

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

## ***PROJECT TX0602***

### ***Matagorda Ship Channel, Texas***

#### **Introduction**

Coastal Mapping Program (CMP) Project TX0602 provides highly accurate digital shoreline data for key areas of change in the Matagorda Ship Channel, Texas from Port Lavaca to Point Comfort. 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 TX0602 was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for timely 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 aerial imagery in order to ascertain the need for more current shoreline data. A Chart Evaluation File (CEF) was forwarded to the Applications Branch (AB) of RSD once the change analysis was complete. Refer to the RB memorandum regarding results of the CSCAP change analysis for further details of the comparison process.

#### **Field Operations**

Field operations consisted of acquisition of aerial photographs along with the collection of Global Positioning System (GPS) and Inertial Measurement Unit (IMU) data. The photographic mission operations were conducted on September 19, 2006, with the NOAA Cessna Citation II (N52RF) aircraft. Three strips of natural color photographs, for a total of twenty-five (25) 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.

GPS data collection operations were conducted in accordance with the GPS Controlled Photogrammetry Field Operations Manual. A base station was established to collect static GPS data, but an equipment failure during the mission rendered the data useless. Airborne kinematic GPS and IMU data was collected for the purpose of positioning and orienting the aerial photographs.

#### **GPS Data Reduction**

The GPS and IMU data was processed to provide precise positions of camera centers for application as photogrammetric control in the aerotriangulation phase of project completion. Due to the failure of the GPS base station, data from published cooperative CORS station TXVA, operated by the Texas Department of Transportation, was downloaded

and used for processing the airborne kinematic data. This data was processed using Applanix POSPAC 4.31 GPS/IMU processing software in November 2006. An Airborne Positioning and Orientation Report (APOR) was written and is 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 performed by RSD/AB personnel in March 2007. All photographs were bridged using a Digital Photogrammetric Workstation (DPW), which is a configuration of computer hardware, modular software components and other associated peripheral devices. All photographs were measured and adjusted as a single block using BAE Systems' SOCET SET (version 5.3) photogrammetric software in conjunction with the Multi-Sensor Triangulation (MST) software module. Using the root mean square (RMS) from the standard deviations of all image points, a predicted horizontal circular error of 1.0 meters was computed based on a 95% confidence level. This CE value was doubled in order to conservatively predict the accuracy of well-defined points measured during the compilation process. 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 based on the UTM Coordinate System (Zone 14 North) and is referenced to the North American Datum of 1983 (NAD 83).

## **Compilation**

The data compilation phase of this project was accomplished by RSD/AB personnel in April 2007. The work was accomplished using a DPW, in conjunction with the SOCET SET Feature Extraction software module. Feature identification and the 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 TX0602 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 2.0 meters at the 95% confidence level.

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

Date	Time (UTC)	Roll Number	Photo Numbers	Scale (nominal)	Tide Level*
09-19-06	16:00-16:03	06ACN14	130001_1790-1802	1:30,000	0.2 m
09-19-06	15:52-15:55	06ACN14	130002_1786-1795	1:30,000	0.3 m
09-19-06	15:43-15:46	06ACN14	130003_1778-1785	1:30,000	0.3 m

\* Tide levels are given in meters above MLLW and are based on preliminary observations recorded by the NOS reference gauge at Port O'Connor, Matagorda Bay, Texas at the time of photography. No verified data was available for this location during this time period. The elevation of MHW at Port O'Connor, Matagorda Bay, Texas is 0.2 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 2008. The review process included analysis of the georeferencing 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. The entire suite of project products was evaluated for compliance to CMP requirements.

