NOAA COASTAL MAPPING PROGRAM
PROJECT COMPLETION REPORT

PROJECT LA0603

Chandeleur Islands, Louisiana

Introduction

NOAA Coastal Mapping Program (CMP) Project LA0603 provides a highly accurate database of new digital shoreline data for the Chandeleur Islands located off of the coast of Louisiana. 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 Requirements Branch (RB) of the Remote Sensing Division (RSD) formulated the photographic mission instructions for this project following the guidelines of the Photo Mission Standard Operating Procedure Version II. 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. RB created a Project Layout Diagram, flight maps and input files for the aircraft's flight management system.

Field Operations

The field operations consisted of the collection of static GPS and kinematic GPS/IMU data and the acquisition of aerial photographs. The photographic mission operations were conducted on January 29 and February 6, 2007, with the NOAA Cessna Citation II (N52RF) aircraft. Six strips of natural color photographs and six strips of black and white infrared photographs were acquired through use of a Wild RC-30 camera with the NOS "A" lens cone at the nominal scale of 1:30,000.

Base stations were established at Pensacola Regional Airport for the mission date of January 29 and New Orleans Lakefront Airport for the mission date of February 6, 2007 using static GPS. Airborne kinematic GPS/IMU data was collected to determine precise camera positions and orientations. GPS/IMU data collection operations were conducted in accordance with the GPS Controlled Photogrammetry Field Operations Manual.

GPS Data Reduction

Global Positioning System (GPS) and Inertial Measurement Unit (IMU) data were processed to provide precise positions and orientations of camera centers for application as photogrammetric control in the aerotriangulation phase of project completion. The static GPS base station data for both photo missions were processed separately in February and May of 2007 using the NGS Online Processing User Service (OPUS) software to compute fixed baseline solutions from three CORS stations for each base station. The final NAD83 position reported by OPUS was the average of these three baseline solutions. The airborne kinematic data was processed separately for each mission using Applanix POSGPS (ver. 4.4) software in March and June of 2007. GPS Data Processing Reports were written and are on file with other project data within the RSD Applications Branch (AB) Project Archive.

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 July 2007 utilizing a Digital Photogrammetric Workstation (DPW), which is a configuration of computer hardware, modular software components and other associated peripheral devices.

The color photographs and black and white infrared photographs were measured and adjusted as a single block using BAE Systems' SOCET SET (version 5.3.1) photogrammetric software in conjunction with the Orientation Management (ORIMA version 9.10) aerotriangulation software. Upon successful completion of the aerotriangulation process the ORIMA 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 1.2 meters based on a 95% confidence level. An Aerotriangulation Report was written and is on file with other project data within the RSD Project Archive.

The project database consists of project parameters and options, camera calibration data, interior orientation parameters, adjusted exterior orientation parameters, and positional listing of all measured points. Positional data is referenced to the North American Datum of 1983 (NAD 83).

Compilation

The data compilation phase of this project was initiated by RSD in January 2008. 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 1:30,000 scale photographs 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 LA0603 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 2.4 meters at the 95% confidence level. This predicted accuracy of compiled, well defined points is derived by doubling the circular error determined from aerotriangulation statistics.

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

Date	Time (UTC)	Roll Number	Photo Numbers	Scale (nominal)	Tide Level*
1-29-07	1648-1652	07AR01	59-70	1:30,000	-0.1
1-29-07	1700-1702	07AR01	76-82	1:30,000	-0.1
1-29-07	1710-1712	07AR01	83-89	1:30,000	0.0
1-29-07	1719-1720	07AR01	92-97	1:30,000	0.0
1-29-07	1729-1731	07AR01	98-103	1:30,000	0.0
1-29-07	1740-1742	07AR01	106-111	1:30,000	0.0
1-29-07	1836-1839	07ACN01	148-159	1:30,000	0.1
1-29-07	1846-1848	07ACN01	165-171	1:30,000	0.1
2-06-07	1640-1642	07ACN02	227-232	1:30,000	-0.1
2-06-07	1648-1650	07ACN02	233-239	1:30,000	-0.1
2-06-07	1658-1700	07ACN02	243-248	1:30,000	0.0
2-06-07	1706-1708	07ACN02	249-254	1:30,000	0.0

*****NOTE: Tide levels are given in meters above MLLW and are based on actual observations at the Gulfport Harbor, MS, tide station. The mean tide range is about 0.4 meters in the project area.

Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a senior member of AB. Final QC review was completed in July 2008, including 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 9.1 software. All project data was evaluated for compliance to CMP requirements.

