

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT MS0604

Port of Biloxi, Mississippi

Introduction

NOAA Coastal Mapping Program (CMP) Project MS0604 provides a highly accurate database of new digital shoreline data for a portion of Biloxi, Mississippi extending from the mouth of Biloxi Bay in the east to Keesler Air Force Base in the west and includes a portion of the Back Bay of Biloxi.

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 complements 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 (7/1/93). 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

Field operations consisted of the collection of static and kinematic Global Positioning System (GPS) data and acquisition of aerial photographs. The photographic mission operations were conducted on November 12, 2006, with the NOAA Cessna Citation II aircraft (N52RF). Two strips of natural color 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.

A base station was established at Gulfport Airport (KGPT), MS, using static GPS. Airborne kinematic GPS data was collected in conjunction with Inertial Measurement Unit (IMU) data to determine precise camera positions and orientations.

GPS Data Reduction

GPSIMU data were processed by RSD personnel to provide precise positions of camera centers for application as photogrammetric control in the Aerotriangulation (AT) phase. The static GPS base station data were processed via the National Geodetic Surveys (NGS) Online Positioning User Service (OPUS) software to compute a NAD83 position for the basestation. The airborne kinematic data was processed using Applanix POSPac (ver. 4.4) software. Refer to the 06GPT316 Airborne Positioning and Orientation Report (APOR) for further information on the GPS data processing and results.

Aerotriangulation

Routine softcopy Aerotriangulation methods were applied to establish a 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 completed using a BAE Systems SOCET SET (SS, ver. 5.4) Digital Photogrammetric Workstation (DPW). The color photographs were adjusted as a single block using the Multi-Sensor Triangulation (MST) module. Upon successful adjustment, MST provided the standard deviations of the residuals for each aero-triangulated ground point. These were then used to compute a 95% confidence circle (95% CC) radius of 1.1 meters. 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, ground control 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 personnel in July 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 analysis of the 1:30,000 scale aerial 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 MS0604 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 2.1 meters. This predicted accuracy is based on a doubling of the 95% CC reported in the Aerotriangulation section above.

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

Date	Time (UTC)	Roll ID	Photo Numbers	Scale	Tide Level*
11-12-06	16:38-16:39	06ACN19	2864-2867	1:30,000	0.1 m
11-12-06	16:44-16:45	06ACN19	2868-2871	1:30,000	0.1 m

* Tide levels are given in meters above MLLW and are based on predicted water levels at the NOS Tidal Gauge (ID#8744117) at Biloxi, MS, at the time of photography. The elevation of MHW is about 0.5 m.

Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a senior member of the RSD Applications Branch (AB). The review process included analysis of the AT 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. The entire suite of project products was evaluated for compliance to CMP requirements.

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

Chart 11372, ICW – Dog Keys Pass to Waveland, 33rd Ed., Jun. /07, Scale 1:40,000
Chart 11373, Mississippi Sound and Approaches, 46th Ed., Jul. /07, Scale 1:80,000

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 (APOR)
- Hardcopy of the Aerotriangulation Report
- Hardcopy of the Project Completion Report (PCR)
- Page-size graphic plot of GC10724 file contents, attached to PCR

