NOAA COASTAL MAPPING PROGRAM

PROJECT COMPLETION REPORT

PROJECT LA0201D

FRESHWATER BAYOU, LOUISIANA

Introduction

Coastal Mapping Program (CMP) Project LA0201D provides a highly accurate database of new digital shoreline data of Freshwater Bayou, Louisiana. This project is a subset of a larger project, LA0201, consisting of four waterways of the Gulf Intracoastal Waterway (GIWW) system in Louisiana: Barataria Waterway, Bayou Lafourche, Lower Grand River, and Freshwater Bayou. The overall project, LA0201, was initially executed by a private mapping firm, 3001, Inc., under contract.

Completion of this project resulted in a densification of the National Spatial Reference System (NSRS), a set of controlled metric quality aerial photographs and digital cartographic feature files (DCFF) of the coastal zone which compliment the Nautical Charting Program (NCP) and other geographic information systems.

The project database consists of information measured and extracted from aerial photographs and metadata related to photogrammetric compilation. Base mapping was conducted in a digital environment using stereo softcopy photogrammetry and associated cartographic practices. Project survey data is referenced to the North American Datum of 1983 (NAD 83).

Project Design

The Requirements Branch (RB) of the Remote Sensing Division (RSD) issued Project Instructions in accordance with guidelines in the Shoreline Mapping Scope of Work (version 12). The instructions discussed the project's purpose, geographic area of coverage, scope and priority; photographic requirements; flight line priority; Global Positioning System (GPS) data collection procedures and guidelines for both kinematic and static surveys; data recording and handling instructions; and contact and communication information.

3001, Inc. created the Project Layout Diagram, flight maps, and input files for the aircraft's flight management system. 3001, Inc. also provided copies of the descriptions and diagrams of selected geodetic control stations at airports that were to be used as bases of operation. A briefing was held to review the Project Instructions and Scope of Work, and to distribute the data to key personnel.

Field Operations

The field operations consisted of the surveying of ground control points, collection of airborne GPS data, and the acquisition of aerial photographs. The photographic mission operation was conducted by Hoffman & Company, Inc. on November 6, 2002, utilizing a Turbo Cessna 210 aircraft. Natural color photographs were acquired through the use of a Zeiss RMK Top15 camera. There was no attempt to acquire tide coordinated aerial photography since tidal influences within the project area are negligible. All aerial photographs were acquired at a nominal scale of 1:12,000. In-flight data from the Leica 9500 Series ABGPS and Applanix AIMU REV-C was acquired as an integral part of photographic mission operations in compliance with the aforementioned photographic mission standard operating procedures. A Photographic Mission Final Report was written and submitted with other project data to RSD.

GPS Data Reduction

GPS data was processed to provide precise and accurate positions of camera centers for application as photogrammetric control in the aerotriangulation phase of the project. National Geodetic Survey (NGS) monuments Median and W-358 were included in the initial surveys for the control network. Initial processing was performed using either the broadcast or rapid ephemeris, and Online Positioning User Service (OPUS) was used for a primary check of the field data. The precise ephemerides were used for final processing as they became available. NGS continuously operating reference stations (CORS) were used as fixed reference stations during final processing, and overlapping occupations were employed to ensure continuity between network points. Final analysis of the network was performed using the Trimble Least Squares Adjustment. GPS data reduction was completed by 3001, Inc. CMP project personnel in October 2002. A GPS Ground Survey Report was written and submitted with other project data to RSD.

Aerotriangulation

Routine softcopy aerotriangulation methods were applied to establish the network of precise GPS camera positions and other control for mapping, and to provide model parameters and orientation elements required for digital compilation. Z/I ImageStation Automatic Triangulation (ISAT) Project Wizard was used to create the project for aerotriangulation. ISAT Strip Wizard was then used to bulk load photographs and generate stereo models in order to identify strips and photographs being used in the block adjustment. Upon successful completion of the aerotriangulation process, the ISAT software provided the RMS of the standard deviations of the residuals for each aerotriangulated ground point which were used to compute a predicted horizontal circular error of 0.2 meters based on a 95% confidence level. This work was completed by 3001, Inc. CMP staff in August 2003. An Aerotriangulation Report was written and submitted with other project data to RSD.

