

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT AL1102

Dauphin Island, Alabama

Introduction

Coastal Mapping Program (CMP) Project AL1102 provides highly accurate digital shoreline data for Dauphin Island in southern Alabama. The Geographic Cell (GC) may be used in support of the NOAA Nautical Charting Program (NCP) as well as geographic information systems (GIS) for coastal zone management applications.

Project Design

Project AL1102 was designed per a request from the Marine Chart Division (MCD) of the Office of Coast Survey, NOAA, for updated shoreline of Dauphin Island and Little Dauphin Island.

Field Operations

Photographic mission operations were conducted on May 9th, 2010 as part of a larger emergency response effort during the ongoing Deepwater Horizon Oil Spill in the Gulf of Mexico, in which over 35,000 images were acquired. The field operations consisted of the collection of static and kinematic Global Positioning System (GPS) data, Inertial Measurement Unit (IMU) data, and the acquisition of color aerial imagery. Imagery was acquired using an Applanix Digital Sensor System (DSS-439) DualCam digital camera with the NOAA King Air aircraft (N68RF). Airborne kinematic GPS data was collected in conjunction with IMU data to determine precise camera positions and orientations.

GPS Data Reduction

GPS and IMU data were processed by Remote Sensing Division (RSD) personnel to yield precise positions and orientations of camera centers as a means of rendering accurately positioned digital images. The static GPS base station data was processed in May of 2010 using the NGS Online Processing User Service (OPUS) software to compute fixed baseline solutions from three CORS stations. The final NAD83 position reported by OPUS was the average of these three baseline solutions. The airborne kinematic data was processed using Applanix POS MMS (ver. 5.2) software in May 2010. It is not standard practice to document the specific GPS/IMU data processing steps and results in NGS emergency response acquisitions, therefore no additional details or reports are available.

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 initiated by RSD personnel in April 2011 utilizing a Digital Photogrammetric Workstation (DPW), which is a configuration of computer hardware, modular software components, and other associated peripheral devices. Eighty-nine (89) digital images were measured and adjusted as two separate blocks using BAE Systems SOCET SET (version 5.5) photogrammetric suite in conjunction with the BINGO aerotriangulation software. Upon successful completion of the aerotriangulation process, the BINGO software provided the standard deviations for each aerotriangulated ground point, which were used to compute a predicted horizontal circular error of 0.14 meters for block one and 0.17 meters for block two 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 (NAD83).

Compilation

The data compilation phase of this project was initiated by RSD in June 2011. 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 the digital photographs and 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.

Spatial data accuracies for Project AL1102 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 0.3 meters at the 95% confidence level. The predicted accuracy of compiled, well defined points is derived by doubling the circular error computed from aerotriangulation statistics.

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

Date	Time (UTC)	Roll Number	Photo Numbers	GSD (nominal)	Tide Level*
5-09-2010	15:39-15:45	n/a	C12956366-C12956697	0.35 m	0.2 m
5-09-2010	15:49-15:54	n/a	C12956991-C12957255	0.35 m	0.2 m
5-09-2010	15:59-16:00	n/a	C12957578-C12957656	0.35 m	0.2 m
5-09-2010	16:06-16:07	n/a	C12957979-C12958069	0.35 m	0.2 m

* Tide levels are given in meters above MLLW and are based on actual observations recorded by the NOS gauge at Dauphin Island, AL. The mean tide range at the NOS gauge is 0.4 meters.

Final Review

The final review of the project was completed by a senior member of RSD in June of 2011, and 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 9.3 software. All project data was evaluated for compliance to CMP requirements.

Comparison of the largest scale NOAA nautical chart with the project imagery resulted in creation of the Chart Evaluation File (CEF). The following nautical charts were used for comparison:

- 11374, Dauphin Island to Dog Keys Pass, 1:40,000 scale, 35th edition
- 11377, Mobile Bay - Approaches & Lower Half, 1:40,000 scale, 9th edition
- 11378, Santa Rosa Sound to Dauphin Island, 1:40,000 scale, 37th 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 Aerotriangulation Report
- Hardcopy of the Project Completion Report (PCR)
- Page-size graphic plot of GC10885 file contents, attached to PCR

Remote Sensing Division Electronic Data Library

- Project database
- GC10885 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

