

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT LA1001

Port of Lake Charles/Cameron, Louisiana

Introduction

NOAA Coastal Mapping Program (CMP) Project LA1001 provides highly accurate digital shoreline data for key areas of change within the Calcasieu Ship Channel from Monkey Island to Lake Charles, 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 Project LA1001 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 high resolution imagery products 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 RB CSCAP memorandum of August 27, 2010 for details of the chart comparison process for this project.

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 digital aerial imagery. Aerial survey operations were conducted on November 23, 2009 and March 12, 2010 with the NOAA Cessna Citation II aircraft. Imagery was acquired using an Applanix DSS-439 dual camera system (color & infrared) with 60 mm lenses. Fourteen strips of imagery were acquired at a nominal altitude of 10,000 feet, resulting in a Ground Sample Distance (GSD) of 0.35 meters. Imagery was not acquired in strict coordination with local tides, and the infrared (IR) images were not used for compilation.

GPS Data Reduction

GPS and IMU data was collected and processed by RSD personnel to yield precise positions and orientations of camera centers as a means of rendering accurately georeferenced digital images. The static GPS base station data was processed in June 2010 using the NGS Online Processing User Service (OPUS) software to compute fixed baseline solutions from the CORS station. The final NAD83 position reported by OPUS was the average of these three baseline solutions. The airborne kinematic data was also processed in June 2010 using Applanix POSGPS (ver. 4.4.0) software.

Aerotriangulation

Routine softcopy aerotriangulation methods 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. This work was initiated by RSD personnel in December 2011 utilizing a Digital Photogrammetric Workstation (DPW) which is a configuration of computer hardware, modular software components and other associated peripheral devices. The fourteen strips of color images were adjusted as one block. Image measurements and block adjustments were performed using BAE Systems' SOCET SET (version 5.5) photogrammetric software. AT procedures were accomplished using the Multi-Sensor Triangulation (MST) module of SOCET SET. The Automatic Point Measurement (APM) algorithm, within MST, was used to collect tie points, and a simultaneous solve adjustment was then performed. Using all measured image points, the predicted horizontal circular error for compiled well-defined points was computed to be 0.4 meters at the 95% confidence level (CE95). Positional data is referenced to the North American Datum of 1983 (NAD 83). An Aerotriangulation Report was written and is on file with other project data within the RSD Project Archive.

Compilation

The data compilation phase of the project was initiated by RSD personnel in December 2011. This work was accomplished utilizing the Feature Extraction module within SOCET SET (ver. 5.5) on a DPW. Feature attribution was assigned in compliance with the Coastal Cartographic Object Attribute Source Table (C-COAST). Selected features were further modified with additional descriptive information to refine general classification.

Spatial data accuracies for Project LA1001 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 0.8 meters at the 95% confidence level.

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

Date	Time (UTC)	Roll Number	Photo Numbers	GSD (nominal)	Tide Level*
11-23-2009	18:03 – 18:04	09NC27	8577 - 8587	0.35 m	0.28 m
11-23-2009	18:07 – 18:10	09NC27	8588 - 8604	0.35 m	0.28 m
11-23-2009	18:13 – 18:14	09NC27	8605 - 8616	0.35 m	0.28 m
11-23-2009	18:19 – 18:21	09NC27	8617 - 8633	0.35 m	0.28 m
11-23-2009	18:25 – 18:29	09NC27	8634 - 8668	0.35 m	0.28 m
11-23-2009	18:33 – 18:36	09NC27	8669 - 8691	0.35 m	0.28 m
11-23-2009	18:43 – 18:49	09NC27	8692 - 8736	0.35 m	0.28 m
11-23-2009	18:53 – 18:58	09NC27	8737 - 8770	0.35 m	0.28 m
11-23-2009	19:02 – 19:09	09NC27	8771 - 8815	0.35 m	0.28 m
11-23-2009	19:13 – 19:21	09NC27	8816 - 8871	0.35 m	0.28 m

11-23-2009	19:27 – 19:29	09NC27	8872 - 8890	0.35 m	0.28 m
11-23-2009	19:52 – 19:57	09NC27	8891 - 8927	0.35 m	0.38 m
11-23-2009	20:02 – 20:07	09NC27	8928 - 8963	0.35 m	0.38 m

* Tide levels are given in meters above MLLW and are based on actual observations recorded by the NOS gauges at Calcasieu Pass and Lake Charles, LA at the time of photography. The mean range in the project area varies from 0.3 m (Lake Charles) to 0.4 m (Calcasieu Pass).

