

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT TX0601A

Port of Houston, Texas

Introduction

Coastal Mapping Program (CMP) Project TX0601A provides highly accurate digital shoreline data for key areas of change within the Port of Houston, 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 TX0601A 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 contemporary high resolution satellite imagery in order to ascertain the need for more current shoreline data. Refer to the RB Memorandum of January 9, 2006, "Results of CSCAP Change Analysis for Houston, Texas (TX0601A)" for details of the chart comparison process.

Field Operations

Routine CMP field operations did not apply for this project based on the origin of the project source data. Existing sources of horizontal control were used for the georeferencing process.

Georeferencing

Eight IKONOS non-orthorectified color images, with a spatial resolution of 1 meter, were georeferenced using Erdas IMAGINE 9.0 software on a Windows platform. Ground control points (GCPs), photogrammetrically measured from metric quality aerial photography, were imported into IMAGINE and used to georeference the satellite imagery. Within IMAGINE, the Raster Geometric Correction tool was used with a 1st order polynomial model. The imagery was resampled using the Nearest Neighbor sampling method. The RMS of the residuals for measured check points was used to compute a predicted horizontal circular error at the 95% confidence interval (CE95) of 1.0 meter for the satellite image. This CE value was tripled and then added to the CE95 of the source imagery from which ground control points were extracted, in order to conservatively predict the accuracy of well-defined points measured during the compilation process. Positional data is based on the UTM Coordinate System (zone 15), and referenced to the North American Datum of 1983.

Compilation

The data compilation phase of this project was accomplished by RSD in November 2006. Digital feature data was compiled in ESRI shapefile format from imagery using ESRI's ArcGIS 9.1 desktop GIS 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 cartographic features were further modified with additional descriptive information to refine general classification.

Spatial data accuracies for Project TX0601A were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were tested to have a horizontal accuracy of 3.9 meters at the 95% confidence level. This predicted accuracy of well-defined points is based on a minimum of twenty (20) check points that were compared to an independent source of higher accuracy.

The following table provides information on satellite images used in this project:

Image #	Image Source	Source ID	Source File Name	Acquisition Date/Time	Tide Level*
1	IKONOS	2005082017171560000010122781	po_182764_rgb_0000000.tif	2005-08-20 17:17 GMT	0.4
2	IKONOS	2005062317060110000011608017	po_182764_rgb_0050000.tif	2005-06-23 17:06 GMT	0.6
3	IKONOS	2005062617145030000011611796	po_182764_rgb_0010000.tif	2005-06-26 17:14 GMT	0.4
4	IKONOS	2005061517134660000011630927	po_182764_rgb_0020000.tif	2005-06-15 17:13 GMT	0.2
5	IKONOS	2005062617142710000011611795	po_182764_rgb_0030000.tif	2005-06-26 17:14 GMT	0.3
6	IKONOS	2005062617142710000011611795	po_182764_rgb_0030001.tif	2005-06-26 17:14 GMT	0.3
7	IKONOS	2005061517134660000011630927	po_182764_rgb_0020001.tif	2005-06-15 17:13 GMT	0.2
8	IKONOS	2005061217044020000011627527	po_182764_rgb_0040000.tif	2005-06-12 17:04 GMT	0.5

* Tide levels are given in meters above MLLW and are based on actual observations recorded by NOS gauges throughout the project area at the time of imagery acquisition. The elevation of the MHW tidal datum: at the Battleship Texas State Park reference station (id #8770743) is equal to 0.4 meters above MLLW, at the Morgans Point substation (id#8770613) is equal to 0.4 meters above MLLW and Manchester substation (id#8770777) is equal to 0.5 meters above MLLW.

Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a senior member of the Applications Branch of RSD. QC activities for this project were finalized by June 2007. The review process also included analysis of the georeferencing results and evaluation of the identification and attribution of cartographic features 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 Project Completion Report (PCR)
- Page-size graphic plot of GC10634 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

Remote Sensing Division Electronic Data Library

- GC10634 in ESRI shapefile format
- Digital copy of the PCR in Adobe PDF format
- Chart Evaluation File (CEF) in shapefile format

