

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

## ***PROJECT ME1101G***

### ***North Haven Harbor, Maine***

#### **Introduction**

Coastal Mapping Program (CMP) Project ME1101G provides highly accurate digital shoreline data for North Haven Harbor, Maine. ME1101G is a subproject of a larger project, ME1101, which covers numerous small harbors along the coast of Maine. 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. 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**

The field operations consisted of the collection of static and kinematic Global Positioning System (GPS) data, and Inertial Measurement Unit (IMU) data, as well as the acquisition of aerial imagery. The photographic mission operations were conducted on June 20, 2011 with the NOAA King Air (N68RF) aircraft. Two strips of RGB (color) digital images were acquired with an Applanix Digital Sensor System (DSS) 439 aerial camera at a nominal altitude of 10,000 feet, resulting in an approximate ground sample distance (GSD) of 0.35 meters. Although imagery was not acquired in strict coordination with local tides, the goal was to collect all imagery below Mean High Water (MHW).

#### **GPS Data Reduction**

The GPS/IMU data were processed by RSD personnel to yield precise camera positions in order to provide a control network necessary for aerotriangulation. The base station's geodetic position was derived using the NGS Online Processing User Service (OPUS), which computed fixed baseline solutions from nearby CORS stations. The kinematic GPS data was processed using Applanix POSPAC (ver. 5.4) software in on December 12, 2012. For further information refer to the Airborne Positioning and Orientation Reports (APOR) on file with other project data within the RSD Project Archive.

## Aerotriangulation

The Total Propagated Uncertainty (TPU) method was used in determining the overall predicted horizontal accuracy of this project. Using this tool, the predicted horizontal uncertainty at the 95% confidence level was calculated to be 1.3 meters for the imagery used to compile the data. In addition, four independent published 3<sup>rd</sup> order NGS photo-identifiable surveyed ground points were observed in the acquired imagery. This work was performed by RSD Applications Branch (AB) personnel in October 2014 utilizing a Digital Photogrammetric Workstation (DPW), which is a configuration of computer hardware, modular software components, and other associated peripheral devices. An Aerotriangulation Report was written and is on file with other project data within the RSD Project Archive. Positional data is referenced to the North American Datum of 1983 (NAD83).

## Compilation

The data compilation phase of this project was accomplished by a member of AB in October 2014. Digital feature data was compiled using SOCET Set (version 5.6.0) 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 features were further modified with additional descriptive information to refine general classification.

Spatial data accuracies for Project ME1101G were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 2.6 meters at the 95% confidence level. This predicted accuracy of compiled well-defined points is derived by doubling the circular error calculated from the aerotriangulation statistics.

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

Date	Time (UTC)	Roll Number	Photo Numbers	Strip Number	Tide Level*
20-JUN-2011	14:07 – 14:08	11NC55	17898 – 17902	50-044	0.4 m
20-JUN-2011	14:12 – 14:12	11NC55	17903 – 17909	50-015	0.4 m
20-JUN-2011	14:17 – 14:18	11NC55	17911 – 17916	50-014	0.4 m

\* Tide levels are given in meters above MLLW and were calculated using the Pydro software tool with discrete tidal zoning referenced to verified water level observations at the time of photography from the NOS gauge in Bar Harbor, ME. The elevation of the MHW tidal datum in the project area is 3.0 meters above MLLW.

## Quality Control / Final Review

The final review of the project was completed by a senior member of RSD in November 2014, and 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 10.1 software. All project data was evaluated for compliance to CMP requirements.

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

13308, Fox Islands Thorofare, ME, 1:15,000 scale, 13<sup>th</sup> Ed., Dec./11

## **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 GC11041 file contents, attached to PCR

### **Remote Sensing Division Electronic Data Library**

- Project database
- GC11041 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