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 March 2012. The review process included analysis of aerotriangulation 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 9.3 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:

RSD Applications Branch Archive

- Hardcopy of the Aerotriangulation Report
- Hardcopy of the Project Completion Report (PCR)
- Page size graphic plot of GC10907 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

Remote Sensing Division Electronic Data Library

- Project Database
- GC10907 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- Chart Evaluation File in shapefile format

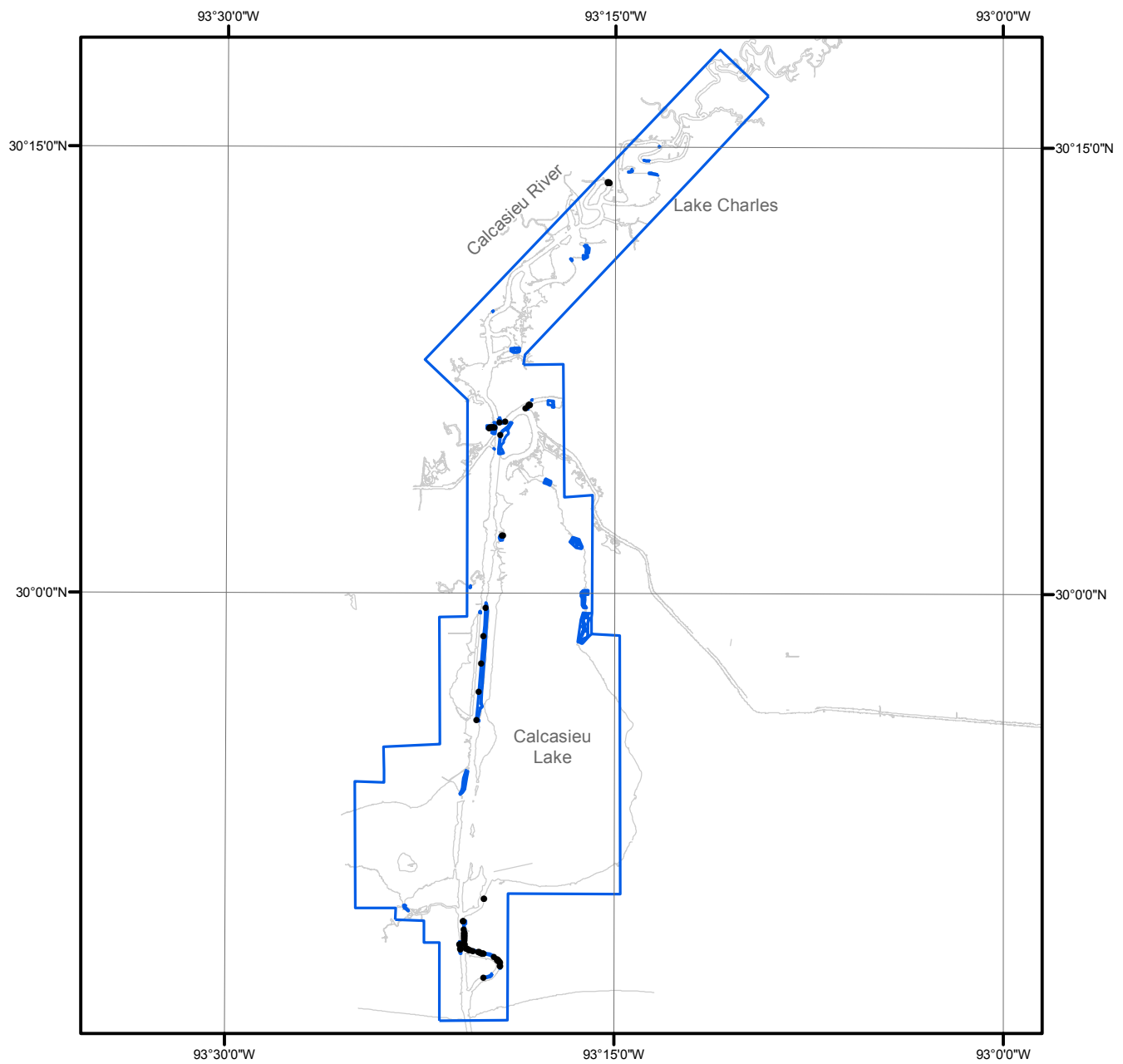
NOAA Shoreline Data Explorer

- GC10907 in shapefile format
- Metadata file for GC10907
- Digital copy of the PCR in Adobe PDF format

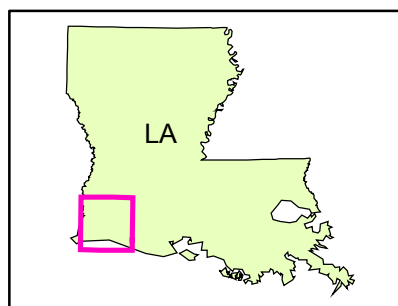
End of Report

PORT OF LAKE CHARLES / CAMERON

LOUISIANA



Overview



LA1001

GC10907