Remote Sensing Division Electronic Data Library

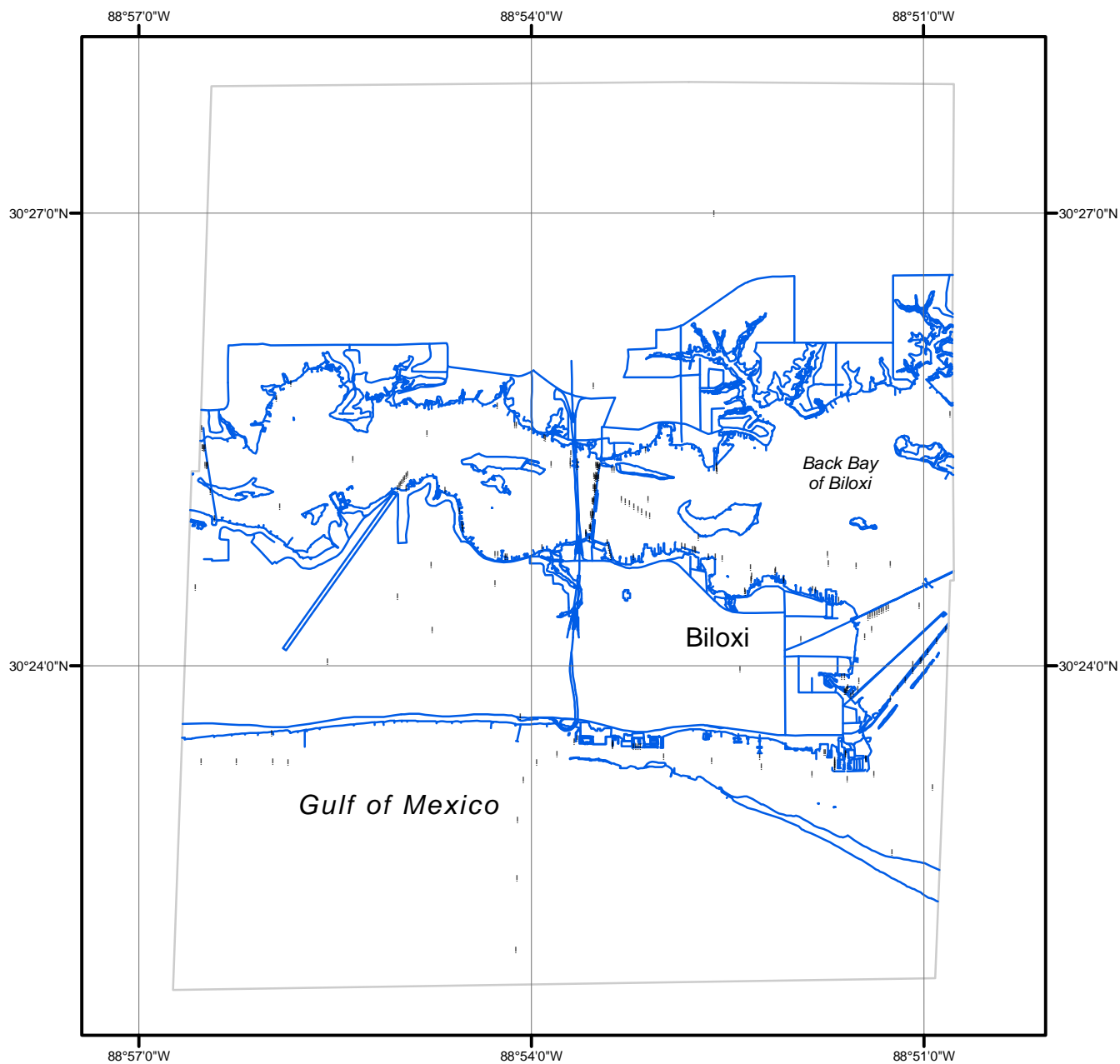
- Project database
- GC10724 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- Chart Evaluation File in shapefile format

NOAA Shoreline Data Explorer

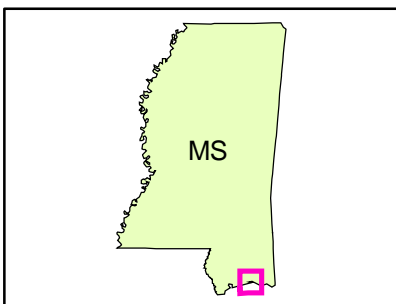
- GC10724 in shapefile format
- Metadata file for GC10724
- Digital copy of the PCR in Adobe PDF format

End of Report

PORT OF BILOXI MISSISSIPPI



Overview



MS0604
GC10724