

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT CT0801B

Falkner Island, Connecticut

Introduction

NOAA Coastal Mapping Program (CMP) Project CT0801B provides a highly accurate database of new digital shoreline data for Falkner Island, Connecticut, including Goose Island and other minor rocks nearby. Falkner Island is located approximately 3 miles south of the coast of Guilford, Connecticut at 41° 12.5' N latitude and 72° 39' W. Project CT0801B is part of a larger acquisition project, CT0801, which also includes Block Island, Rhode Island.

Successful completion of this project resulted in a densification of the National Spatial Reference System (NSRS), a set of metric quality aerial images, and digital feature data of the coastal zone which complements the Nautical Charting Program (NCP) as well as geographic information systems (GIS) for a variety of coastal applications.

The project database consists of information measured and extracted from aerial images and metadata related to photogrammetric compilation. Base mapping was conducted in a digital environment using stereo softcopy photogrammetry and associated cartographic practices.

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 Procedures. The instructions discussed the project purpose, geographic area of coverage, scope and priority, image requirements, Global Positioning System (GPS) data collection procedures and guidelines, instructions for data recording and handling, and contact and communication information. RB created a project layout diagram, flight maps and input files for the aircraft flight management system.

Field Operations

The field operations consisted of acquiring digital aerial imagery, static and kinematic Global Positioning System (GPS) data, and Inertial Measurement Unit (IMU) data. Aerial survey operations for Project CT0801 were conducted on May 11 & 23, 2008 with the NOAA Cessna Citation II aircraft (N52RF) and the Applanix Digital Sensor System (DSS-439 DualCam). Twelve strips of natural color and black & white infrared imagery were acquired in tandem in coordination with local tides, though only four strips were used in the completion of this subproject.

A base station was established at the Quonset State Airport, Quonset, Rhode Island using

static GPS. Airborne kinematic GPS data was collected to determine precise camera positions in order to establish a control network necessary for aerotriangulation. GPS data collection operations were conducted in accordance with the GPS Controlled Photogrammetry Field Operations Manual (10/25/99).

GPS Data Reduction

GPS and IMU data were processed by RSD personnel to yield precise camera positions and orientations in order to provide a control network necessary for aerotriangulation. The airborne kinematic data was processed using POSPAC 5.3.0 GPS/IMU processing software on February 28, 2011. An Airborne Positioning and Orientation Report (APOR) contains further information on this phase of project execution and is on file with other project data within the RSD Applications Branch (AB) Project Archive.

Aerotriangulation

The aerotriangulation (AT) task was initiated by RSD personnel in September 2011 utilizing a Digital Photogrammetric Workstation (DPW). Image measurements and block adjustments were performed using BAE Systems' SOCET SET (SS, version 5.5) photogrammetric software. AT procedures were accomplished using the Multi-Sensor Triangulation (MST) module of SS. The Automatic Point Measurement (APM) algorithm, within MST, was used to collect tie points, and a simultaneous solve adjustment was then performed. The predicted horizontal circular error, using all measured image points, was computed to be 0.5 meters at the 95% confidence level (CE95). Positional data for this project is referenced to the North American Datum of 1983 (NAD 83). An Aerotriangulation Report was written and is on file with other project data within the RSD Project Archive.

Compilation

The data compilation phase of this project was initiated by RSD in September 2011. Digital mapping was performed using a DPW in conjunction with the SOCET SET Feature Extraction software module. Feature identification and attribution within the Geographic Cell (GC) were based on image analysis of the project photographs and information extracted from the appropriate NOAA nautical charts, US Coast Guard Light List 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 CT0801B 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 derived from aerotriangulation statistics.

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

Date	Time (UTC)	Roll #	Photo #s	GSD (m)	Tide Level*
5-11-08	19:44-19:45	08NC19	3535-3543	0.26	1.8
5-11-08	19:49-19:50	08NC19	3544-3547	0.26	1.8
5-11-08	19:44-19:45	08NR33	15172-15180	0.26	1.8
5-11-08	19:49-19:50	08NR33	15181-15184	0.26	1.8

* Tide levels are given in meters above MLLW and are based on actual observations at the Bridgeport, CT reference station, with corrections applied to substation, Sachem Head. The elevation of MHW at the Sachem Head substation is 1.7 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 January 2012. 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 9.3 software. All project data was evaluated for compliance to CMP requirements.

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

12372, Long Island Sound, CT (Small Craft Chart), 1:40,000 scale, 35th Ed.

