

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

## ***PROJECT AL1501-CS-N***

### ***Port of Mobile, Alabama***

#### **Introduction**

Coastal Mapping Program (CMP) Project AL1501-CS-N provides highly accurate digital shoreline data for key areas of change within the Port of Mobile, Alabama. 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 AL1501-CS-N was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD). RB formulated the photographic mission instructions for this project following the guidelines of the Photo Mission Standard Operating Procedures. The instructions discussed the project's purpose, geographic area of coverage, photographic requirements, Global Positioning System (GPS) data collection procedures and guidelines for both kinematic and static surveys, and data recording and handling instructions. RB also created Project Layout Diagram, flight map, 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. Digital images utilized for this project were acquired with the NOAA King Air aircraft on April 4, 2015 using an Applanix Digital Sensor System (DSS) 539 aerial camera at a nominal altitude of 10,500 feet, resulting in an approximate ground sample distance (GSD) of 0.37 meters. The collection of these photographs coincided with the MLLW tide stage in the project area.

#### **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 7.1 software on May 13, 2015. For further information refer to the Airborne Positioning and Orientation Report (APOR) on file with other project data within the RSD Electronic Data Library.

#### **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 AB personnel in

March 2017 utilizing a photogrammetric workstation with the SOCET SET (version 5.6) suite of photogrammetric software. The digital images were measured and adjusted as a single block using the Multi-Sensor Triangulation (MST) module of SOCET SET. Upon successful completion of this process, the triangulation software provided the standard deviations for each aerotriangulated ground point, which were used to compute predicted horizontal circular errors of 0.61 meters based on a 95% confidence level. An Aerotriangulation Report was written and is on file with other project data within the RSD Electronic Data Library. Positional data is referenced to the North American Datum of 1983 (NAD83).

## Compilation

The data compilation phase of this project was accomplished by RSD Applications Branch personnel in May 2017. Digital mapping was performed using the Feature Extraction software module of SOCET SET. Feature identification and attribution within the GC were based on image analysis of the aerial imagery and information extracted from the largest scale NOAA nautical chart 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 AL1501-CS-N 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 well-defined points measured during the compilation phase was 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 #s	Tide Level*
04-04-2015	19:49 – 19:50	15NC27	53-004 / 4523 – 4534	0.0 m
04-04-2015	19:57 – 20:02	15NC27	53-001 / 4535 – 4567	0.0 m
04-04-2015	20:13 – 20:16	15NC27	53-003 / 4570 – 4592	0.0 m
04-04-2015	20:21 – 20:25	15NC27	53-002 / 4593 – 4615	0.0 m

\* Tide levels are given in meters above MLLW and were calculated using the Pydro software tool with a TCARI grid referenced to verified water level observations at the time of photography from various NOS gauges in the vicinity of the project. The elevation of MHW in the project area varies between 0.4 – 0.5 meters above MLLW.

## Quality Control / Final Review

The final review of the project was completed by a senior member of RSD in June 2017, and 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 Esri's ArcGIS 10.4.1 desktop software. All project data was evaluated for compliance to CMP requirements.

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

- 11376, Mobile Bay, AL, 1:80,000 (incl. 1:25,000 inset), 58<sup>th</sup> Ed., Nov. 2015

## **End Products and Deliverables**

The following specifies the location and identification of end products generated during the completion of this project:

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

- Airborne Positioning and Orientation Report (APOR)
- Aerotriangulation Report
- CSCAP evaluation memorandum
- CEF in shapefile format
- Project database
- GC11299 in shapefile format
- Project Completion Report (PCR)

