

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT VI1601-CS-T

Port of St. Thomas, U.S. Virgin Islands

Introduction

NOAA Coastal Mapping Program (CMP) Project VI1601-CS-T provides highly accurate digital shoreline data for key areas of change within the Port of St. Thomas Harbor, U.S. Virgin Islands, and surrounding coastal areas. The project extends from Green Cay westward to Perseverance Bay and includes both East and West Gregerie Channel. 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 VI1601-CS-T was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for timely updates to the NOAA chart suite within key ports. 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 imagery to ascertain the need for more current shoreline data. Two ortho-rectified WorldView (WV) satellite images from DigitalGlobe, Inc. with a spatial resolution of 0.5 meters were utilized for the CSCAP analysis. A Chart Evaluation File (CEF) was created once the change analysis was complete. Refer to the CSCAP memorandum of July 28, 2016 for details of the chart comparison process.

Field Operations

Routine CMP field operations did not apply for this project based on the origin of the project source data. Existing sources of horizontal control were used for the georeferencing process.

Georeferencing

Georeferencing tasks were accomplished by a member of the Systems and Quality Assurance Branch (SQAB) of RSD in July 2016. The WV imagery was georeferenced using ESRI's ArcGIS® (ver. 10.2.2) desktop GIS software. Previous CMP Project VI0801 (GC10799) was used as control for Project VI1601. The Georeferencing tool in ArcGIS was used to re-sample the imagery using the Nearest Neighbor sampling method with a 1st order polynomial model. Check points were measured from 2012 USACE ortho-rectified imagery with a reported accuracy of 1.0 in order to assess the accuracy of the georeferenced images. The RMS of the residuals for each measured check point was used to compute a predicted horizontal circular error of 1.0 meters for image #1 and 1.5 meters for image #2, based on a 95% confidence level (CE95). This CE value was doubled and added to the CE95 of the source from which check points were obtained in order to conservatively predict the accuracy of well-defined points measured during compilation. Positional data is referenced to the North American Datum of 1983 (NAD 83).

Compilation

The data compilation phase of the project was initiated by RSD personnel in December 2016. Digital feature data was compiled from satellite imagery in shapefile format using ESRI's ArcGIS (ver. 10.2.2) software. Feature attribution was assigned in compliance with the Coastal Cartographic Object Attribute Source Table (C-COAST), which provided the definition and attribution scheme for the full range of cartographic features pertinent to the CMP.

Spatial data accuracies for Project VI1601-CS-T were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were tested to have a horizontal accuracy of 3.0 meters for image #1 and 4.1 meters for image #2, at the 95% confidence level. Predicted accuracies are based on comparisons of a minimum of 20 check points to an independent source of higher accuracy.

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

Image #	Image Source	Source File Name	Acquisition Date/Time	Tide Level*
1	WorldView2	20160417_1450_WV02_ORI_GEOREF.jp2	2016-04-17 14:50 GMT	0.18
2	WorldView2	20160417_1450_WV2_ORI_georef2.jp2	2016-04-17 14:50 GMT	0.18

* Tide levels are given in meters above MLLW and are based on verified water levels recorded by the NOS tide gauge at Charlotte Amalie, St. Thomas reference station at the time of photography. The elevation of MHW at Charlotte Amalie is equal to 0.23 meters above MLLW.

Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a senior member of the Applications Branch of RSD. The final QC review was completed in December 2016. 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 software. All project data was evaluated for compliance to CMP requirements.

End Products and Deliverables

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

Remote Sensing Division Electronic Data Library

- Project database
- GC11301 in shapefile format
- Project Completion Report (PCR)
- Chart Evaluation File in shapefile format

