

# **NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT**

## ***PROJECT LA0401B***

### ***Atchafalaya Bay, Little Bay to New Pass, Louisiana***

#### **Introduction**

NOAA Coastal Mapping Program (CMP) Project LA0401B provides a highly accurate database of new digital shoreline data for Atchafalaya Bay. The project extends from Little Bay in the eastern region to New Pass in the western region of Atchafalaya Bay, including the Wax Lake Outlet to the Intracoastal Waterway. Project LA0401B is a sub-project of a larger project, LA0401, which includes the region of Wax Lake in the Northwest and Avoca Cutoff in the Northeast to Atchafalaya Bay and the Gulf of Mexico in the South.

Successful 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 feature data of the coastal zone which compliments the Nautical Charting Program (NCP) as well as geographic information systems (GIS) for a variety of coastal zone management applications.

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 Design**

The design of project LA0401 was based on a comparison of image analysis to cartographic detail depicted on the pertinent NOAA nautical charts of the project site. The Remote Sensing Division (RSD) of the National Geodetic Survey (NGS), NOAA formulated the LA0401 Project Instructions, dated November 1, 2004, which contain the specific field and photo mission operational guidelines. 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.

RSD created a Project Layout Diagram and flight maps. Optical Geomatics, Inc. created the input files for the aircraft's flight management system and provided copies of the descriptions of potential geodetic control stations at the bases of operation.

## **Field Operations**

The field operations consisted of the collection of static and kinematic GPS data and the acquisition of aerial photographs. Optical Geomatics, Inc. conducted photographic flight missions on January 24, 2006 and March 25, 2006 utilizing a Cessna 208/G Grand Caravan aircraft. Natural color and black and white infrared (B&W IR) photography was acquired through the use of a Leica RC-30 camera using airborne GPS and IMU technology at a nominal scale of 1:36,000.

Two base stations were established during airborne data collection using static GPS, and provided differential correction of real time kinematic data. These were located at HPWILLIAMS (PID AU3275), the Primary Airport Control station (PACS) for Harry P. Williams Memorial Airport, and at a new point set for the project (identified as LA44) that was adjacent to L 044 (PIDAU3429). Occupation on L 044 was not possible because a trailer was parked directly on the point. Additional information concerning field operations in support of Project LA0401 can be found in the Airborne Positioning and Orientation Report, the Photo Final Report, and the LA0401 Aerotriangulation Report.

## **GPS Data Reduction**

GPS data was collected and processed to provide precise positions of camera centers for application as photogrammetric control in the aerotriangulation phase of project completion. Both the static GPS datasets acquired from the reference stations and the kinematic airborne GPS (ABGPS) datasets were executed in compliance with NOAA's Scope of Work for Shoreline Mapping, version 12. The static GPS data from three CORS stations (ILSU, HOUM and LMCN) as well as the airborne GPS Data were processed using POSGPS (POSPac version 4.3) from Applanix, Inc. The airborne GPS data was processed from the two base stations. These trajectories were then used in the processing of the inertial data. Precise satellite ephemerides and standard meteorological data were applied during the data reduction process.

The inertial data was processed using POSProc (POSPac version 4.3) from Applanix, Inc. This software produces an SBET ("smooth best estimate of trajectory") using the post-processed GPS trajectory from POSGPS and the roll, pitch, and heading information recorded by the Position and Orientation System (POS) during flight. Refer to the Airborne Positioning and Orientation Report for additional information.

## **Aerotriangulation**

All photographs of the project were bridged using a softcopy stereo photogrammetric system in a Windows XP environment in order to establish the network of control required for the compilation phase. A single block aerotriangulation strategy was implemented using both the natural color and B&W IR photographs, and was completed in February 2007. The photographic measurements were made using the Multi-Sensor Triangulation (MST) module within BAE's SOCET SET version 5.3.0 software. After the final analytical adjustment was performed, the RMS of the standard deviations for all aerotriangulated image points was computed using the MST module. These values were then used to compute a predicted horizontal circular error of 0.8 meters based on a 95% confidence level. Refer to the LA0401 Aerotriangulation Report for further information.

## Compilation

The data compilation phase of this project was initiated by RSD in May 2007. Digital mapping was performed using a DPW in conjunction with the SOCET SET Feature Extraction software module. Feature identification and attribution within the Geographic Cell (GC) were based on image analysis of 1:36,000 scale color and tide coordinated B&W IR photography and information extracted from the appropriate NOAA nautical charts, US Coast Guard Light List, 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 LA0401B were determined according to standard Federal Geographic Data Committee (FGDC) practices. For the project, cartographic features were compiled to meet a horizontal accuracy of 1.6 meters at the 95% confidence level. The predicted accuracy of compiled, well defined points is computed 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	Photo Numbers	Strip	Scale (nominal)	Tide Level*
1-24-06	19:04-19:07	0602CN0	0069-0075	2	1:36,000	0.1
1-24-06	18:54-18:58	0602CN0	0060-0067	3	1:36,000	-0.2 to 0.0
1-24-06	18:37-18:41	0602CN0	0038-0045	4	1:36,000	0.0
3-25-06	16:26-16:30	0602R02	0070-0076	2 IR	1:36,000	-0.1 to 0.1
3-25-06	16:14-16:19	0602R02	0059-0067	3 IR	1:36,000	-0.1 to 0.1
3-25-06	15:55-16:00	0602R02	0038-0046	4 IR	1:36,000	-0.1 to 0.1

\* Tide levels are given in meters above MLLW and are based on actual observations at the Tesoro Marine Terminal station (LA), and at various substations throughout the project area with corrections applied from the Galveston (TX) and Grand Isle (LA) reference stations. The elevation of MHW within the project area is equal to 0.2 to 0.4 meters above MLLW. **Note:** Tesoro Marine Terminal tide gauge was out of service on 3/25/06 during the time of IR imagery collection.