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

11363, Chandeleur and Breton Sounds, Louisiana, 1:80,000 scale, 40th 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 Airborne Positioning and Orientation Report
- Hardcopy of the Aerotriangulation Report
- Hardcopy of the Project Completion Report (PCR)
- Page-size graphic plot of GC10677 file contents, attached to PCR

Remote Sensing Division Electronic Data Library

- Project database
- GC10677 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

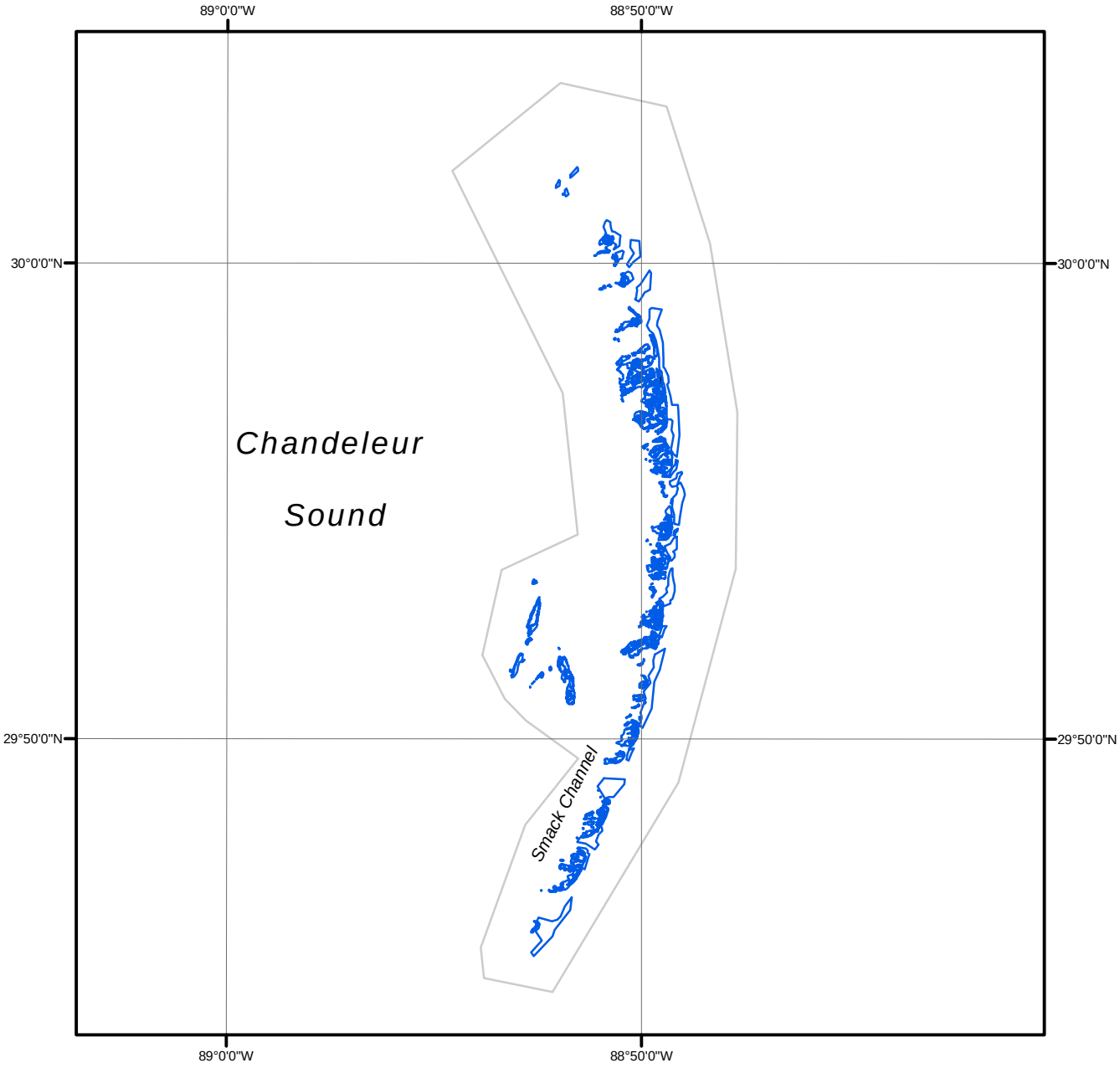
NOAA Shoreline Data Explorer

- GC10677 in shapefile format
- Metadata file for GC10677
- Digital copy of the PCR in Adobe PDF format

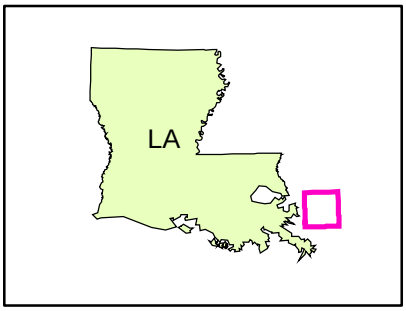
End of Report

CHANDELEUR ISLANDS

LOUISIANA



Overview



LA0603

GC10677