

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT AK2114-CM-T

St. Matthew Island, Alaska

Introduction

Coastal Mapping Program (CMP) Project AK2114-CM-T provides digital shoreline data for St. Matthew Island, Alaska, including Hall and Pinnacle Islands, nearby. 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

Project AK2114-CM-T was designed by the Systems and Quality Assurance Branch (SQAB) of the Remote Sensing Division (RSD) to support the Continually Updated Shoreline Product (CUSP), a seamless database of high resolution shoreline data, in response to a request from Marine Chart Division (MCD) of NOAA's Office of Coast Survey. Shoreline data was then extracted from CUSP to undergo further processing and formatting to produce a GC.

Based on an analysis of project requirements and results of a source data search, it was determined that multiple source imagery would apply for this project. Available source data deemed adequate for successful completion of this project included ten orthorectified commercial satellite images of WorldView-3 and GeoEye-1 and one non-orthorectified WorldView-1 satellite image from Maxar Technologies.

Field Operations

Routine CMP field operations did not apply for this project based on the origin of the project source data.

Georeferencing

Limited georeferencing tasks were performed for this project by SQAB personnel in May 2021 using Esri's ArcGIS Pro (ver. 2.8) desktop GIS software. The orthorectified satellite imagery was assessed for positional accuracy and determined to be suitable for feature compilation without the need for further image georeferencing tasks. The commercial orthorectified satellite imagery from Maxar Technologies has a claimed image accuracy, or horizontal circular error at the 90% confidence level (CE90), of 5 meters. This value was used to calculate an accuracy of 8.7 meters CE95. The non-orthorectified WorldView and GeoEye Maxar images were georeferenced to offshore rocks in the orthorectified satellite imagery due to image distortions, with a deductive estimate of 12.0 meters CE95. Copernicus Sentinel-2 Data, RADARSAT, and ICESat-2 were also used as supplemental data to verify geo-positioning and interpretation of a mean high water line from imagery acquired at low tide levels. Positional data for this project is referenced to the North American Datum of 1983 (NAD 83).

Compilation

Data compilation for this project was initiated by SQAB personnel in May 2021. Digital mapping was performed using ArcGIS Pro 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. Selected features were further modified with additional descriptive information to refine general classification. Spatial data accuracies were determined according to standard Federal Geographic Data Committee (FGDC) practices as described above.

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

Image Source	Source File IDs	Acquisition Date/Time	GSD	Tide Level*
WorldView-1	1020010003E82500	2008-07-06 / 22:41 GMT	0.64 m	0.0 m
WorldView-2	1030010033540D00	2014-07-12 / 22:59 GMT	0.53 m	-0.1 m
WorldView-3	104001001D05C600	2016-06-06 / 23:23 GMT	0.31 m	-0.2 m
WorldView-3	104001001D704400	2016-06-25 / 23:24 GMT	0.31 m	0.0 m
WorldView-3	104001003D77FF00	2018-06-05 / 23:38 GMT	0.31 m	0.2 m
WorldView-3	104001004D446400	2019-06-14 / 22:56 GMT	0.31m	0.2 m
WorldView-3	104001004C786F00	2019-06-14 / 22:57 GMT	0.31 m	0.2 m
WorldView-3	104001004E3DFC00	2019-06-14 / 22:57 GMT	0.31 m	0.2 m
WorldView-3	104001004E5AD500	2019-06-15 / 23:12 GMT	0.37 m	0.1 m
GeoEye-1	10500100174FF900	2019-07-08 / 23:07 GMT	0.41 m	0.3 m
GeoEye-1	105001001D193500	2020-05-07 / 23:09 GMT	0.41 m	-0.1 m
GeoEye-1	105001001D2E5200	2020-05-12 / 22:53 GMT	0.45 m	0.2 m
WorldView-1	10200100B1D95400	2021-05-14 / 02:09 GMT	0.68 m	0.2 m

* Tide Levels are given in meters relative to MLLW based on verified observations at the NOS tide station in Village Cove, St Paul Island, AK (#9464212), with time and height offsets applied to the St. Matthew Island, AK substation (#9466203). The height of the MHW tidal datum at St. Matthew Island is approximately 0.6 meters above MLLW.

Quality Control / Final Review

Quality control tasks were conducted by senior members of RSD. The final QC review was completed in September 2021. 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 (ver. 10.8.1) software. All project data was evaluated for compliance to CMP requirements.

A Chart Evaluation File (CEF) resulted from the comparison of source imagery and compiled project data with the largest scale NOAA electronic nautical charts covering the project area:

US4AK6CC, 1st Ed., Aug. 2020, Scale 1:80,000
US4AK6DB, 1st Ed., Aug. 2020, Scale 1:80,000
US4AK6DC, 1st Ed., Aug. 2020, Scale 1:80,000
US4AK6EB, 1st Ed., Aug. 2020, Scale 1:80,000

End Products and Deliverables

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

RSD Electronic Data Library

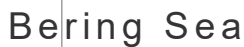
- Project database
- Project Completion Report (PCR)
- GC11737 in shapefile format
- CEF in shapefile format

NOAA Shoreline Data Explorer

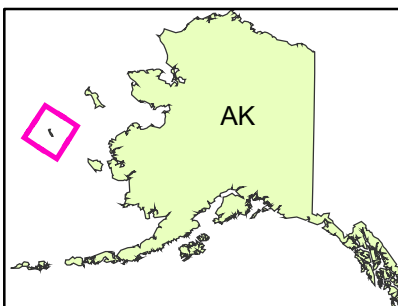
- GC11737 in shapefile format
- Metadata file for GC11737
- PCR in Adobe PDF format

End of Report

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Overview



AK2114-CM-T

GC11737

