

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT CA0602

Port Hueneme and Ventura Harbor, California

Introduction

Coast and Shoreline Change Analysis Program (CSCAP) project CA0602 provides highly accurate digital shoreline data for key areas of change in Port Hueneme and Ventura Harbor, California. 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 CA0602 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. 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 of March 5, 2007, "Change Analysis Report for Port Hueneme and Ventura Harbor, California," for details of the chart comparison process.

Field Operations

The field operations consisted of the collection of static and kinematic GPS data and the acquisition of aerial photographs. The photographic mission operations were conducted on Nov 04, 2006 with the NOAA Cessna Citation II (N52RF) aircraft. Two strips of natural color photographs were acquired through use of a Wild RC-30 camera with the NOS "A" lens cone at a nominal scale of 1:30,000.

A base station was established at the Santa Barbara Airport (KSBA) using static GPS. Airborne kinematic GPS data was collected in conjunction with an Inertial Measurement Unit (IMU) to determine precise camera positions and orientations. GPS data collection operations were conducted in accordance with the GPS Controlled Photogrammetry Field Operations Manual.

GPS Data Reduction

GPS and IMU data were collected and processed to provide precise positions of camera centers for application as photogrammetric control in the aerotriangulation phase of project completion. The static GPS base station data was processed in November 2006 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 POSGPS (ver. 4.2) software in February 2007 for all of the photographs. 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 initiated by RSD personnel in April 2007 utilizing a Digital Photogrammetric Workstation (DPW), which is a configuration of computer hardware, modular software components and other associated peripheral devices. The two strips of twenty eight natural color photographs were measured by using BAE Systems' SOCET SET (version 5.2) photogrammetric software in conjunction with the Multi-Sensor Triangulation Package (MST) aerotriangulation software. Upon successful completion of the aerotriangulation process, the MST software provided the RMS of the standard deviations of the residuals for each aerotriangulated ground point which were used to compute an overall predicted horizontal circular error of 0.95 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.

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 the project was initiated by RSD personnel in April 2007. Digital mapping was performed using a Digital Photogrammetric Workstation (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 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). Selected features were further modified with additional descriptive information to refine general classification.

Spatial data accuracies for Project CA0602 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 1.9 meters at the 95% confidence level. This predicted accuracy of compiled, well defined points is derived by doubling the circular error derived from aerotriangulation statistics.

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

Date	Time (UTC)	Roll Number	Photo Numbers	Scale (nominal)	Tide Level*
11-04-06	20:27 – 20:28	06ACN18	2753 – 2756	1:30,000	0.2 m
11-04-06	20:29 – 20:30	06ACN18	2762 – 2764	1:30,000	0.2 m

* Tide levels are given in meters above MLLW and are based on verified water levels recorded by the NOS gauge at Los Angeles, with time and height corrections applied to tidal substations in the project area. The mean tide range in the project area is about 1.1 meters.

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 June 2007. 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 9.1 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 charts were used in the comparison process:

- 18724, Port Hueneme and Approaches, CA, 1:20,000 scale, 1st edition, Mar. 2003
- 18725, Ventura CA, 1:25,000 scale, 28th edition, Nov. 2006

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 GC10669 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

Remote Sensing Division Electronic Data Library

- Project database
- GC10669 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- Chart Evaluation File in shapefile format

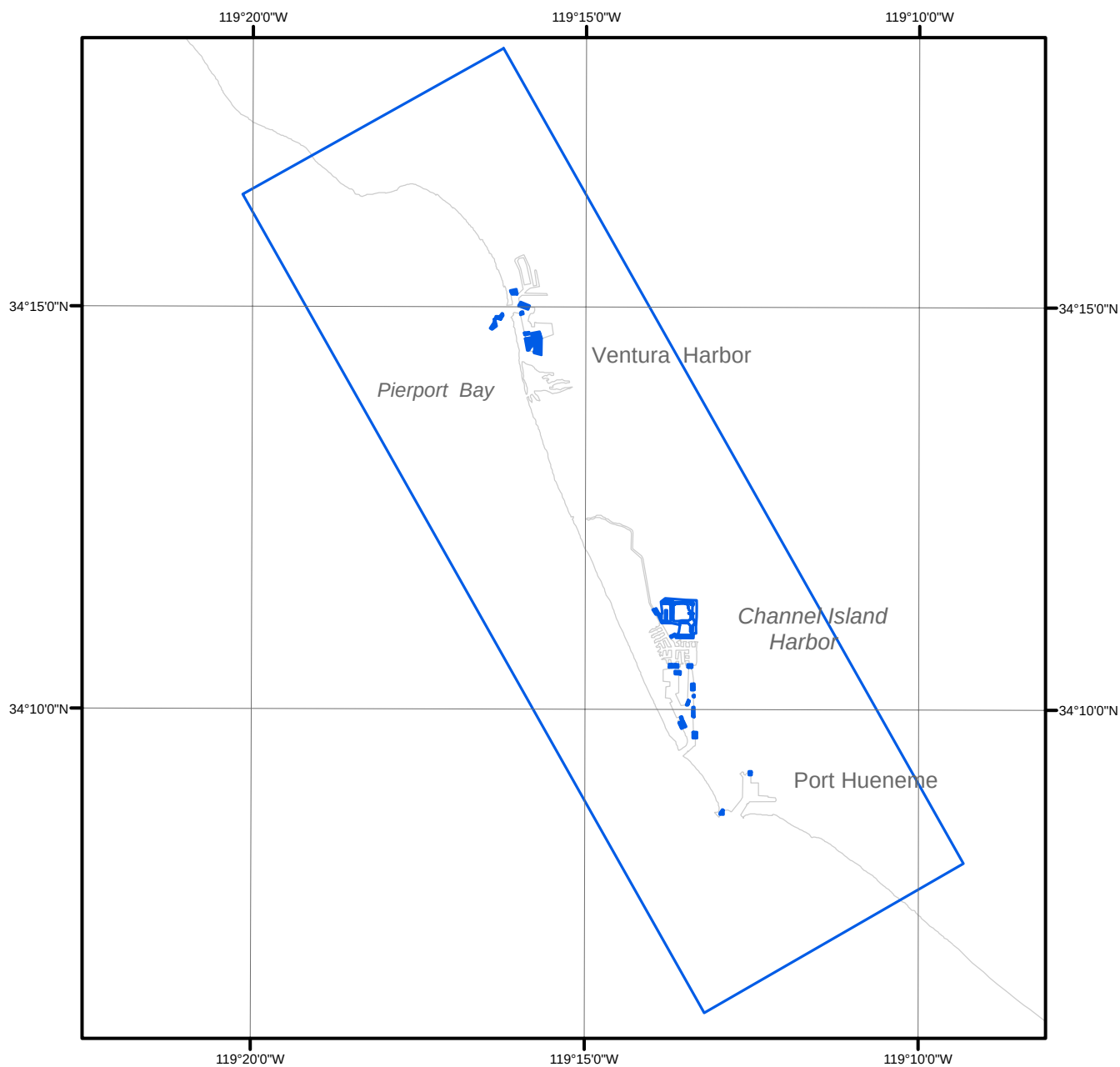
NOAA Shoreline Data Explorer

- GC10669 in shapefile format
- Metadata file for GC10669
- Digital copy of the PCR in Adobe PDF format

End of Report

PORT HUENEME AND VENTURA HARBOR

CALIFORNIA



Overview



CA0602

GC10669