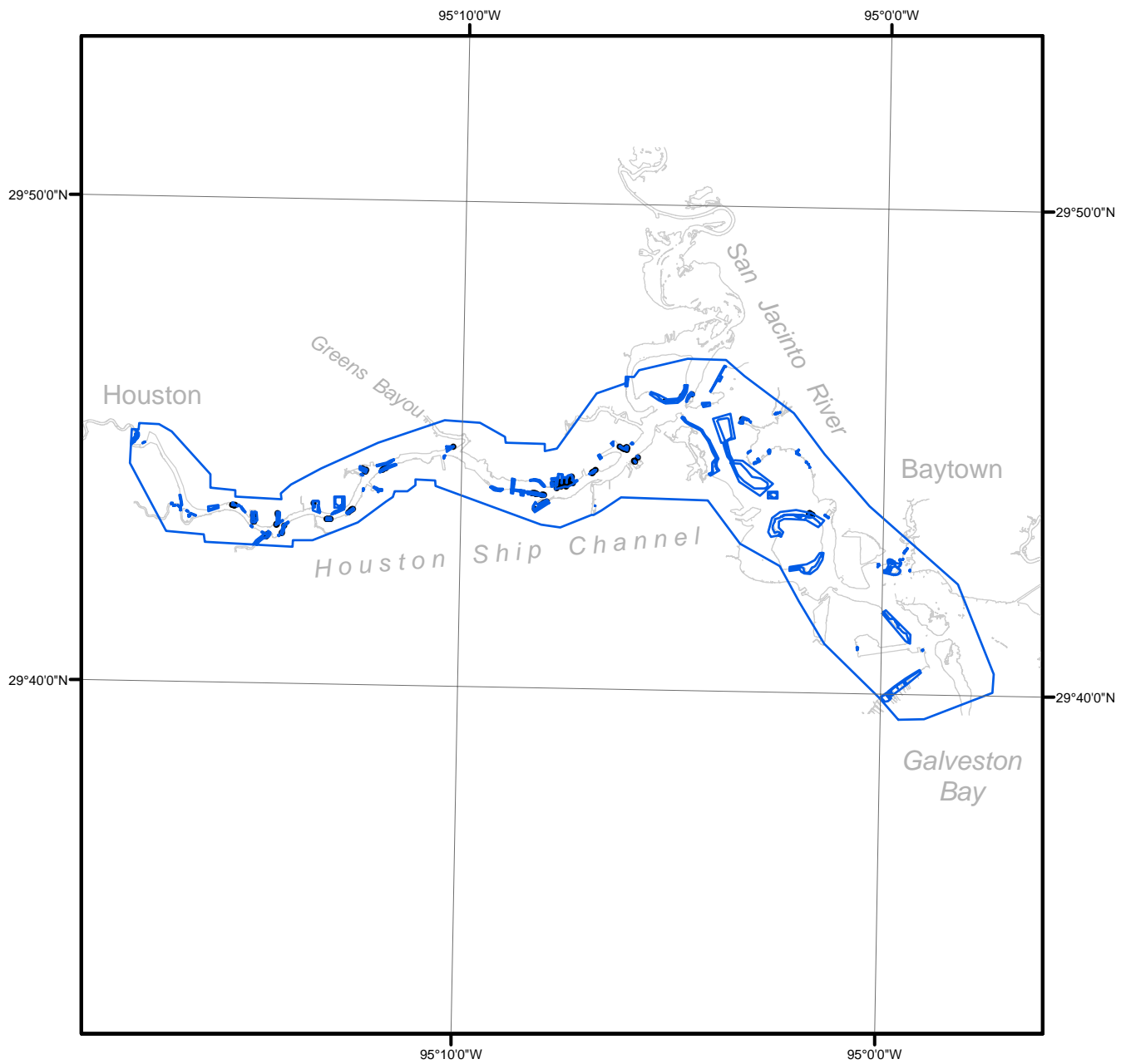
NOAA Shoreline Data Explorer

- GC10634 in ESRI shapefile format
- Metadata file for GC10634
- Digital copy of the PCR in Adobe PDF format

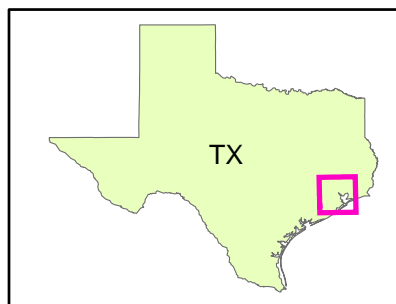
End of Report

PORT OF HOUSTON

TEXAS



Overview



TX0601A

GC10634