

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT LA1505-CS-N

Port of Intracoastal City, Louisiana

Introduction

NOAA Coastal Mapping Program (CMP) Project LA1505-CS-N provides highly accurate digital shoreline data for key areas of change in the Port of Intracoastal City and nearby portions of the Intracoastal Waterway and Vermilion River, in Louisiana. 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 the project was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for timely updates to the NOAA chart suite within key U.S. ports. 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 digital 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. The RB CSCAP Memorandum for Project LA1603-CS-T dated July 25, 2016 contains details of the initial chart comparison process. AB personnel conducted further change analysis using the aerial imagery for Project LA1505-CS-N, acquired subsequent to the RB analysis and covering a slightly wider area, which resulted in additional discrepancies being identified.

Field Operations

The field operations for Project LA1505-CS-N 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. Color digital images utilized for this project were acquired with the NOAA King Air aircraft in October 2016 using an Applanix Digital Sensor System (DSS) dual aerial camera at a nominal altitude of 10,500 feet, resulting in an approximate ground sample distance (GSD) of 0.33 meters. Near-Infrared (NIR) images were also acquired concurrently, but were not used for this project. Although imagery was not acquired in strict coordination with local tides, the goal was to collect all imagery below Mean High Water (MHW).

Direct Georeferencing Data Processing

The GPS/IMU data were processed by RSD personnel to yield precise camera positions and orientations for direct geo-referencing (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. Airborne kinematic data was processed using Applanix POSPac MMS 7.1 software in November 2016. 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 the Exterior Orientation Total Propagated Uncertainty (EO-TPU) tool developed by NGS. Using this tool, the predicted horizontal uncertainty at the 95% confidence level for all project imagery was calculated to be 0.83-0.92 meters. Previously compiled feature data from CMP Project LA1101 (GC10995) was used to verify the horizontal integrity of the DG data. 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 a member of RSD in August 2017. Digital feature data was compiled using SOCET SET (ver. 5.6) software. Feature identification and attribution within the GC were based on image analysis of the digital photographs and information extracted from the appropriate NOAA nautical charts 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 LA1505-CS-N were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 1.8 meters at the 95% confidence level. This predicted accuracy of compiled well-defined points is derived by doubling the horizontal uncertainty calculated from the EO-TPU tool. The table below provides further information on the imagery used to complete this project:

Date	Time (UTC)	Roll #	Strip / Photo #s	Tide Level*
10-2-2016	14:49 – 14:52	16VC82	53-003 / 18699-18718	0.4 m
10-2-2016	15:02 – 15:07	16VC82	53-002 / 18722-18752	0.4 m
10-2-2016	15:08 – 15:10	16VC82	53-002 / 18764-18771	0.4 m
10-2-2016	15:14 – 15:15	16VC82	53-005 / 18772-18777	0.4 m
10-2-2016	15:23 – 15:24	16VC82	53-004 / 18792-18795	0.4 m
10-2-2016	15:24 – 15:25	16VC82	53-004 / 18801-18805	0.4 m
10-2-2016	15:33 – 15:36	16VC82	53-001 / 18811-18829	0.4 m
10-3-2016	16:07 – 16:09	16VC83	53-002 / 18830-18842	0.4 m
10-3-2016	16:13 – 16:15	16VC83	53-005 / 18843-18857	0.3 – 0.4 m
10-3-2016	16:20 – 16:21	16VC83	53-004 / 18858-18864	0.3 m
10-3-2016	16:25	16VC83	53-001 / 18865-18866	0.4 m
10-3-2016	16:26	16VC83	53-001 / 18869-18870	0.4 m

10-3-2016	16:30	16VC83	53-003 / 18871-18873	0.4 m
10-3-2016	16:41	16VC83	53-001 / 18874-18875	0.4 m

* 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 MHW in the project area is approximately 0.5 meters above MLLW.

