

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT OR0501

Coos Bay, Oregon

Introduction

NOAA Coastal Mapping Program (CMP) Project OR0501 provides a highly accurate database of new digital shoreline data for Coos Bay, Oregon and surrounding coastal areas. The project extends from just north of Twomile Creek northward to the town of Hauser, and includes the entire bay area, the port of Coos Bay, and portions of the Coos River.

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 Requirements Branch (RB) of the Remote Sensing Division (RSD) formulated the photographic mission instructions for this project following the guidelines of the Photo Mission Standard Operating Procedure Version II (7/1/93). The instructions discussed the project's purpose, geographic area of coverage, scope and priority; photographic requirements; flight line priority; Global Positioning System (GPS) data collection procedures and guidelines for both kinematic and static surveys; data recording and handling instructions; and contact and communication information. RB created a Project Layout Diagram, flight maps and input files for the aircraft's flight management system.

Field Operations

Field operations for this project consisted of the collection of static and kinematic GPS data and the acquisition of aerial photographs. The photographic mission operations to acquire the color images were conducted from August 8 to August 9, 2005. The MLLW infrared (IR) images were flown on July 14, 2006 and the MHW IR images were flown on July 16, 2006. All images were acquired using the NOAA Cessna Citation II aircraft. Thirteen strips of natural color photographs and eight strips of black and white IR 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. The collection of the B&W IR photographs was coordinated with the MLLW and MHW tide levels, based on predicted tides at the Charleston, OR gauge (#9432780).

A base station was established at the Southwest Oregon Regional airport using static GPS. Airborne kinematic GPS data was collected to determine precise camera positions in order to establish a control network necessary for aerotriangulation. GPS data

collection operations were conducted in accordance with the GPS Controlled Photogrammetry Field Operations Manual (10/25/99).

GPS Data Reduction

GPS and IMU data was processed by RSD personnel to provide precise camera positions and orientations for application as photogrammetric control in the aerotriangulation phase of project completion. The static GPS base station data for the color images was processed in August 2005 using the NGS Online Processing User Service (OPUS) software to compute fixed baseline solutions from three CORS stations. The airborne kinematic data for the color images was processed using Applanix POSPac (v. 4.3) software in November 2007. The static GPS base station data for the B&W infrared images was processed using OPUS in December 2007. The airborne kinematic data for the B&W infrared images was processed using POSPac in January 2008. Please refer to the Airborne Positioning and Orientation Report (APOR) for OR0501 for more information on the GPS data and results.

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 January 2008 utilizing a Digital Photogrammetric Workstation (DPW), which is a configuration of computer hardware, modular software components and other associated peripheral devices. All of the images were imported using Bingo Frame Import and then measured and adjusted as a single block using the Multi-Sensor Triangulation (MST) module within BAE Systems SOCET SET (version 5.3) photogrammetric 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 a predicted horizontal circular error of 0.6 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 this project was initiated by RSD personnel in April 2008. 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 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 OR0501 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 1.2 meters at the 95% confidence level. This predicted accuracy of compiled, well defined points was calculated by doubling the circular error derived from aerotriangulation statistics.

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

Date	Time (UTC)	Roll Number	Photo Numbers	Strip	Scale (nominal)	Tide Level*
08-08-05	21:12-21:16	05ACN09	1112-1129	20-010 C	1:30,000	1.3
08-08-05	21:23-21:27	05ACN09	1133-1148	20-011 C	1:30,000	1.4
08-08-05	22:35-22:39	05ACN09	1221-1237	20-003 C	1:30,000	1.4
08-08-05	22:46-22:51	05ACN09	1243-1260	20-004 C	1:30,000	1.5
08-09-05	23:00-23:05	05ACN11	1281-1300	20-001 C	1:30,000	1.8
08-09-05	23:13-23:18	05ACN11	1306-1325	20-002 C	1:30,000	1.8
07-14-06	18:28-18:35	06AR06	751-774	20-002 IR_L	1:30,000	0.1
07-14-06	18:39-18:43	06AR06	775-797	20-001 IR_L	1:30,000	0.2
07-14-06	18:53-18:58	06AR06	798-816	20-010 IR_L	1:30,000	0.3
07-14-06	19:04-19:08	06AR06	817-834	20-011 IR_L	1:30,000	0.3
07-16-06	23:04-23:10	06AR07	860-883	20-002 IR_H	1:30,000	1.7
07-16-06	23:15-23:22	06AR07	884-906	20-001 IR_H	1:30,000	1.8
07-16-06	23:41-23:46	06AR07	907-925	20-010 IR_H	1:30,000	1.7
07-16-06	23:51-23:57	06AR07	926-942	20-011 IR_H	1:30,000	1.7

* Tide levels are given in meters above MLLW and are based on actual observations at the NOS reference tide station in Charleston, OR with corrections applied to various substations throughout the project area. The approximate tide range in the project area is 1.7m.

Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a senior member of the RSD Applications Branch (AB). The final QC review was completed in September 2008. The review process included analysis of the 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. The entire suite of project products was evaluated for compliance to CMP requirements.

