NOAA COASTAL MAPPING PROGRAM
PROJECT COMPLETION REPORT

PROJECT FL2004C-CS-N

Port Manatee, Florida

Introduction

Coastal Mapping Program (CMP) Project FL2004C-CS-N provides highly accurate digital shoreline data for key areas of change within Port Manatee, 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

The design of Project FL2004C-CS-N 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 imagery in order to ascertain the need for more current shoreline data. A Chart Evaluation File (CEF) was forwarded to the Applications Branch (AB) of RSD once the change analysis was complete. Refer to the change analysis memorandum for Project FL2004C-CS-N for details of the chart comparison process.

Field Operations

The 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. Digital images utilized for this project were acquired with the NOAA King Air aircraft in November 2019 and January 2020 using an Applanix Digital Sensor System (DSS) 580/560 dual camera at a nominal altitude of 10,500 feet, resulting in an approximate ground sample distance (GSD) of 0.32 meters for project imagery. Although color and near infrared (NIR) imagery was acquired in tandem, only the color imagery was used for this project. The collection of imagery was loosely coordinated to occur below the Mean High Water (MHW) stage of tide.

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. Airborne kinematic data was processed in November 2019 and February 2020 using Applanix POSPac MMS (ver. 8.4) software, utilizing the IN-Fusion PP-RTX processing mode, which is an implementation of Trimble's *CenterPoint RTX* GNSS correction service. For further information refer to the Airborne Positioning and Orientation Reports (APOR) 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. Image accuracy for this project was

determined by propagating sensor EO and image measurement uncertainties through the photogrammetric collinearity equations using an 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 range from 0.91 to 1.05 meters. Positional data is referenced to the North American Datum of 1983 (NAD83).

Compilation

Data compilation for this project was accomplished by a member of AB in February 2020. Digital feature data was compiled from the orthomosaics used for CSCAP analysis using Esri's ArcGIS (ver. 10.7.1) desktop GIS software. 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.

Spatial data accuracies for Project FL2004C-CS-N were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 2.1 meters at the 95% confidence level. This predicted accuracy of compiled well-defined points measured during compilation was derived by doubling the horizontal uncertainty calculated from the EO-TPU tool.

The following table provides information on the images used in the project completion:

Date	Time (UTC)	Roll #	Flight Line / Photo #s	Tide Level*
11-Nov-2019	14:41 – 14:43	19VC59	62-005 / 19688 – 19696	0.6 m
16-Jan-2020	17:51 – 17:53	20VC06	62-006 / 1691 – 1700	0.2 m

* Tide levels are given in meters above MLLW and are based on verified observations at the Port Manatee, FL reference station (#8726384). The elevation of MHW in the project area is 0.58 meters above MLLW.

Quality Control / Final Review

The final review of the project was completed by a senior member of RSD in July 2020, and included analysis of DG data 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 Esri's ArcGIS. All project data 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 Electronic Data Library

- CSCAP evaluation memorandum
- Airborne Positioning and Orientation Report (APOR)
- GC11642 in shapefile format
- Project Completion Report (PCR)
- CEF in shapefile format

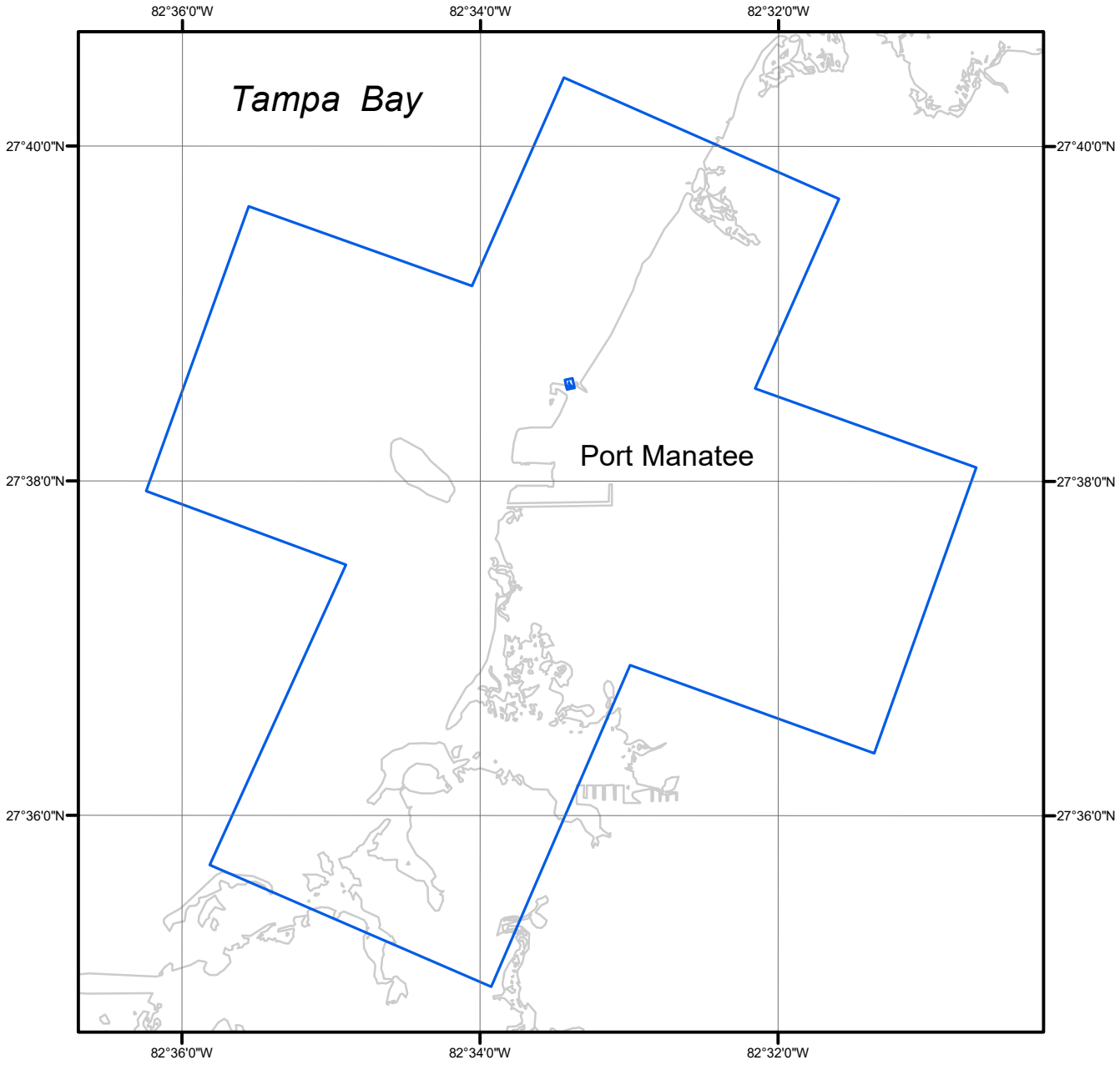
NOAA Shoreline Data Explorer

- GC11642 in shapefile format
- Metadata file for GC11642
- PCR in Adobe PDF format

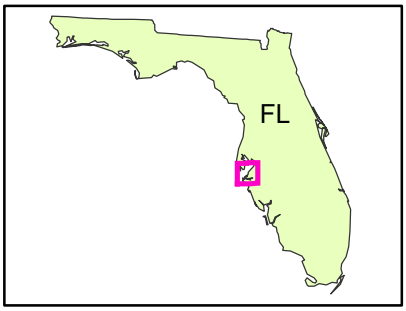
End of Report

PORT MANATEE

FLORIDA



Overview



FL2004C-CS-N

GC11642