## 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 September 2007. 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 version 9.1 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 charts were used in the comparison process:

11351, Point Au Fer to Marsh Island, LA, 1:80,000 scale, 39<sup>th</sup> Ed.

11354, Panel N (KAP 35), the Lower Atchafalaya River, 1:80,000 scale, 26<sup>th</sup> Ed.

## **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 Aerotriangulation Report
- Hardcopy of the Project Completion Report (PCR)
- Page-size graphic plot of GC10657 file contents, attached to PCR

### **Remote Sensing Division Electronic Data Library**

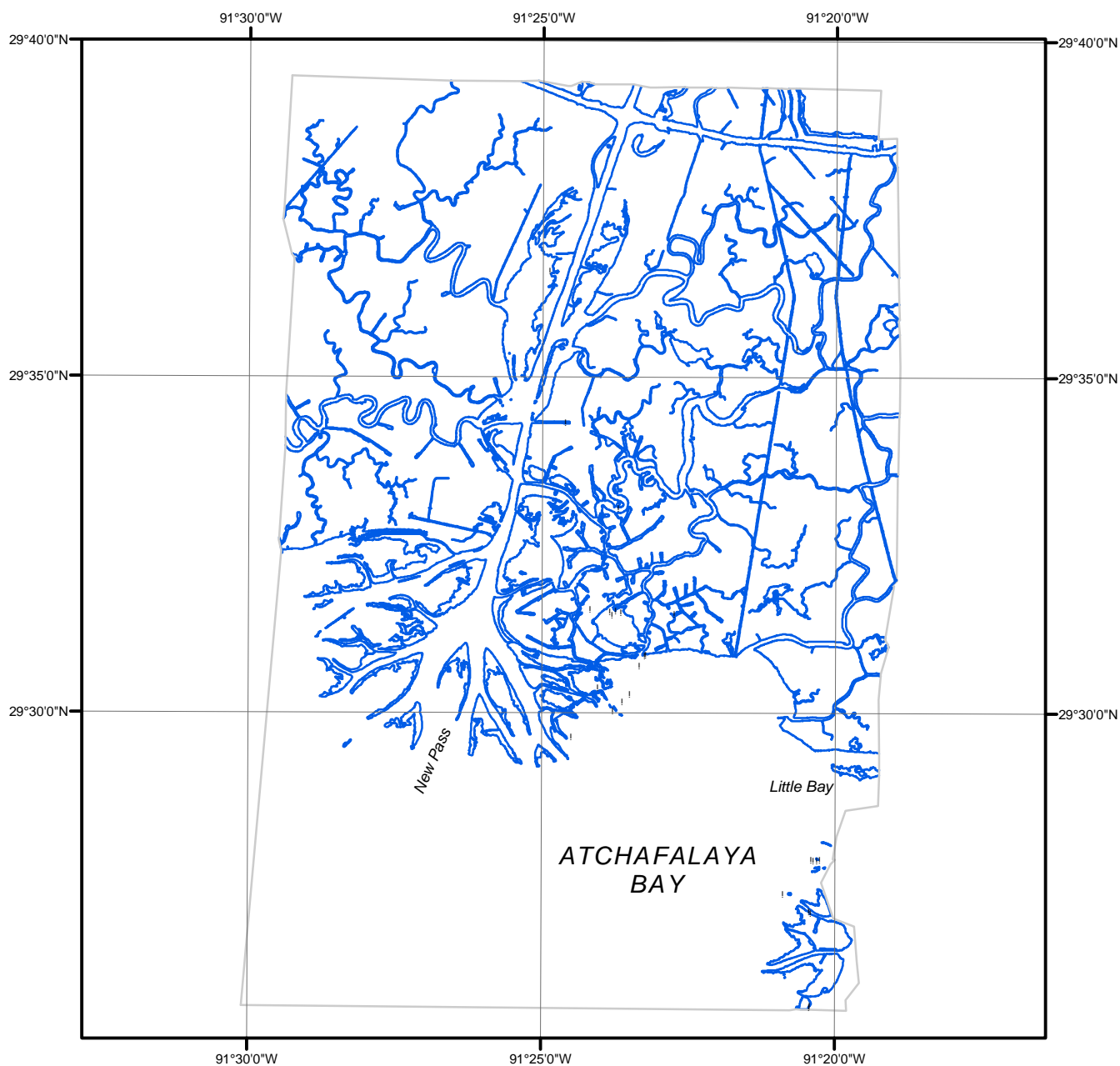
- Project database
- GC10657 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

### **NOAA Shoreline Data Explorer**

- GC10657 in shapefile format
- Metadata file for GC10657
- Digital copy of the PCR in Adobe PDF format

## **End of Report**

# ATCHAFALAYA BAY, LITTLE BAY TO NEW PASS, LOUISIANA



Overview



LA0401B

GC10657