The project database and supporting documentation has been provided on a CD-ROM deliverable entitled, “Digital Files to Supplement Aerotriangulation Report.” Positional data is based on the North American Datum of 1983, and is referenced to the State Plane Zone 1702 Louisiana South in U.S. Survey Feet.

Compilation

The data compilation phase of the project was performed by CMP team members of the Applications Branch (AB) of RSD from July to August 2005. Digital mapping was performed using the SOCET SET Feature Extraction software module on a Digital Photogrammetric Workstation (DPW), which is a configuration of computer hardware, modular software components and other associated peripheral devices. Feature identification and the assignment of cartographic codes were based on image analysis of 1:12,000 scale natural color photographs and information extracted from the appropriate NOAA Nautical Charts, US Coast Guard Light List and other ancillary sources. Cartographic feature attribution was assigned in compliance with the Coastal Cartographic Object Attribute Source Table (C-COAST). Nomenclature was assigned to selected cartographic features to refine general classification.

Cartographic features were compiled to meet a horizontal accuracy of 0.4 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 provides information on aerial photographs used in the project completion process:

Date	Time (UTC)	Roll Number	Photo Numbers	Scale (nominal)	Tidal Stage (MLLW)*
11-6-02	1953-1957	0209CN01	0204-0217	1:12,000	0.5 ft.
11-6-02	2000-2002	0209CN01	0218-0224	1:12,000	n/a
11-6-02	2006-2009	0209CN01	0225-0237	1:12,000	n/a
11-6-02	2013-2015	0209CN01	0238-0249	1:12,000	n/a

* Actual tide levels based on the Pilot Station, SW Pass, LA (8760943).

Quality Control / Final Review

The final review was initiated by a senior RSD Applications Branch (AB) CMP team member in September 2005. The digital cartographic feature file (DCFF) was evaluated for completeness and accuracy. Data review consisted of an on-line and off-line evaluation of digital compilation and hard copy products. The on-line review comprised of reviewing stereo models on a DPW for cartographic feature codes selection, positional accuracies of features, and nomenclature. The cartographic feature attribution was judged to conform to C-COAST specification. The offline evaluation compared the project data in shapefile format with the largest scale NOAA digital raster nautical charts available and the natural color photographs. The following nautical chart was used in the comparison process:

11349, Vermilion Bay and Approaches, LA, 1:80,000 scale, 41st edition

End Products and Deliverables

The following specifies the location and identification of the products generated during the completion of this project:

RSD Applications Branch Archive

- Hardcopy of the GPS Processing Report
- Hardcopy of the Aerotriangulation Report
- Hardcopy of the Project Completion Report (PCR)
- Page-size graphic plot of GC10531 file contents, attached to PCR

Remote Sensing Division Electronic Data Library

- Project Database
- Digital copy of DCFF GC10531 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- Chart Evaluation File in shapefile format