## 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 GC10661 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

### Remote Sensing Division Electronic Data Library

- GC10661 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

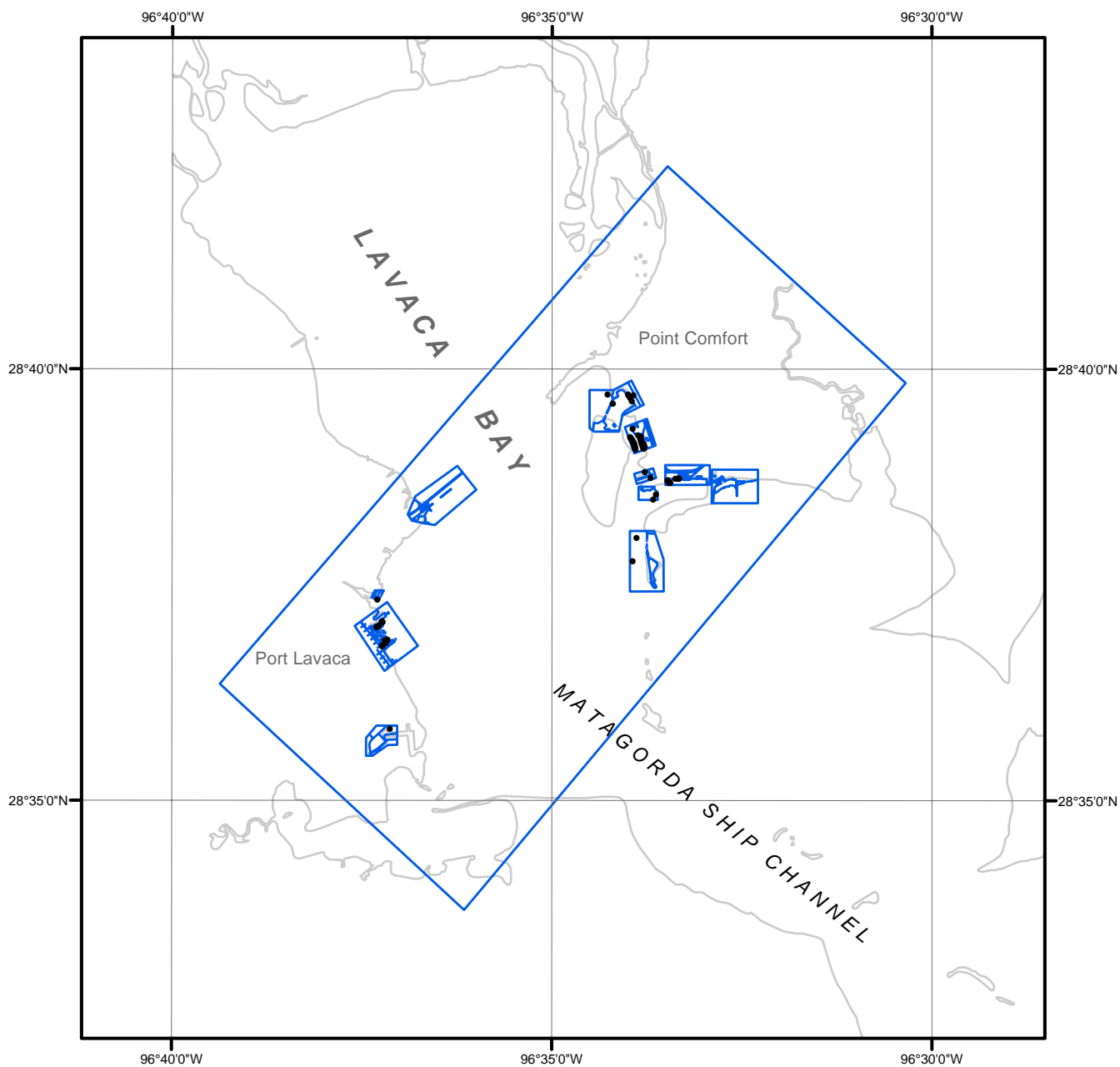
### NOAA Shoreline Data Explorer

- GC10661 in shapefile format
- Metadata file for GC10661
- Digital copy of the PCR in Adobe PDF format

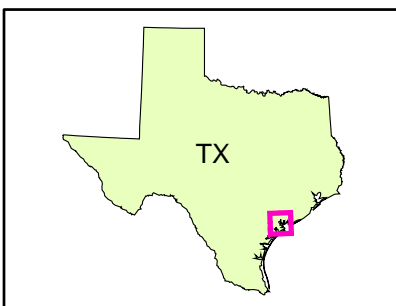
## End of Report

# MATAGORDA SHIP CHANNEL

## TEXAS



Overview



TX0602

GC10661