

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT TX1103

Corpus Christi / Port Ingleside, Texas

Introduction

Coastal Mapping Program (CMP) Project TX1103 provides highly accurate digital shoreline data for the port of Corpus Christi/Port Ingleside, Texas. The Geographic Cell (GC) may be used in support of the NOAA Nautical Charting Program (NCP) as well as geographic information systems (GIS) for a variety of coastal zone management applications.

Project Design

The design of Project TX1103 was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for updates to the NOAA Electronic Navigational Chart (ENC) series. Project requirements were formulated as a result of analysis conducted within the Coast and Shoreline Change Analysis Program (CSCAP), in which NOAA nautical chart products are compared to contemporary high resolution imagery to ascertain the need for more current shoreline data. The result of this analysis was a recommendation for the complete photogrammetric recompilation of the shoreline for all port areas. Refer to the RB CSCAP memorandum of October 26, 2011 for details of the chart comparison process.

Field Operations

The field operations consisted of the collection of static and kinematic Global Positioning System (GPS) data and Inertial Measurement Unit (IMU) data and the acquisition of aerial imagery. The photographic mission operations were conducted on March 6, 2011 with the NOAA King Air (N68RF) aircraft. Eight strips of RGB (color) digital images were acquired with an Applanix Digital Sensor System (DSS) 439 aerial camera at a nominal altitude of 10,000 feet, resulting in an approximate ground sample distance (GSD) of 0.35 meters. Although imagery was not acquired in strict coordination with local tides, the goal was to collect all imagery below Mean High Water (MHW).

GPS Data Reduction

The GPS/IMU data were processed by RSD personnel to yield precise camera positions in order to provide a control network necessary for aerotriangulation. The base station's geodetic position was derived using the NGS Online Processing User Service (OPUS), which computed fixed baseline solutions from nearby CORS stations. The kinematic GPS data was processed using Applanix POSPAC (ver. 5.4) software in May 2012. For further information refer to the Airborne Positioning and Orientation Reports (APOR) on file with other project data within the RSD Project Archive.

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 performed by RSD Applications Branch (AB) personnel in February 2014 utilizing a Digital Photogrammetric Workstation (DPW), which is a configuration of computer hardware, modular software components, and other associated peripheral devices. The digital images were measured and adjusted as a single block using the Multi-Sensor Triangulation (MST) module of BAE Systems SOCET SET (v5.6.0) software. Upon successful completion of this process, the MST module provided the standard deviations for each aerotriangulated ground point, which were used to compute a predicted horizontal circular error of 0.5 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. Positional data is referenced to the North American Datum of 1983 (NAD83).

Compilation

The data compilation phase of this project was accomplished by a member of AB in July 2014. Digital feature data was compiled using SOCET SET v5.6.0 software. 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 TX1103 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 1.0 meters at the 95% confidence level. This predicted accuracy of compiled well-defined points is derived by doubling the circular error calculated from the aerotriangulation statistics.

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

Date	Time (UTC)	Roll #	Photo #s	~GSD	Tide Level*
6-MAR-2011	18:15 – 18:16	11NC03	0823 – 0832	0.35 m	0.1 m
6-MAR-2011	18:22 – 18:23	11NC03	0833 – 0842	0.35 m	0.1 m
6-MAR-2011	18:29 – 18:32	11NC03	0843 – 0858	0.35 m	0.1 m
6-MAR-2011	18:36 – 18:39	11NC03	0859 – 0874	0.35 m	0.1 m
6-MAR-2011	18:44 – 18:48	11NC03	0875 – 0901	0.35 m	0.1 m
6-MAR-2011	18:57 – 19:01	11NC03	0902 – 0929	0.35 m	0.1 m
6-MAR-2011	19:04 – 19:07	11NC03	0930 – 0951	0.35 m	0.1 m
6-MAR-2011	19:12 – 19:15	11NC03	0952 – 0972	0.35 m	0.1 m

* Tide levels are given in meters above MLLW referenced to preliminary water level observations at the time of photography from several TCOON gauges in the project area. The elevation of the MHW tidal datum in the project area varies between 0.18 – 0.30 meters above MLLW.

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 July 2014. 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 10.1 software. All project data was evaluated for compliance to CMP requirements.