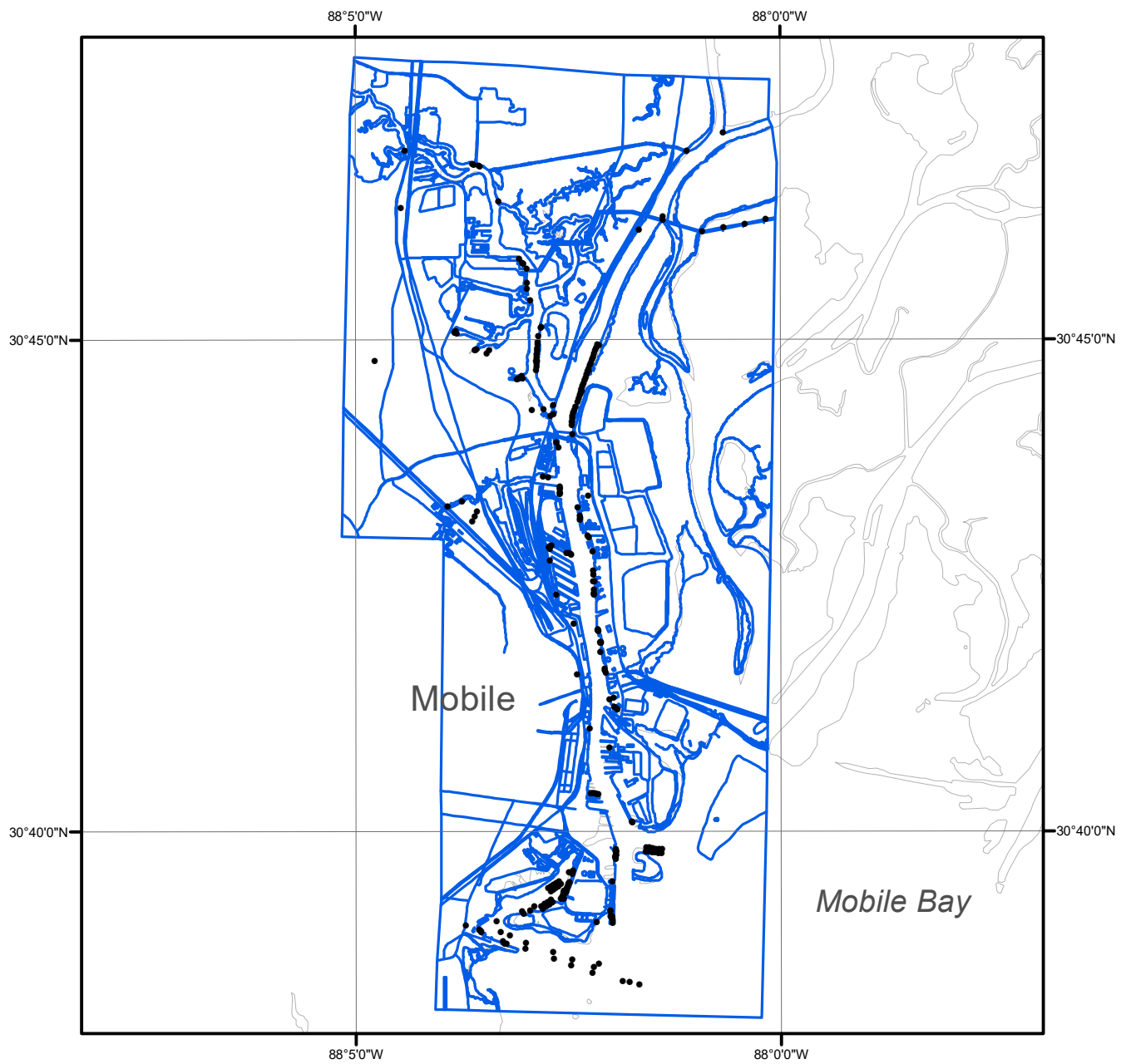
### **NOAA Shoreline Data Explorer**

- GC11299 in shapefile format
- Metadata file for GC11299
- Digital copy of the PCR in Adobe PDF format

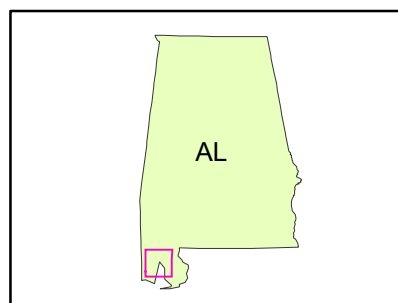
## **End of Report**

# PORT OF MOBILE

## ALABAMA



Overview



AL1501-CS-N

GC11299