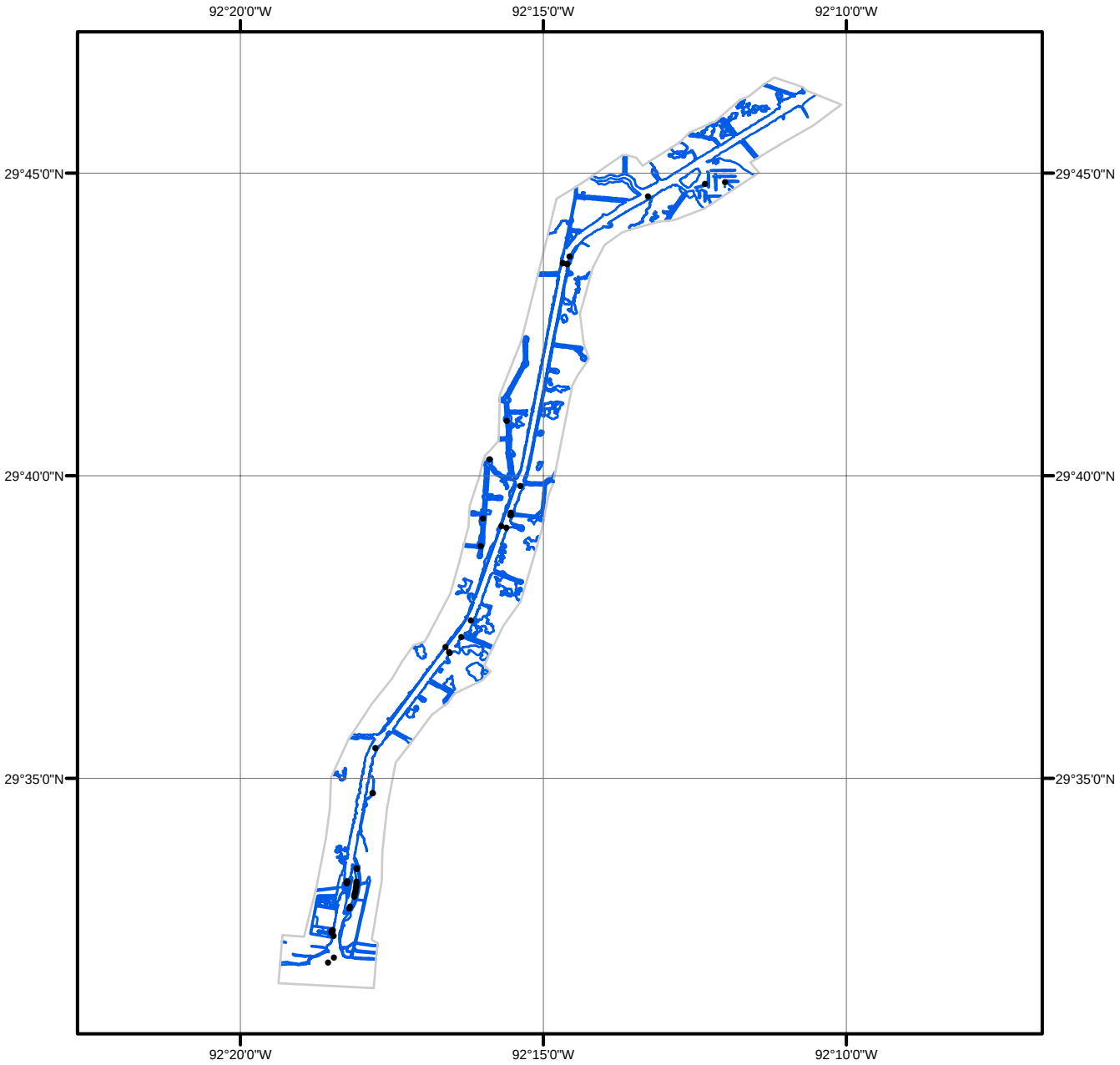
NOAA Shoreline Data Explorer

- DCFF for GC10531
- Metadata file for GC10531
- Digital copy of the PCR in Adobe PDF format

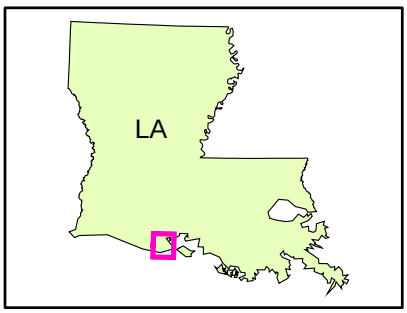
End of Report

FRESHWATER BAYOU

LOUISIANA



Overview



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