

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT LA1002D-CM-N

Mississippi River, South Pass, Louisiana

Introduction

NOAA Coastal Mapping Program (CMP) Project LA1002D-CM-N provides a highly accurate database of new digital shoreline data for Mississippi River South Pass from Head of Passes to the Gulf of Mexico, and includes portions of Garden Bay, Redfish Bay, and many other connecting waterways. Project LA1002D-CM-N is a subproject of a larger project, LA1002-CM-N, which includes the shoreline of the Mississippi River from its mouth on the Gulf of Mexico to Baton Rouge.

Successful completion of the project resulted in a densification of the National Spatial Reference System (NSRS), a set of controlled metric-quality aerial photographs and digital feature data of the coastal zone which complements the Nautical Charting Program (NCP) as well as geographic information systems (GIS) for a variety of coastal zone management applications.

Project Design

The Requirements Branch (RB) of the Remote Sensing Division (RSD) formulated the Project Instructions for this project following the guidelines of the “Scope of Work, Shoreline Mapping for the Coastal Mapping Program” (SOW), Version 13B, dated January 2008. The instructions discussed the project’s purpose, geographic area of coverage, scope and priority; data acquisition, processing, accuracy, and compilation requirements; product delivery and reporting instructions; and contact and communication information.

Field Operations

All project digital imagery was acquired by NOAA on March 13-14, 2010 using a dual mounted Applanix DSS 439 digital camera aboard NOAA’s King Air aircraft (N68RF) at a nominal altitude of 10,000 feet giving a Ground Sample Distance (GSD) of 0.35 meters. NOAA provided 322 Applanix DSS color (RGB) images, and processed airborne GPS and IMU data in order to support photogrammetric processing and feature compilation. Strict tide coordination was not required for this project. NOAA also provided shapefiles depicting the shoreline to be mapped, the boundaries of the project compilation areas, and flight lines and exposure centers of the imagery to be used for compilation.

The collection of static GPS data was performed by Woolpert, Inc. Four (4) ground checkpoints were required and multiple sessions were observed and submitted to the NGS Online Processing User Service (OPUS), which computed fixed baseline solutions from nearby CORS stations. A mean of the values was used to determine the checkpoint coordinates. For more information please refer to the Ground Control Report.

GPS Data Reduction

GPS/IMU data was collected and processed by RSD personnel to yield precise positions and orientations of camera centers for application as photogrammetric control in the aerotriangulation phase of project completion. 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 OPUS. The airborne kinematic data was processed in June 2010 using POSPAC 4.4.0. For further information refer to the Airborne Positioning and Orientation Report (APOR) that is on file with other project data within the RSD Electronic Data Library.

Aerotriangulation

Aerotriangulation (AT) for this project was performed by Woolpert using a softcopy stereo photogrammetric workstation to build the network of control for the compilation phase. The AT adjustment was performed using INPHO Match AT, a bundle block adjustment software. All NGS provided GPS and IMU data was imported into Match AT to complete the adjustment. No ground control was used to produce the final adjustment for the project area. Due to the large number of “water only” images and images with limited locations for tie points, there were several images that could not be used in the final adjustment.

Output results were reviewed both graphically and in the text file printout. Any large blunders on any pass points were reviewed and re-measured. Residuals were reviewed to be within specs for the project. The output from Orima reports the standard deviation values for all triangulated points. The RMS of the standard deviations in both X and Y directions were then used to determine the radius of the 95% confidence circle for each image block. The predicted horizontal accuracy is 0.35 meters for the project. For further information refer to the Aerotriangulation Report that is on file with other project data within the RSD Electronic Data Library.

The project database consists of camera calibration data, interior orientation parameters for each frame, airborne GPS antenna position and offset data, adjusted exterior orientation parameters for each frame, positional listing of all measured points, the control file and refined image coordinates as listed in the Project Database section of the Aerotriangulation Report. Positional data is referenced to the North American Datum of 1983 (NAD 83).

Compilation

Feature extraction for LA1002D-CM-N occurred from February through May 2011. All compilation work performed under this task order followed the extraction methods and features as described in Shoreline Mapping SOW 13B, dated January 2008. Digital feature extraction was completed in a softcopy stereo environment using DAT_EM Summit Softcopy systems software version 5.4, and Microstation V8. All coding and classification of features occurred within the MicroStation environment as features were collected, and was based on interpretation of the project imagery, and on 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 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 0.7 meters at the 95% confidence level. This predicted accuracy of compiled, well-defined points is derived by doubling the circular error derived from aerotriangulation statistics.

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

Date	Time (UTC)	Roll Number	Strip / Photo Numbers	GSD (nominal)	Tide Level*
3/13/2010	20:16 – 20:19	10NC04	50-035 / 596 – 620	0.35 m	0.25 m
3/13/2010	20:25 – 20:29	10NC04	50-050 / 621 – 642	0.35 m	0.26 m
3/13/2010	21:00 – 21:02	10NC04	50-051 / 734 – 754	0.35 m	0.27 m
3/13/2010	21:12 – 21:15	10NC04	50-048 / 755 – 777	0.35 m	0.27 m
3/13/2010	21:26 – 21:29	10NC04	50-049 / 813 – 836	0.35 m	0.28 m
3/13/2010	21:55 – 21:56	10NC04	50-056 / 900 – 908	0.35 m	0.28 m
3/13/2010	22:04 – 22:05	10NC04	50-057 / 909 – 915	0.35 m	0.29 m
3/14/2010	15:15 – 15:19	10NC10	50-038 / 2753 – 2781	0.35 m	0.14 m
3/14/2010	15:33 – 15:34	10NC10	50-055 / 2805 – 2807	0.35 m	0.15 m
3/14/2010	15:47 – 15:48	10NC10	50-059 / 2853 – 2863	0.35 m	0.16 m
3/14/2010	17:24 – 17:27	10NC10	50-039 / 3272 – 3291	0.35 m	0.13 m
3/14/2010	18:00 – 18:01	10NC10	50-040 / 3450 – 3456	0.35 m	0.13 m
3/14/2010	18:32 – 18:36	10NC10	50-037 / 3615 – 3643	0.35 m	0.12 m
3/14/2010	18:41 – 18:45	10NC10	50-036 / 3644 – 3670	0.35 m	0.13 m

* Tide levels are given in meters relative to MLLW and are based on verified observations at the Pilots Station East, SW Pass station (876-0922). The elevation of MHW for this tide station is 0.36 meters above MLLW.

Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion. The final QC review was completed in August 2011. 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 MicroStation software. All project data was evaluated for compliance to CMP requirements.

Comparisons of the largest scale NOAA nautical charts with natural color photographs and compiled project data resulted in creation of the Chart Evaluation File (CEF). The following nautical chart was used in the comparison process:

- 11361, Mississippi River Delta, LA, 1:80,000 scale, 76th Ed., Aug 2011 (incl. 1:40,000 insets)

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

- Ground Control Report
- Airborne Positioning and Orientation Reports (APOR)
- Aerotriangulation Report
- Project database
- GC10902 in shapefile format
- Project Completion Report (PCR)
- CEF in shapefile format

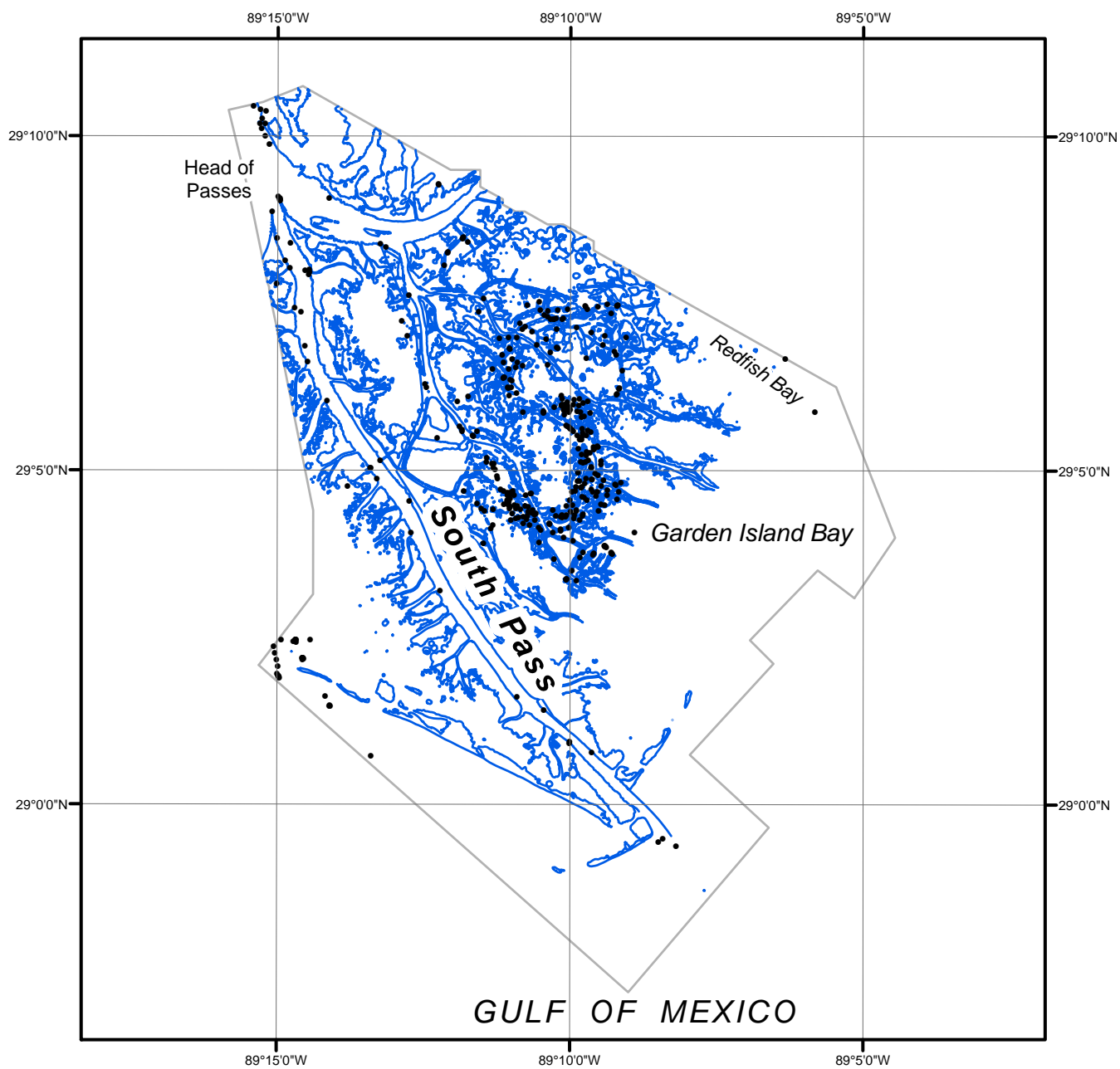
NOAA Shoreline Data Explorer

- GC10902 in shapefile format
- Metadata file for GC10902
- Copy of PCR in Adobe PDF format

End of Report

MISSISSIPPI RIVER, SOUTH PASS

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Overview



LA1002D-CM-N

GC10902