NOAA COASTAL MAPPING PROGRAM
PROJECT COMPLETION REPORT

PROJECT VI1101

Cruz Bay to Great Cruz Bay, St. John, U.S. Virgin Islands

Introduction

NOAA Coastal Mapping Program (CMP) Project VI1101 provides highly accurate digital shoreline data for a portion of St. John, U.S. Virgin Islands, from Cruz Bay to Great Cruz Bay, including Turner Bay. 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

This project was designed per a request from the NOAA Hydrographic Surveys Division (HSD) for shoreline data in support of HSD operations. 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 ver. II. The instructions discussed the project's purpose, geographic area of coverage, scope and priority, image requirements, flight line priority, 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 the collection of static and kinematic GPS data and the acquisition of aerial imagery. The photographic mission operations were conducted on April 2, 2011 with the NOAA King Air (N68RF) aircraft. Two strips of natural color (RGB) digital images were acquired using an Applanix DSS-439 camera, and flown at an approximate altitude of 4,500 feet, resulting in a ground sample distance (GSD) of 0.5 feet (0.16 meters). All images were acquired at a stage of tide below MHW.

A base station was established at Henry E. Rohlsen Airport (TISX), on St. Croix, U.S. Virgin Islands, using static GPS. Airborne kinematic GPS data was collected in conjunction with an Inertial Measurement Unit (IMU) to yield precise camera positions and orientations.

GPS Data Reduction

GPS and IMU data was processed by RSD personnel to yield precise positions and orientations of camera centers for application as control during the aerotriangulation phase. The base station data was processed in May 2011 using the NGS Online Processing User Service (OPUS) software to compute fixed baseline solutions from the three nearest CORS stations. The final NAD83 position reported by OPUS was the

average of these three baseline solutions. Airborne kinematic data was processed using Applanix POSGPS (ver. 5.4) software in April of 2012. For additional information, refer to the Airborne Positioning and Orientation Report (APOR) written to document this phase of the project.

Aerotriangulation

Routine softcopy aerotriangulation (AT) methods were applied to establish the 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 completed by RSD Applications Branch (AB) personnel in May 2012. BAE Systems SOCET SET® v. 5.6 softcopy photogrammetry suite was used for both project setup and AT, using the Multi-Sensor Triangulation (MST) module. Upon successful completion of the AT process, the MST software provided the RMS of the standard deviations of the residuals for each aerotriangulated ground point which were used to compute a predicted horizontal circular error at the 95% confidence level (CE95) of 0.25 meters. An AT report, written to document this phase of project completion, is on file with other project data within the AB Project Archive. Positional data is referenced to the North American Datum of 1983.

Compilation

The data compilation phase of the project was initiated by AB personnel in May 2012. This work was accomplished using the Feature Extraction module within BAE Systems' SOCET SET (v. 5.6). Feature identification and the assignment of cartographic codes were based on image analysis of the project digital images and information extracted from the appropriate NOAA Nautical Charts, U.S. Coast Guard Light List and other ancillary sources. Feature attribution was assigned in compliance with the Coastal Cartographic Object Attribute Source Table (C-COAST). Selected features were further modified with additional descriptive information to refine general classification.

Spatial data accuracies for Project VI1101 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 0.5 meters at the 95% confidence level. This accuracy figure was derived by doubling the CE95 computed from the AT statistics, in order to conservatively predict the accuracy of compiled well-defined points.

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

Date	Time (UTC)	Roll Number	Line Number	Photo Numbers	GSD (nominal)	Tide Level*
4/2/2011	13:46-13:47	11NC21	22-002	3291 – 3296	0.16 m	0.07 m
4/2/2011	13:52-13:53	11NC21	22-001	3297 – 3301	0.16 m	0.07 m

* Tide levels given in meters above MLLW and were calculated using the Pydro software tool with a TCARI grid referenced to verified water level observations at NOS gauges. The height of the MHW tidal datum in the project area varies between 0.24 - 0.25 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 June 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 9.3.1 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:

25647, Pillsbury Sound, VI, 1:15,000 scale, 11th edition

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 GC10938 file contents, attached to PCR

