

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT ME0601

Portland, Maine

Introduction

Coastal Mapping Program (CMP) Project ME0601 provides highly accurate digital shoreline data for key areas of change in Portland, ME. The geographic cell (GC) may be used in support of the NOAA Nautical Charting Program (NCP) as well as geographic information systems (GIS) for coastal zone management applications.

Project Design

The design of Project ME0601 was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for timely updates to NOAA's Electronic Navigational Chart 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 Portland, ME CSCAP Analysis memo for details regarding 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.

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 AB personnel in October 2006 utilizing a Digital Photogrammetric Workstation (DPW), which is a configuration of computer hardware, modular software components and other associated peripheral devices. Twenty-three (23) natural color aerial photographs from RSD Acquisition ANE0501 to support the Airport Survey Program Project OC00329_1001 were measured and adjusted as one block using BAE's SOCET SET[®] (version 5.3.0) suite of digital photogrammetric software. BAE's Multi-Sensor Triangulation (MST[®]) module was used to perform the aerotriangulation and evaluate the accuracy of the adjustment. Upon successful completion of the aerotriangulation process, the MST module 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 for the entire block based on a 95% confidence level (CE95).

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).

Georeferencing

One Quickbird non-orthorectified color image with a spatial resolution of 61 centimeters, acquired from Digital Globe, Inc., was georeferenced using Erdas IMAGINE 9.0 software on a Windows platform. Ground control points (GCP's), photogrammetrically measured from the aerotriangulated aerial photographs described above, 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 CE95 of 1.4 meters for the satellite image. This CE value was tripled and then added to the CE95 of the source imagery given above, in order to conservatively predict the accuracy of well-defined points measured during the compilation process. A Georeferencing Report was written and is on file with other project data within the AB Project Archive.

Compilation

The compilation of cartographic feature data for this project was accomplished by a member of AB in February 2007. Digital feature data was compiled in ESRI shapefile format from imagery using ESRI's ArcGIS® version 9.1 desktop GIS software. Feature attributes were established using 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 ME0601 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features extracted from georeferenced commercial satellite imagery were tested to have a horizontal accuracy of 4.9 meters at the 95% confidence level, a predicted accuracy of well-defined points based on a minimum of twenty (20) check points which were compared to an independent source of higher accuracy.

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

Image Source	Source ID	Source File Name	Acquisition Date/Time	Tide Level*
QuickBird	005537419010_01	06FEB19155613-S2AS-005537419010_01_P001	2006-02-19 15:56 GMT	0.6 m

* Tide levels are given in meters above MLLW and are based on actual observations recorded by the NOS reference gauge at Portland, ME. The Old Orchard Beach and Portland Head Light substations were used and referenced to Portland, ME. The elevation of MHW at Portland, ME is 2.9 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 May 2007. 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 Georeferencing Report
- Hardcopy of the Project Completion Report (PCR)
- Page size graphic plot of GC10635 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

Remote Sensing Division Electronic Data Library

- GC10635 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

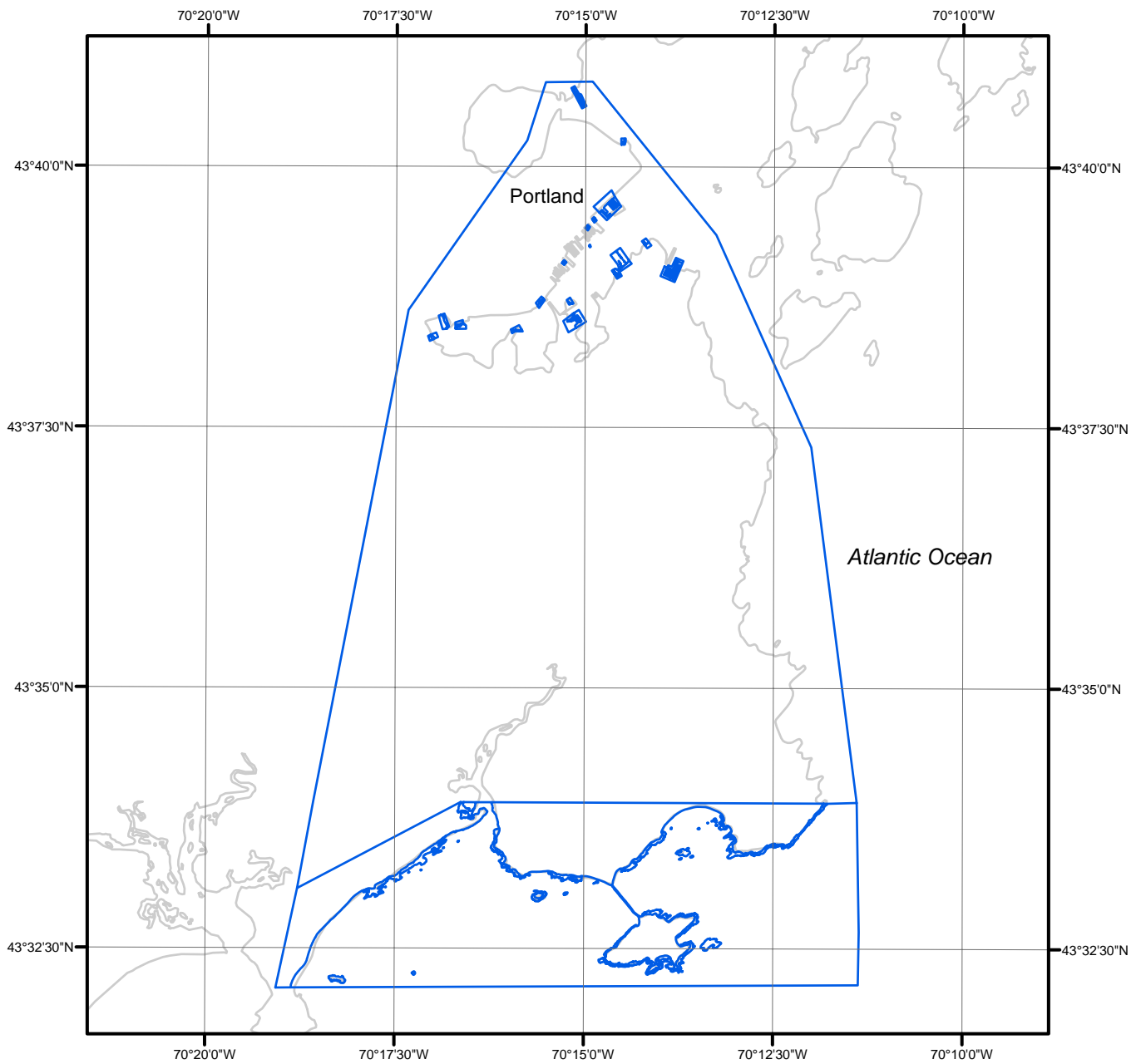
NOAA Shoreline Data Explorer

- GC10635 in shapefile format
- Metadata file for GC10635
- Digital copy of the PCR in Adobe PDF format

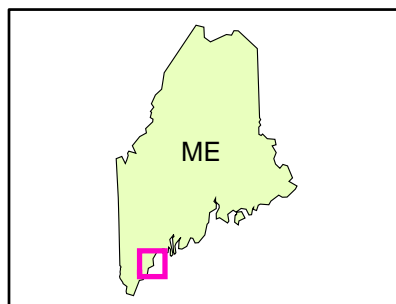
End of Report

PORTLAND

MAINE



Overview



ME0601

GC10635