NOAA COASTAL MAPPING PROGRAM
PROJECT COMPLETION REPORT

PROJECT AK1407-CS-T

Dutch Harbor, Alaska

Introduction

Coastal Mapping Program (CMP) Project AK1407-CS-T provides highly accurate digital shoreline data for key areas of change within Dutch Harbor, Alaska. 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 AK1407-CS-T was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for updates to the NOAA chart suite in 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. WorldView (WV) commercial satellite imagery from DigitalGlobe, Inc. was used for this project. An orthorectified natural color WV2 image with a spatial resolution of 0.5 meters was utilized for the CSCAP analysis. Additional images, including one panchromatic WV2 image with a resolution of 0.5 meters and two orthorectified color WV3 image tiles with a resolution of 0.35 meters, were subsequently obtained for use in compilation after difficulties were encountered georeferencing the first image. A Chart Evaluation File (CEF) was created once the change analysis was complete. Refer to the CSCAP memorandum of July 17, 2014 for details regarding 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 initiated by a member of the Applications Branch (AB) of RSD in August 2015. The WV2 images were georeferenced using Esri's ArcGIS® (ver. 10.2.2) desktop GIS software. Within ArcGIS the Georeferencing tool was used and the imagery re-sampled using the Nearest Neighbor sampling method with a 1st order polynomial model. The WV3 imagery was not georeferenced since positioning was adequate direct from the vendor. Check points measured from RC30 stereo imagery for a previous project (Unalaska Airport survey) were used as control and to assess the accuracy of all imagery. The RMS of the residuals for each measured check point was used to compute a predicted horizontal circular error of 1.4 meters for both the WV2 and WV3 color imagery, and 2.5 meters for the panchromatic WV2 image, based on a 95% confidence level (CE95). These values were doubled 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

Data compilation was accomplished by a member of AB in May 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 provides the definition and attribution scheme for the full range of cartographic features pertinent to the CMP.

Spatial data accuracies for Project AK1407-CS-T were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were tested to have a horizontal accuracy of 2.7 meters for the color imagery and 5.0 meters for the panchromatic image at the 95% confidence level. Predicted accuracies are based on comparisons of a minimum twenty (20) check points to an independent source of higher accuracy. The following table provides information on the satellite images used in the project completion:

Image Source	Source File ID	Product Description	Acquisition Date/Time	Tide Level*
WorldView-2	20140428_222624_WV2_ORI.tif	Pan-sharpened natural color, orthorectified	4-28-2014 / 22:26 GMT	0.0 m
WorldView-2	12may14wv021500014may12221131-p1bs_r2c1_rpc_sub.tif	Panchromatic	5-12-2014 / 22:11 GMT	0.2 m
WorldView-3	20150613_2203_wv3_ori_R1C2.jp2 (tile)	Pan-sharpened natural color, orthorectified	6-13-2015 / 22:03 GMT	0.2 m
WorldView-3	20150613_2203_wv3_ori_R1C3.jp2 (tile)	Pan-sharpened natural color, orthorectified	6-13-2015 / 22:03 GMT	0.2 m

* Tide levels are given in meters above MLLW and based on verified observations recorded at the NOS gage in Unalaska, AK at the time of image acquisition. MHW is 1.0 meters above MLLW at the tide gage.

Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a senior member of RSD. The final QC review was completed in July 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. 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:

Remote Sensing Division Electronic Data Library
- GC11224 in shapefile format
- Digital copy of the PCR in Adobe PDF format
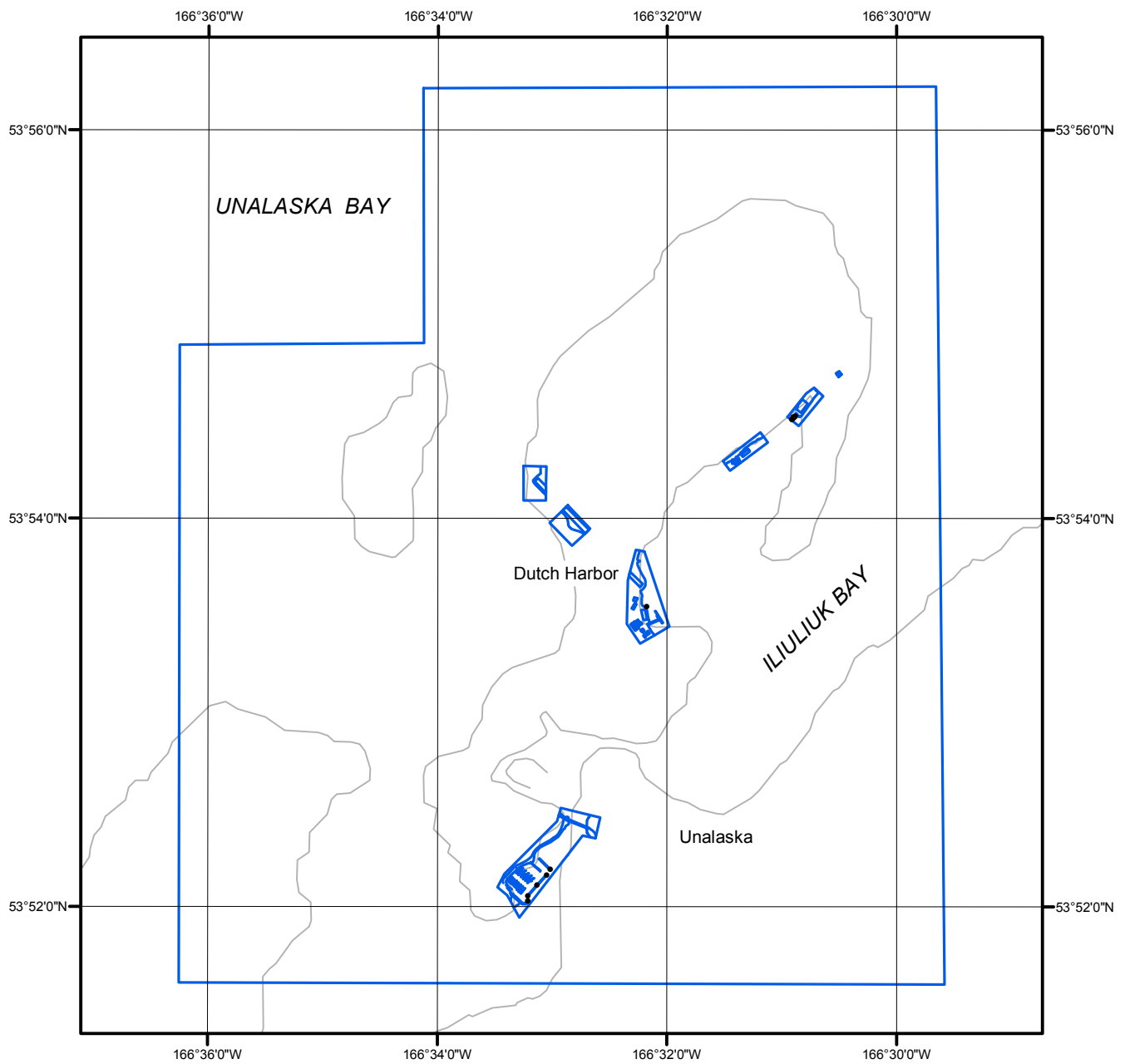- CEF in shapefile format

NOAA Shoreline Data Explorer
- GC11224 in shapefile format
- Metadata file for GC11224
- Digital copy of the PCR in Adobe PDF format

End of Report

DUTCH HARBOR

ALASKA

166°36'0"W 166°34'0"W 166°32'0"W 166°30'0"W

53°56'0"N

UNALASKA BAY

53°54'0"N

Dutch Harbor

ILIULIUK BAY

Unalaska

53°52'0"N

Overview

AK

AK1407-CS-T

GC11224