Remote Sensing Division Electronic Data Library

- Project database
- GC10938 in shapefile format
- Digital copy of the PCR in Adobe PDF format
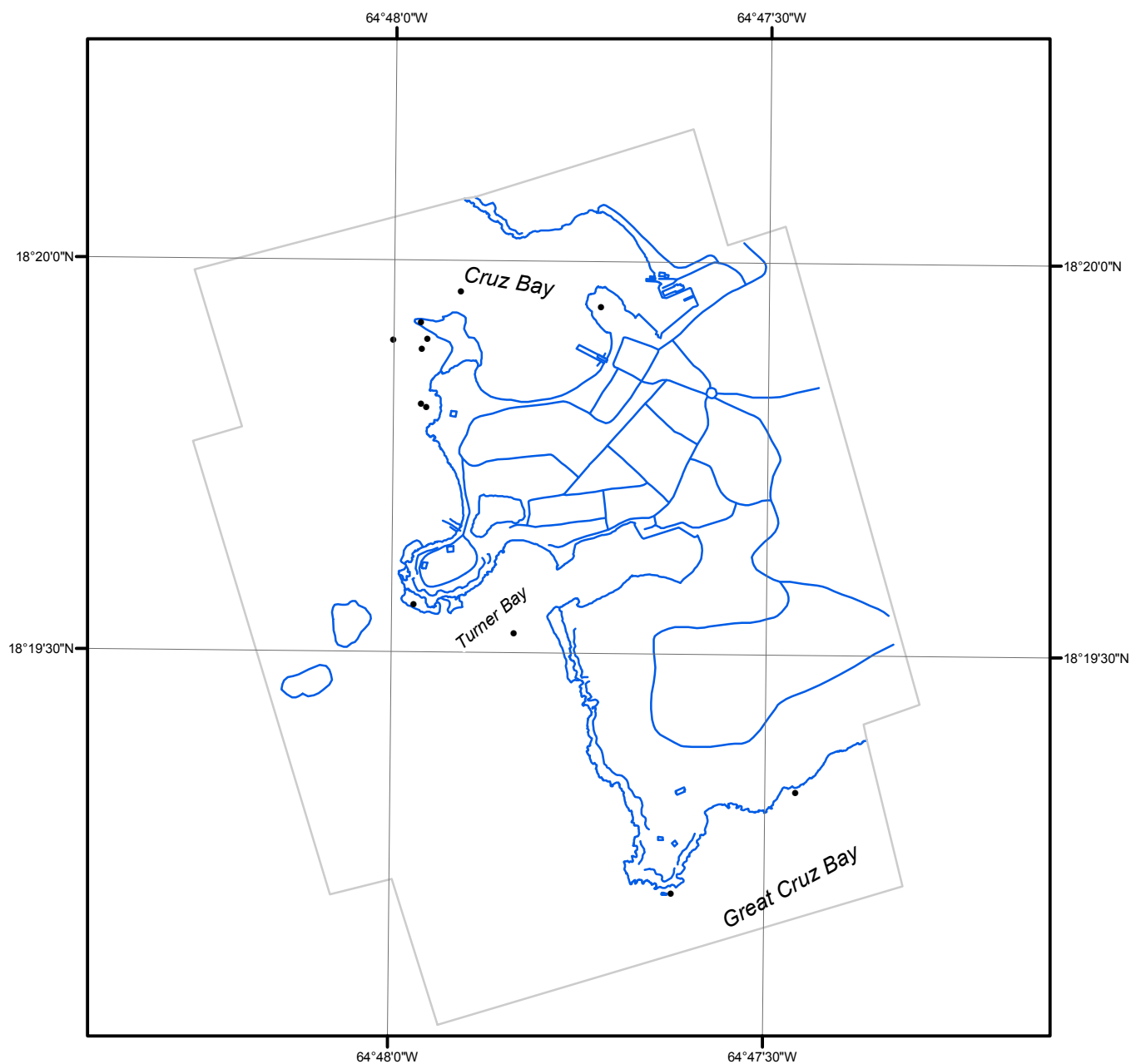- Chart Evaluation File in shapefile format

NOAA Shoreline Data Explorer

- GC10938 in shapefile format
- Metadata file for GC10938
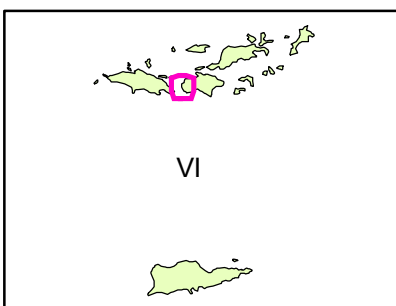- Digital copy of the PCR in Adobe PDF format

End of Report

CRUZ BAY TO GREAT CRUZ BAY, ST. JOHN

U.S. VIRGIN ISLANDS

64°48'0"W 64°47'30"W

18°20'0"N 18°20'0"N

Cruz Bay

Turner Bay

18°19'30"N 18°19'30"N

Great Cruz Bay

64°48'0"W 64°47'30"W

Overview

VI

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NOAA
U.S. DEPARTMENT OF COMMERCE

VI1101

GC10938