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

11309, Corpus Christi Bay, 1:40,000 scale, 41st edition
11311, Corpus Christi Harbor, 1:10,000 scale, 24th edition

End Products and Deliverables

The following specifies the location and identification of end 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 GC11065 file contents, attached to PCR

Remote Sensing Division Electronic Data Library

- Project database
- GC11065 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

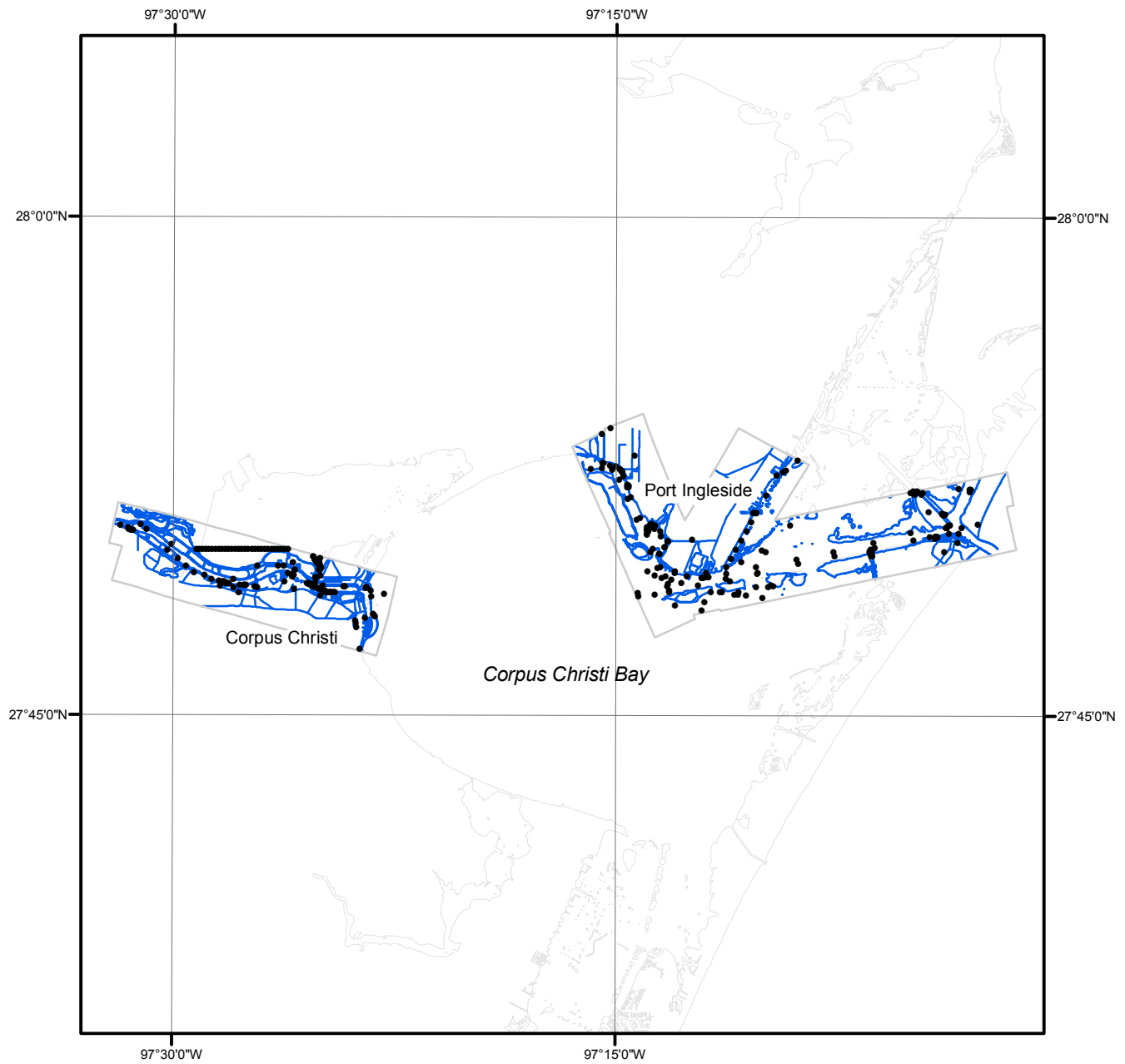
NOAA Shoreline Data Explorer

- GC11065 in shapefile format
- Metadata file for GC11065
- Digital copy of the PCR in Adobe PDF format

End of Report

CORPUS CHRISTI / PORT INGLESIDE

TEXAS



Overview



TX1103

GC11065