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

18587, Coos Bay, OR, 1:20,000 scale, 68th edition, Oct. /05

18580, Cape Blanco to Yaquina Head, OR, 1:191,730 scale, 21st edition, Dec. /05

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 APOR
- Hardcopy of the Aerotriangulation Report
- Hardcopy of the Project Completion Report (PCR)
- Page-size graphic plot of GC10695 file contents, attached to PCR

Remote Sensing Division Electronic Data Library

- Project database
- GC10695 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- Chart Evaluation File in shapefile format

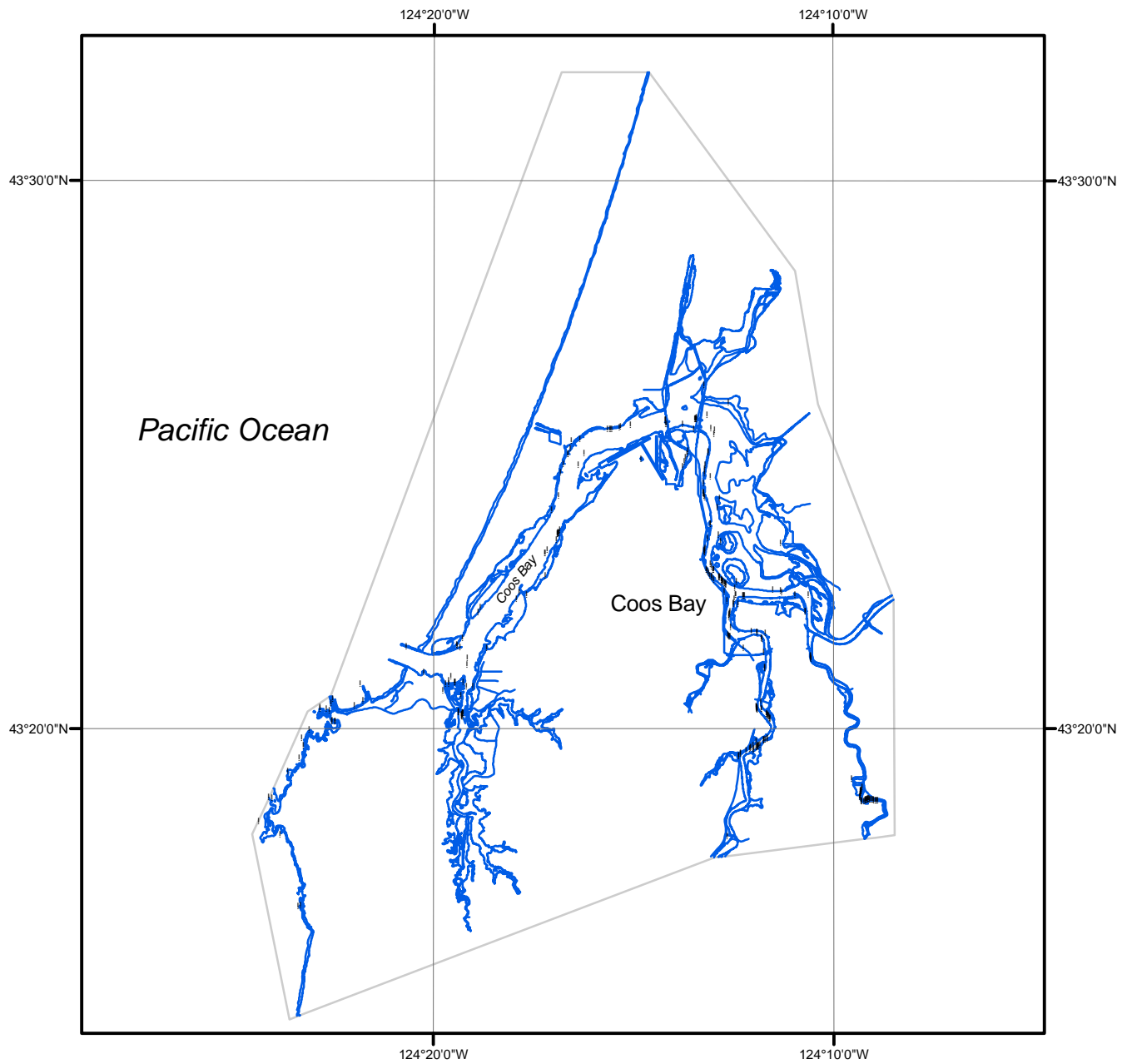
NOAA Shoreline Data Explorer

- GC10695 in shapefile format
- Metadata file for GC10695
- Digital copy of the PCR in Adobe PDF format

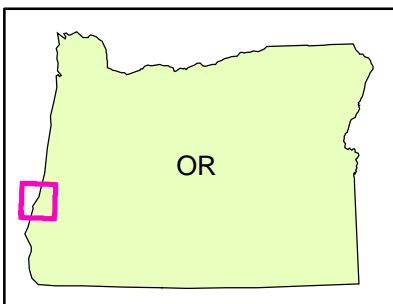
End of Report

COOS BAY

OREGON



Overview



OR0501

GC10695