

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

## ***PROJECT ME1101F***

### ***Carvers Harbor, Maine***

#### **Introduction**

Coastal Mapping Program (CMP) Project ME1101F provides highly accurate digital shoreline data for the port of Carvers Harbor, Maine. ME1101F 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 and the acquisition of aerial imagery. The photographic mission operations were conducted on June 20 and 21, 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 December 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

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 performed by RSD Applications Branch (AB) personnel in November 2013 utilizing a Digital Photogrammetric Workstation (DPW), which is a configuration of computer hardware, modular software components, and other associated peripheral devices. The digital images were measured and adjusted as a single block using the triangulation software module of BAE Systems SOCET GXP (v4.1.0) software. Upon successful completion of this process, the triangulation software provided the standard deviations 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. 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 March 2014. Digital feature data was compiled using SOCET GXP v4.1.0 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 ME1101F 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 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	GSD (nominal)	Tide Level*
20-JUN-2011	14:32 – 14:33	11NC55	17923 – 17929	0.35 m	0.6 m
21-JUN-2011	12:30 – 12:31	11NC57	18242 – 18247	0.35 m	0.5 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

Quality control tasks were conducted during all phases of project completion by a senior member of AB. The final QC review was completed in March 2014. 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 10.1 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 chart was used in the comparison process:

13305, Penobscot Bay, 1:40,000 scale, 29th edition, June 2012

## **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 GC11039 file contents, attached to PCR

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

- Project database
- GC11039 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

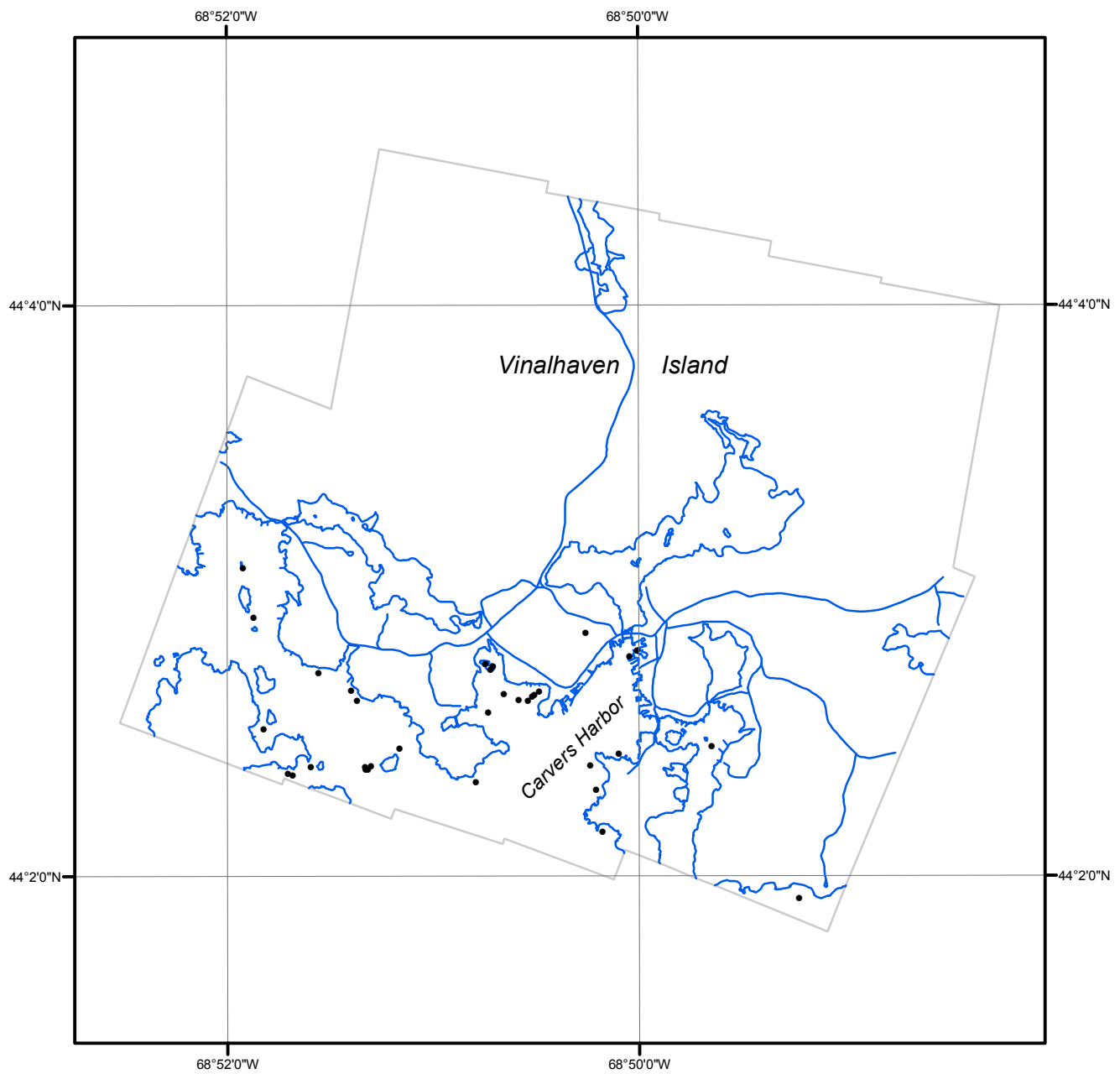
### **NOAA Shoreline Data Explorer**

- GC11039 in shapefile format
- Metadata file for GC11039
- Digital copy of the PCR in Adobe PDF format

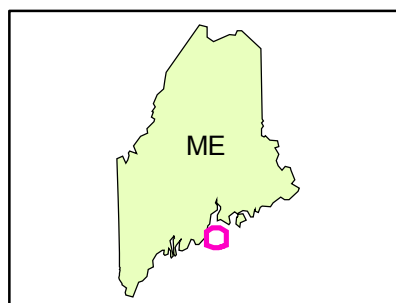
## **End of Report**

# CARVERS HARBOR

## MAINE



Overview



ME1101F

GC11039