

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT LA1002K

Port of Baton Rouge, Louisiana

Introduction

Coastal Mapping Program (CMP) Project LA1002K provides highly accurate digital shoreline data for key areas of change for the Mississippi River from the port of Baton Rouge to Donaldsonville, 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. This project is a subproject of a larger CMP Project LA1002 which extends from Baton Rouge to Southwest Pass, Louisiana.

Project Design

The design of Project LA1002K 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 high resolution imagery in order to ascertain the need for more current shoreline data. Orthomosaics from aerial photography were utilized for the CSCAP analysis. 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 September 13, 2010 for details of the chart comparison process.

Field Operations

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. Aerial survey operations were conducted on March 15, 2010 with the NOAA King Air (N68RF) aircraft. A total of fifty nine strips of digital RGB (color) images were acquired, although only sixteen strips (623 images) were used for this subproject. All photography was acquired with an Applanix DSS-439 medium format digital camera at a nominal altitude of 10,000 feet, resulting in an approximate ground sample distance (GSD) of 0.35 m.

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. 4.4) software in June 2010. For further information refer to the Airborne Positioning and Orientation Reports (APOR) on file with other project data within the AB Project Archive.

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 EO Total Propagated Uncertainty (TPU) tool developed by NGS. Using this tool, the predicted horizontal uncertainty at the 95% confidence level was calculated to be 1.0 meters.

Ten NGS third order geodetic control points were used to test the horizontal integrity of the DG data. Comparisons between image measurements and published coordinates for these points did not exceed 1 meter. Image measurements were made within the orthomosaics used in the CSCAP analysis for this project.

Compilation

The data compilation phase of this project was accomplished by a member of AB in June 2013. Digital feature data was compiled in ESRI shapefile format from the orthomosaics utilized in the CSCAP analysis, using ESRI's ArcGIS 9.3 desktop GIS software. Feature attributes were established using 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 LA1002K were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features compiled to meet a horizontal accuracy of 2.0 meters at the 95% confidence level. This predicted accuracy of compiled, well-defined points is derived by doubling the horizontal uncertainty value derived from the DG data.

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

Date	Time (UTC)	Roll #	Strip / Frame #s	~GSD	Water Level*
3/15/2010	15:38 – 15:47	10NC11	50-016 / 4300-4357	0.35 m	5.6-6.5
3/15/2010	15:55 – 16:02	10NC11	50-003 / 4358-4401	0.35 m	5.6-6.5
3/15/2010	16:07 – 16:13	10NC11	50-004 / 4402-4445	0.35 m	5.7-6.3
3/15/2010	16:19 – 16:24	10NC11	50-001 / 4446-4478	0.35 m	5.7-6.3
3/15/2010	16:31 – 16:36	10NC11	50-002 / 4479-4511	0.35 m	5.0-6.2
3/15/2010	16:44 – 16:47	10NC11	50-005 / 4512-4533	0.35 m	5.0-6.0
3/15/2010	16:54 – 16:59	10NC11	50-008 / 4534-4567	0.35 m	5.0-6.0
3/15/2010	17:11 – 17:14	10NC11	50-006 / 4568-4591	0.35 m	5.1-5.6
3/15/2010	17:21 – 17:25	10NC11	50-009 / 4592-4624	0.35 m	5.1-5.6

3/15/2010	17:31 – 17:35	10NC11	50-007 / 4625-4652	0.35 m	5.1-5.9
3/15/2010	17:42 – 17:47	10NC11	50-010 / 4653-4685	0.35 m	4.4-5.0
3/15/2010	17:54 – 17:58	10NC11	50-011 / 4686-4715	0.35 m	4.4-5.0
3/15/2010	18:04 – 18:08	10NC11	50-012 / 4716-4745	0.35 m	3.7-5.0
3/15/2010	18:14 – 18:22	10NC11	50-015 / 4746-4804	0.35 m	3.7-5.0
3/15/2010	18:29 – 18:37	10NC11	50-013 / 4805-4863	0.35 m	3.5-4.1
3/15/2010	18:43 – 18:51	10NC11	50-014 / 4864-4922	0.35 m	3.5-4.1

* Water (river) levels are given in meters above the LWRP and were interpolated from actual observations recorded by US Army Corps of Engineers gages throughout the project area. The height of the LWRP in the project area ranges from approximately 0.4 to 1.0 meters above Mean Sea Level.

