

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT FL1602A-CM-N

St. Andrew Bay, North and West Bays, Florida

Introduction

NOAA Coastal Mapping Program (CMP) Project FL1602A-CM-N provides a highly accurate database of new digital shoreline data for a portion St. Andrew Bay, and in particular North and West Bays, in Florida. Project FL1602A-CM-N is a subproject of a larger acquisition project, FL1602-CM-N, designed to provide coverage of all of St. Andrew Bay. 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 FL1602-CM-N was designed by the Requirements Branch (RB) of the Remote Sensing Division (RSD). RB 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, Global Positioning System (GPS) data collection procedures and guidelines, instructions for data recording and handling, and mission communication protocols. RB also created a Project Layout Diagram, flight maps and input files for the aircraft flight management system.

Field Operations

The field operations consisted of the collection of static and kinematic GPS data and Inertial Measurement Unit (IMU) data, and the acquisition of digital aerial imagery. Aerial survey operations were conducted in February 2017 for MLLW and April 2017 for MHW, using the NOAA King Air aircraft (N68RF). Project imagery, consisting of four flight lines each of natural color and near-infrared (NIR) imagery, were acquired concurrently using an Applanix DSS-580/560 dual head digital camera system, at both MLLW and MHW, for a total of eight strips. All imagery was acquired at a nominal altitude of 10,500 feet, resulting in an approximate ground sample distance (GSD) of 0.33 meters for the color imagery and 0.35 meters for the NIR.

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 (ver. 7.1) software in March and May of 2017. 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. The predicted horizontal accuracy of the imagery 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 be 1.0 meters.

All stereo-models were examined and found to have acceptable levels of parallax for mapping purposes.

Compilation

The data compilation phase of this project was accomplished by RSD Applications Branch (AB) personnel in September 2019. 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 FL1602A-CM-N were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 2.0 meters at the 95% confidence level. 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)	Color Imagery		Infrared Imagery		Tide Level*
		Roll	Strip / Images	Roll	Strip / Images	
2-13-2017	18:05 – 18:07	17VC12	64-012 / 2395 – 2402	17VR10	64-012 / 1801 – 1808	0.1 m
2-13-2017	18:11 – 18:12	17VC12	64-011 / 2403 – 2408	17VR10	64-011 / 1809 – 1814	0.1 m
2-16-2017	15:00 – 15:03	17VC13	64-002 / 2523 – 2537	17VR11	64-002 / 1929 – 1943	0.0 m
2-16-2017	15:12 – 15:15	17VC13	64-003 / 2538 – 2551	17VR11	64-003 / 1944 – 1957	0.0 m
2-16-2017	15:21 – 15:24	17VC13	64-001 / 2552 – 2564	17VR11	64-001 / 1958 – 1970	0.0 m
2-16-2017	15:32 – 15:35	17VC13	64-004 / 2565 – 2583	17VR11	64-004 / 1971 – 1989	0.0 m
2-16-2017	15:40 – 15:46	17VC13	64-007 / 2584 – 2616	17VR11	64-007 / 1990 – 2022	0.0 – 0.1 m
2-16-2017	15:51 – 15:57	17VC13	64-005 / 2617 – 2646	17VR11	64-005 / 2023 – 2052	0.0 – 0.1 m
2-16-2017	16:03 – 16:08	17VC13	64-008 / 2647 – 2676	17VR11	64-008 / 2053 – 2082	0.1 m
2-16-2017	16:14 – 16:20	17VC13	64-006 / 2677 – 2708	17VR11	64-006 / 2083 – 2114	0.1 m

4-02-2017	14:51 – 14:52	17VC23	64-012 / 4235 – 4242	17VR21	64-012 / 3641 – 3648	0.3 – 0.4 m
4-02-2017	15:17 – 15:18	17VC23	64-011 / 4318 – 4323	17VR21	64-011 / 3724 – 3729	0.4 m
4-02-2017	15:25 – 15:28	17VC23	64-003 / 4324 – 4337	17VR21	64-003 / 3730 – 3743	0.4 m
4-02-2017	15:34 – 15:36	17VC23	64-002 / 4338 – 4352	17VR21	64-002 / 3744 – 3758	0.4 m
4-02-2017	15:42 – 15:45	17VC23	64-001 / 4353 – 4365	17VR21	64-001 / 3759 – 3771	0.4 m
4-02-2017	15:47 – 15:53	17VC23	64-008 / 4366 – 4395	17VR21	64-008 / 3772 – 3801	0.4 m
4-02-2017	15:57 – 16:03	17VC23	64-005 / 4396 – 4425	17VR21	64-005 / 3802 – 3831	0.4 m
4-02-2017	16:08 – 16:14	17VC23	64-007 / 4426 – 4458	17VR21	64-007 / 3832 – 3864	0.4 m
4-02-2017	16:20 – 16:24	17VC23	64-004 / 4459 – 4477	17VR21	64-004 / 3865 – 3883	0.4 m
4-02-2017	16:28 – 16:34	17VC23	64-006 / 4478 – 4509	17VR21	64-006 / 3884 – 3915	0.4 m

* Tide levels are given in meters above MLLW and were calculated using the Pydro software tool with tidal zoning referenced to verified water level observations from the NOS reference station at Panama City. The height of the MHW tidal datum in the project area varies between 0.38 – 0.47 meters above MLLW.

Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a senior member of AB. The final QC review was completed in November 2019. 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 (ver. 10.7.1) 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 charts were used in the comparison process:

- 11390, Intracoastal Waterway, East Bay to West Bay, 26th Ed., Nov. 2015
- 11391, St. Andrew Bay, 26th Ed., Sep. 2015
- 11392, St. Andrew Bay - Bear Point to Sulphur Point, 9th Ed., Sep. 2015

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

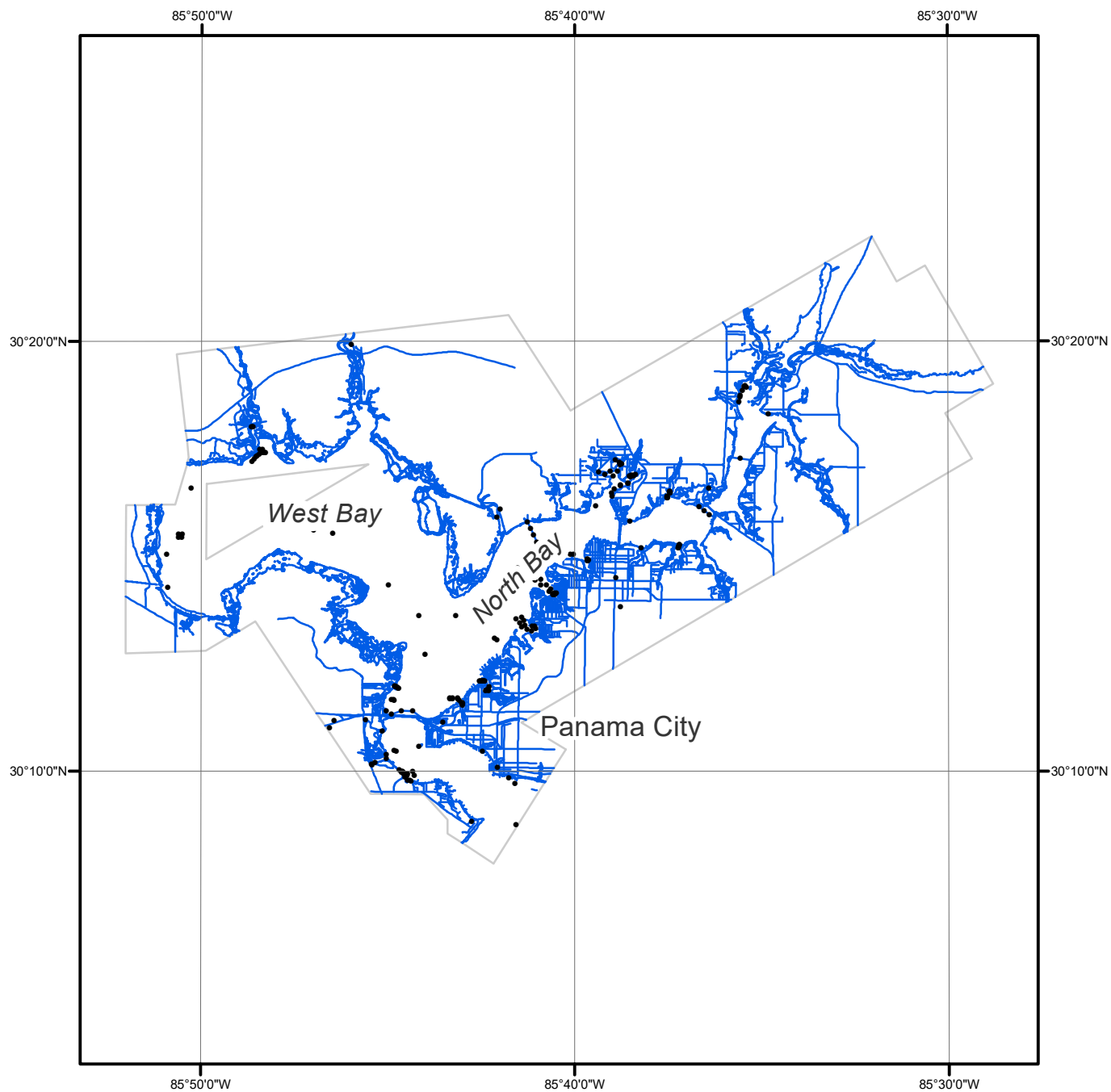
- Airborne Positioning and Orientation Reports (APOR)
- Project Completion Report (PCR)
- Project database
- GC11409 in shapefile format
- CEF in shapefile format

NOAA Shoreline Data Explorer

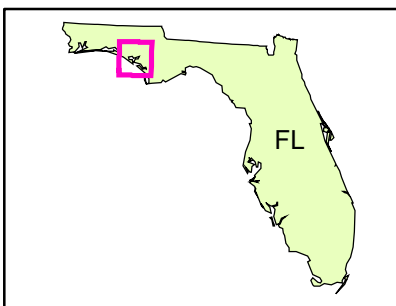
- GC11409 in shapefile format
- Metadata file for GC11409
- PCR in Adobe PDF format

End of Report

ST ANDREW BAY, NORTH AND WEST BAYS FLORIDA



Overview



FL1602A-CM-N

GC11409