

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

## ***PROJECT OH1502-CS-N***

### ***Port of Conneaut, Ohio***

#### **Introduction**

Coastal Mapping Program (CMP) Project OH1502-CS-N provides highly accurate digital shoreline data for key areas of change within the port of Conneaut, Ohio. 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 OH1502-CS-N 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 (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 January 12, 2015, "Results of CSCAP Change Analysis for Conneaut, Ohio (OH1502-CS-N)," for details regarding the chart comparison process.

#### **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. Digital images utilized for this project were acquired with the NOAA King Air aircraft on September 19, 2014 using an Applanix Digital Sensor System (DSS) 439 aerial camera at a nominal altitude of 11,000 feet, resulting in an approximate ground sample distance (GSD) of 0.35 meters. The collection of these photographs was not tide coordinated.

#### **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 MMS 6.2 software on December 12, 2014. For further information refer to the Airborne Positioning and Orientation Reports (APOR) on file with other project data within the AB 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 personnel in May 2015 utilizing SOCET GXP (ver. 4.1) software on a Digital Photogrammetric Workstation (DPW), which is a configuration of computer hardware, modular software components, and other associated peripheral devices. The RGB images were measured and adjusted as a single block using the Triangulation module of SOCET GXP (ver. 4.1). Upon successful completion of this process, SOCET GXP triangulation report provided the standard deviations for each aerotriangulated ground point, which were used to compute a predicted horizontal circular error of 0.5 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 May 2015. Digital feature data was compiled from the aerotriangulated RGB imagery using the ToolBox module of SOCET GXP (ver. 4.1). 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 OH1502-CS-N were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 1.0 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 images used in the project completion:

Date	Time (UTC)	Roll #	Flight Line	Photo Numbers	Lake Level*
19-SEP-2014	14:25 – 14:27	14NC80	53-001	18580 – 18588	174 m
19-SEP-2014	14:31 – 14:33	14NC80	53-002	18589 – 18598	174 m

\* Lake levels are given in meters above IGLD 1985 and are based on actual observations recorded by the NOS gauge at Erie, PA (Station ID: 9063038) at the time of photography.

## 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 2015. 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 10.2.2. 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 Airborne Positioning and Orientation Report (APOR)
- Hardcopy of the Project Completion Report (PCR)
- Page size graphic plot of GC11152 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

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

- GC11152 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

### **NOAA Shoreline Data Explorer**

- GC11152 in shapefile format
- Metadata file for GC11152
- Digital copy of the PCR in Adobe PDF format

## **End of Report**

# PORT OF CONNEAUT

## OHIO



Overview



OH1502-CS-N

GC11152