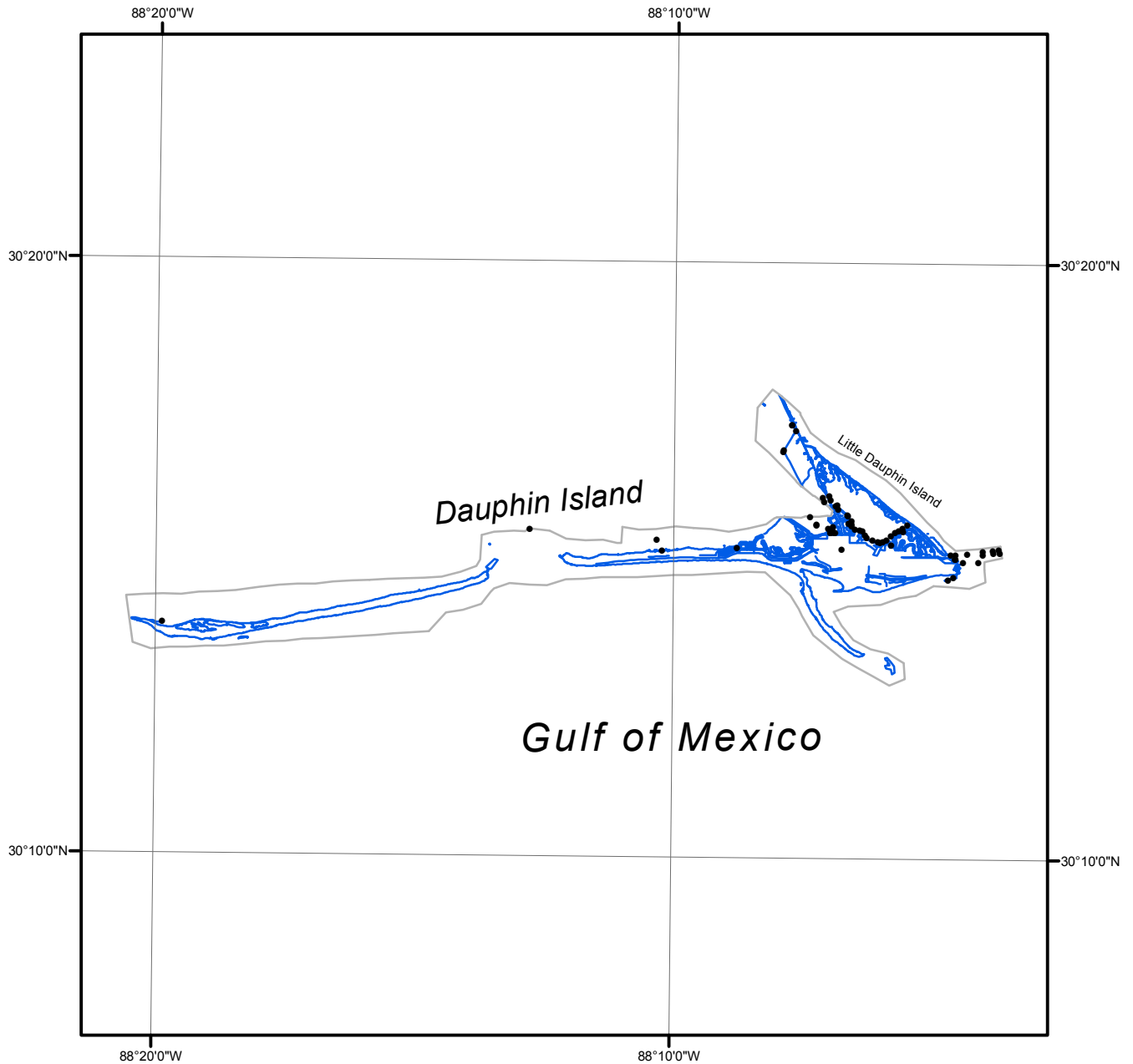
NOAA Shoreline Data Explorer

- GC10885 in shapefile format
- Metadata file for GC10885
- Digital copy of the PCR in Adobe PDF format

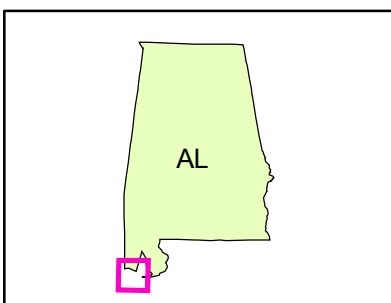
End of Report

DAUPHIN ISLAND

ALABAMA



Overview



AL1102

GC10885