Quality Control / Final Review

The final QC review was completed in June 2013 by a senior member of RSD. The review process included analysis of the direct georeferencing 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. The entire suite of project products 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 APOR
- Hardcopy of the Project Completion Report (PCR)
- Page size graphic plot of GC10997 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

Remote Sensing Division Electronic Data Library

- GC10997 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

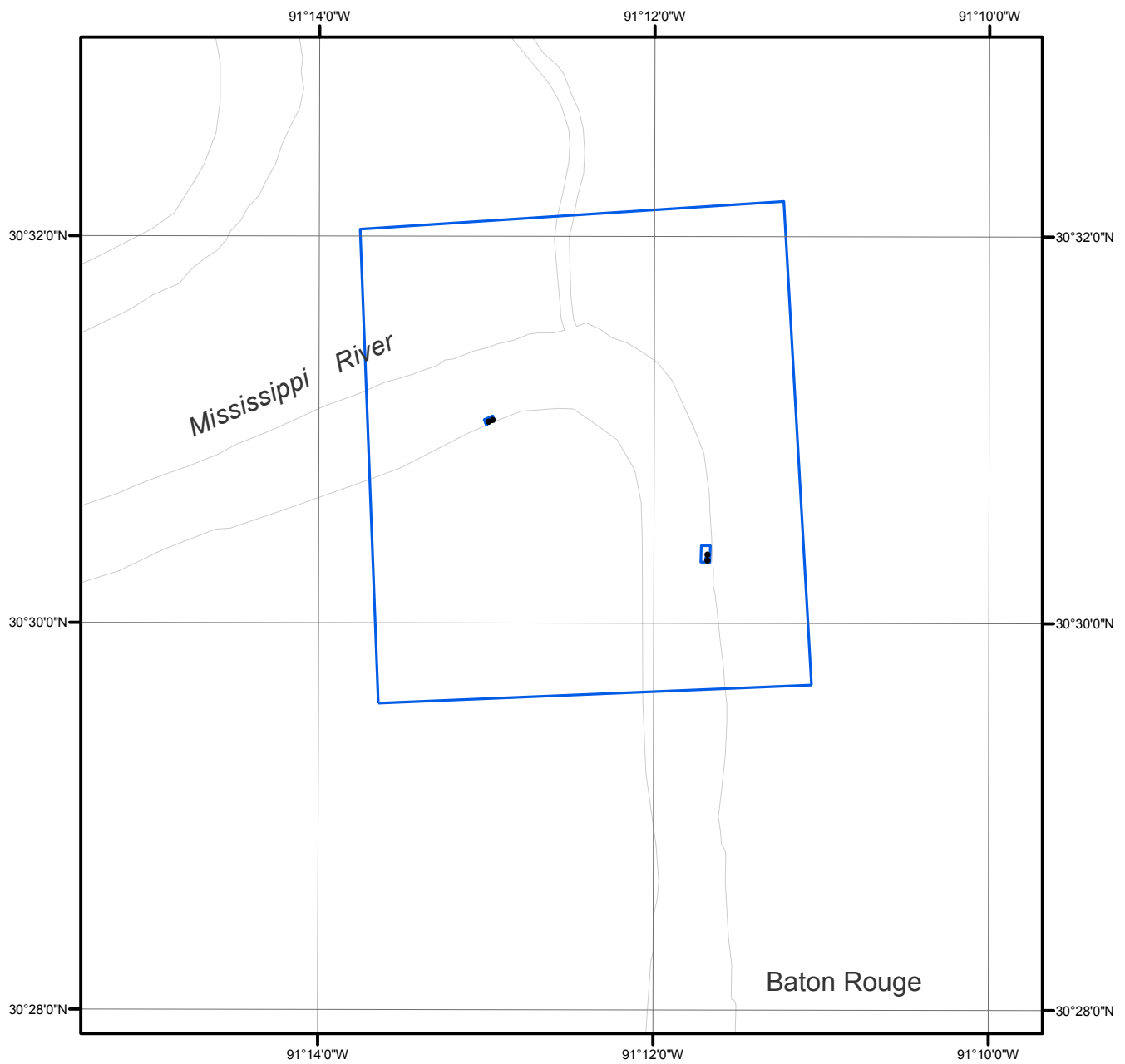
NOAA Shoreline Data Explorer

- GC10997 in shapefile format
- Metadata file for GC10997
- Digital copy of the PCR in Adobe PDF format

End of Report

PORT OF BATON ROUGE

LOUISIANA



Overview



LA1002K

GC10997