Quality Control / Final Review

The final review of the project was completed by a member of RSD in August 2017, and included analysis of DG results and assessment of the identification and attribution of digital feature data within the Geographic Cell (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 10.4.1 software. 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:

Remote Sensing Division Electronic Data Library

- CSCAP evaluation memorandum
- Airborne Positioning and Orientation Report (APOR)
- Project Completion Report (PCR)
- Project database
- GC11348 in shapefile format
- CEF in shapefile format

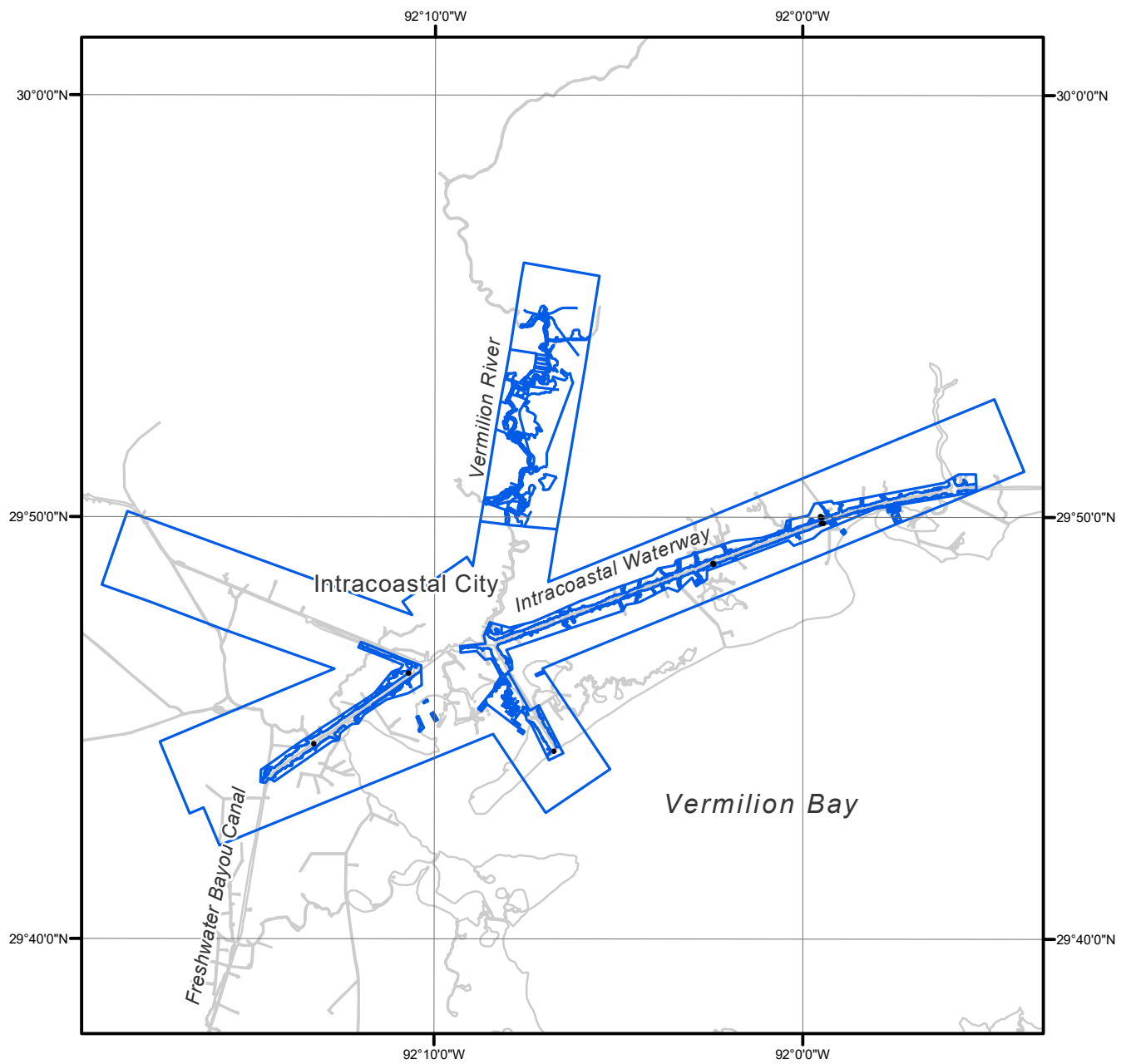
NOAA Shoreline Data Explorer

- GC11348 in shapefile format
- Metadata file for GC11348
- Digital copy of the PCR in Adobe PDF format

End of Report

PORT OF INTRACOASTAL CITY

LOUISIANA



Overview



LA1505-CS-N

GC11348