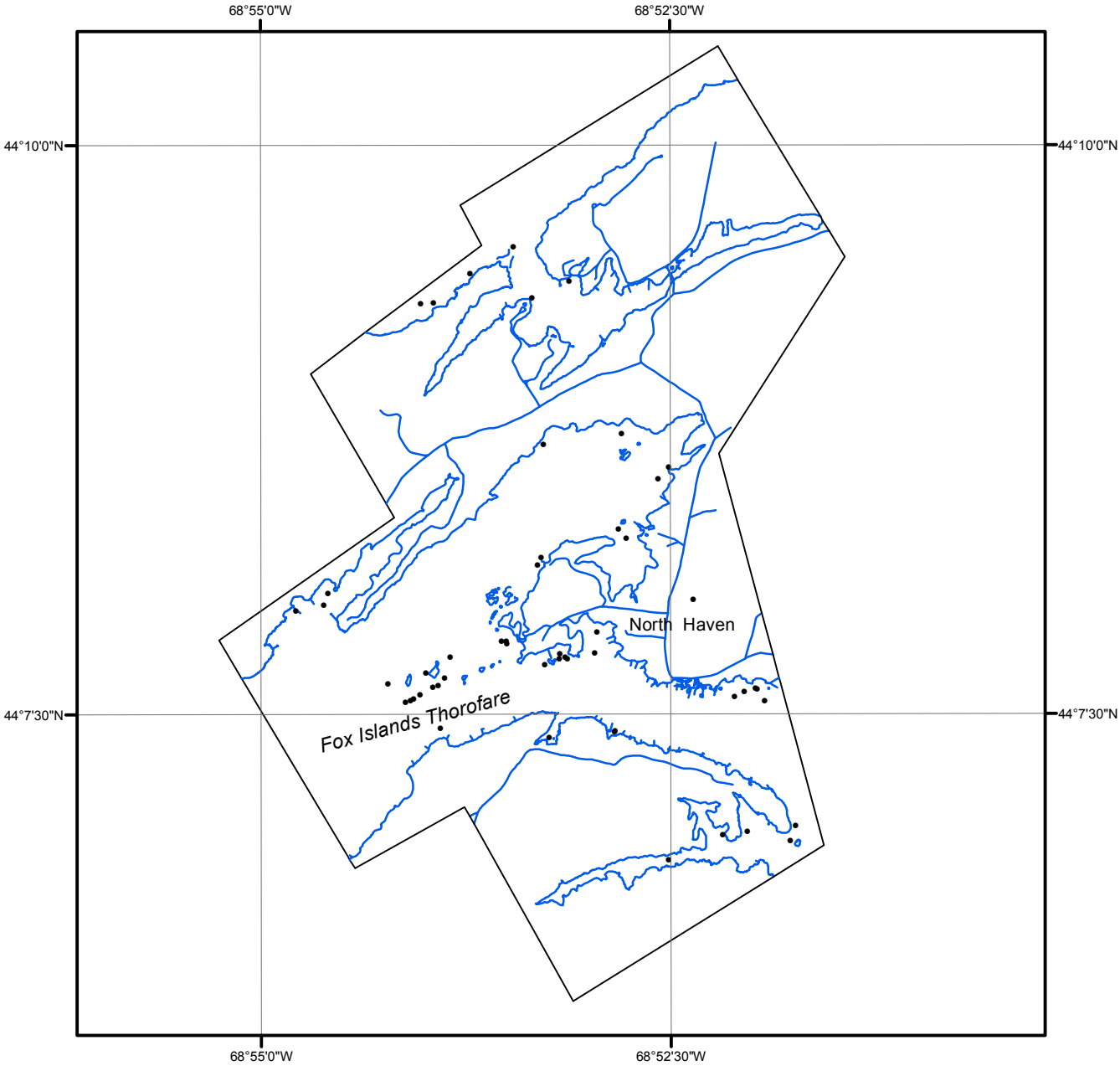
### **NOAA Shoreline Data Explorer**

- GC11041 in shapefile format
- Metadata file for GC11041
- Digital copy of the PCR in Adobe PDF format

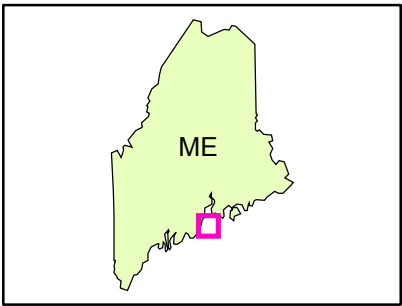
## **End of Report**

# NORTH HAVEN HARBOR

## MAINE



Overview



**ME1101G**  
GC11041