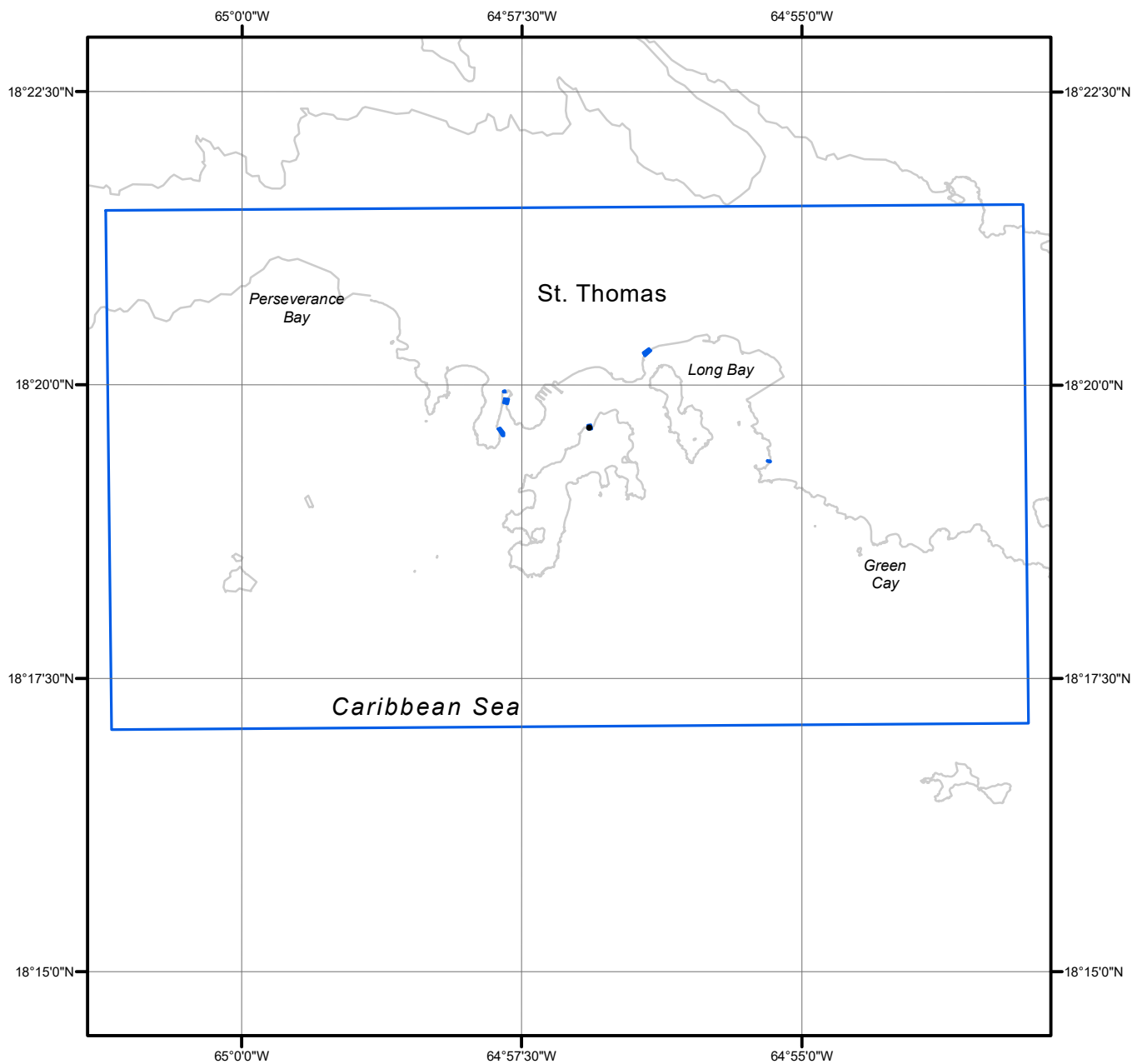
NOAA Shoreline Data Explorer

- GC11301 in shapefile format
- Metadata file for GC11301
- Digital copy of the PCR

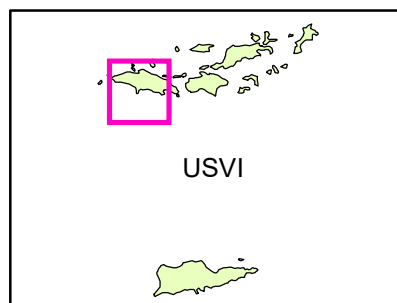
End of Report

PORT OF ST. THOMAS

U.S. VIRGIN ISLANDS



Overview



VI1601-CS-T

GC11301