and Jesup. 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 FL1417-CU-N was designed by the Requirements Branch (RB) of the Remote Sensing Division (RSD). Photographic mission instructions were formulated 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, Global Positioning System (GPS) data collection procedures and guidelines, instructions for data recording and handling, and mission communication protocols. RB created a project layout diagram, flight maps and input files for the aircraft flight management system.

Field Operations

The field operations for Project FL1417-CU-N consisted of the collection of static and kinematic GPS and Inertial Measurement Unit (IMU) data, and the acquisition of digital aerial imagery. Aerial survey operations were conducted on February 10, 2014 with the NOAA King Air aircraft (N68RF). Project imagery for subproject FL1417A-CM-N included two flight lines of natural color and near-infrared (NIR) imagery acquired concurrently using an Applanix DSS-439 camera system. All imagery was acquired at a nominal altitude of 10,500 feet, resulting in an approximate ground sample distance (GSD) of 0.37 meters.

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 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 using Applanix POSPac MMS (ver. 6.2) software in April 2014. For further information refer to the Airborne Positioning and Orientation Report (APOR) that is on file with other project data within the RSD Electronic Data Library.

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 Exterior Orientation Total Propagated Uncertainty (EO-TPU) tool developed by NGS. Using this tool, the predicted horizontal uncertainty at the 95% confidence level was calculated to be 1.5 meters.

Compilation

The data compilation phase of this project was accomplished by RSD AB personnel in August 2016. Digital mapping was performed using the Feature Extraction software module within SOCET SET (ver. 5.6). Feature identification and attribution within the GC were based on image analysis of the aerial imagery and information extracted from the largest scale NOAA nautical chart 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 FL1417A-CM-N were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 3.0 meters. This predicted accuracy of well-defined points measured during the compilation phase was derived by doubling the imagery accuracy computed from the EO-TPU tool.

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

Date	Time (UTC)	Roll #	Photo #s	Tide Level*
2/10/2014	18:29 – 18:30	14NC26	6466 – 6472	n/a
2/10/2014	18:29 – 18:30	14NR18	3366 – 3372	n/a
2/10/2014	18:52 – 18:53	14NC26	6553 – 6559	n/a
2/10/2014	18:52 – 18:53	14NR18	3453 – 3459	n/a

* Astronomic tides are negligible in this part of the St. Johns River and Lake Monroe.

Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a member of the Applications Branch. The final QC review was completed in August 2016. The review process included analysis of the DG 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 10.2.2 software. All project data was evaluated for compliance to CMP requirements.

Comparisons of the largest scale NOAA nautical charts with source imagery and compiled project data resulted in creation of the Chart Evaluation File (CEF). The following nautical chart was used in the comparison process:

11498, St. Johns River – Lake Dexter to Lake Harney, 1:40,000, 18th Ed., Nov. 2013

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

- Airborne Positioning and Orientation Report (APOR)
- Project Completion Report (PCR)
- Project database
- GC11252 in shapefile format
- Chart Evaluation File in shapefile format

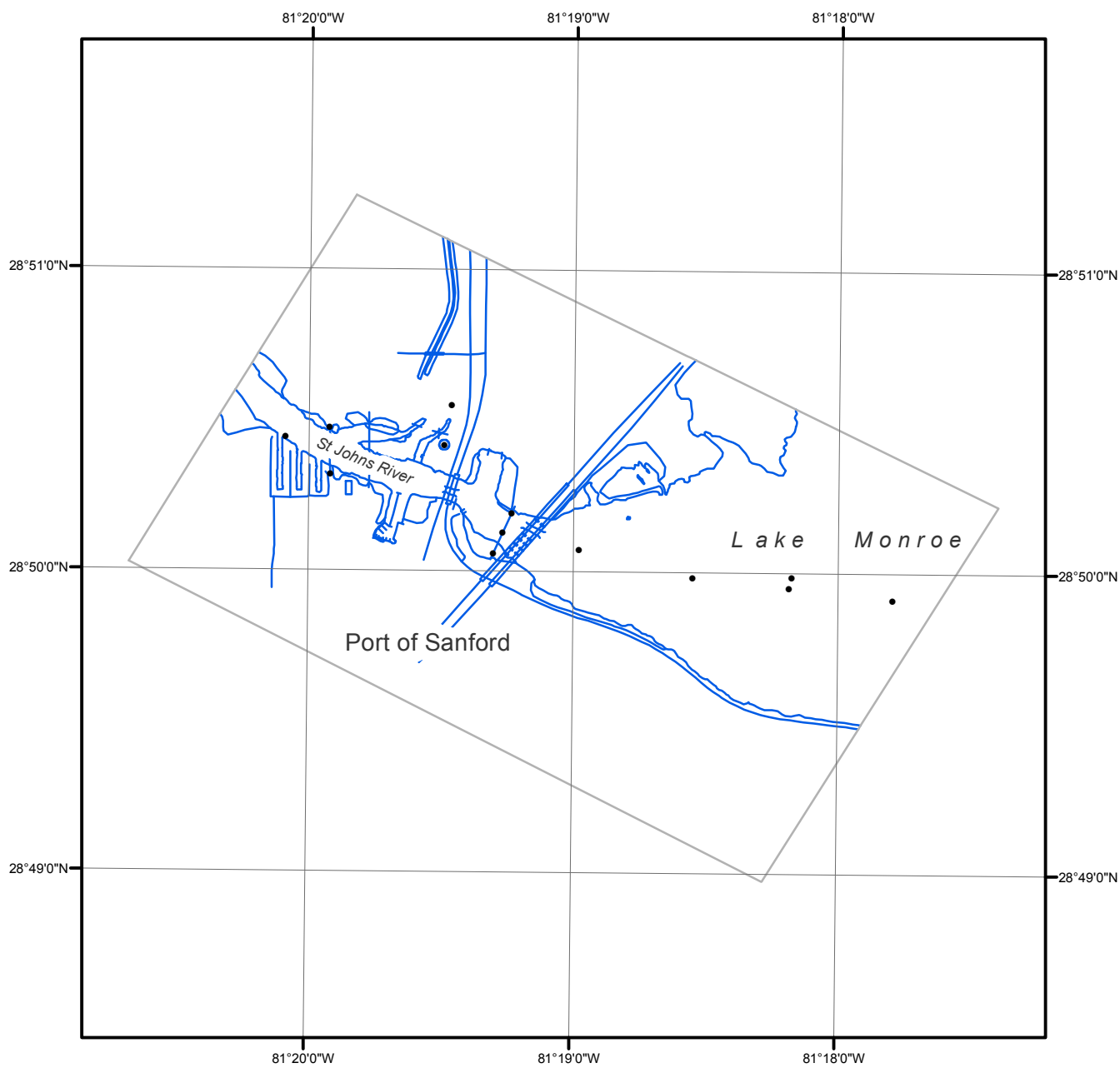
NOAA Shoreline Data Explorer

- GC11252 in shapefile format
- Metadata file for GC11252
- Digital copy of the PCR

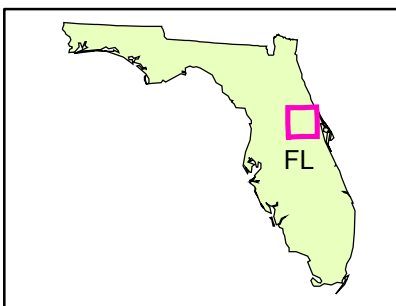
End of Report

PORT OF SANFORD

FLORIDA



Overview



FL1417A-CM-N

GC11252