End Products and Deliverables

The following specifies the location and identification of the 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 GC10921 file contents, attached to PCR

Remote Sensing Division Electronic Data Library

- Project database
- GC10921 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

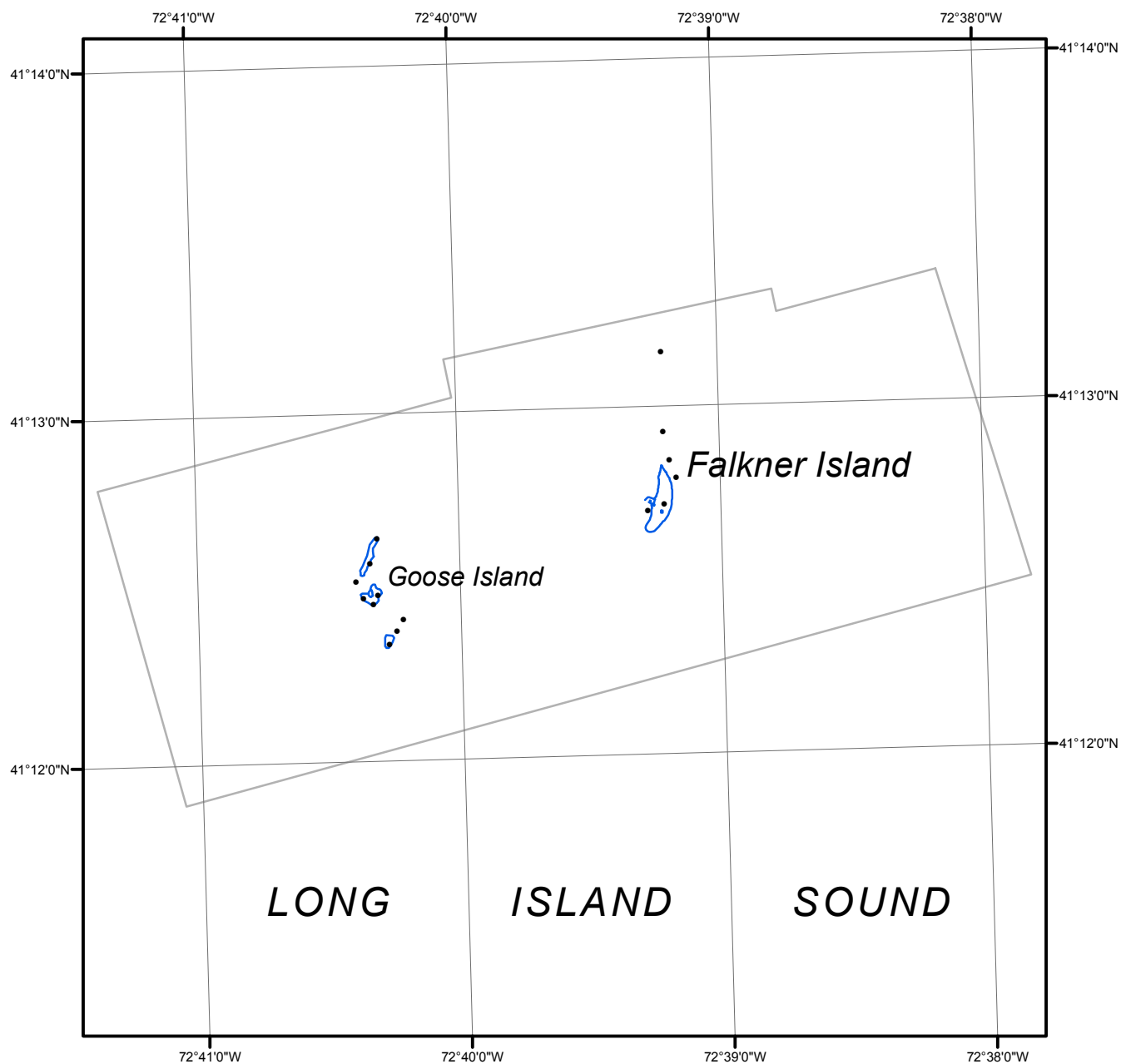
NOAA Shoreline Data Explorer

- GC10921 in shapefile format
- Metadata file for GC10921
- Digital copy of the PCR in Adobe PDF format

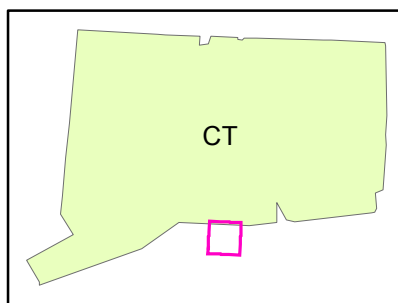
End of Report

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Overview



CT0801B

GC10921