

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT GU1901-CS-T

Apra Harbor, Guam

Introduction

Coastal Mapping Program (CMP) Project GU1901-CS-T provides highly accurate digital shoreline data for key areas of change within Apra Harbor, Guam. 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 GU1901-CS-T was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for expedited 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 in order to ascertain the need for more current shoreline data. Commercial satellite imagery was utilized for the CSCAP analysis. A Chart Evaluation File (CEF) was created once the change analysis was complete. Refer to the CSCAP memorandum of November 7, 2018 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 the RSD in March 2019. One orthorectified, pan-sharpened natural color WorldView-2 image from DigitalGlobe, Inc. with a spatial resolution of 0.5 meters was georeferenced with GPS-measured control points from a previous project (CMP Project GU0701) using Esri's ArcGIS (ver. 10.5.1) desktop GIS software. Within ArcGIS, the Georeferencing tool was used, and the imagery was re-sampled using the Nearest Neighbor sampling method with a 1st order polynomial model. Check points from Project GU0701 were used to assess the accuracy of the resampled imagery. The RMS of the residuals for each measured check point was used to compute a predicted horizontal circular error (CE) of 1.44 meters based on a 95% confidence level. This CE value was doubled 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

Data compilation was accomplished by a member of AB in March 2019. Digital feature data was compiled in shapefile format from satellite imagery using Esri's ArcGIS (ver. 10.5.1) 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 GU1901-CS-T were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 2.9 meters at the 95% confidence level, which is a deductive estimate based on georeferencing statistics. The following table provides information on the satellite images used in the project completion:

Image Source	Source File ID	Resolution	Acquisition Date/Time	Tide Level*
WorldView-2	20181107_WV02_ORI_MOS.jp2	0.5 m	2018-11-07 / 01:22 GMT	0.27 m

* Tide levels are given in meters above MLLW and based on verified observations recorded at the NOS gauge in Apra Harbor at the time of image acquisition. The MHW tidal datum is 0.68 meters above MLLW at the NOS gage.

Quality Control / Final Review

Quality control tasks were conducted subsequent to project completion, in June 2019, by a senior member of RSD. 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 10.5.1. 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

- CSCAP evaluation memorandum
- Project database
- GC11480 in shapefile format
- Project Completion Report (PCR)
- CEF in shapefile format

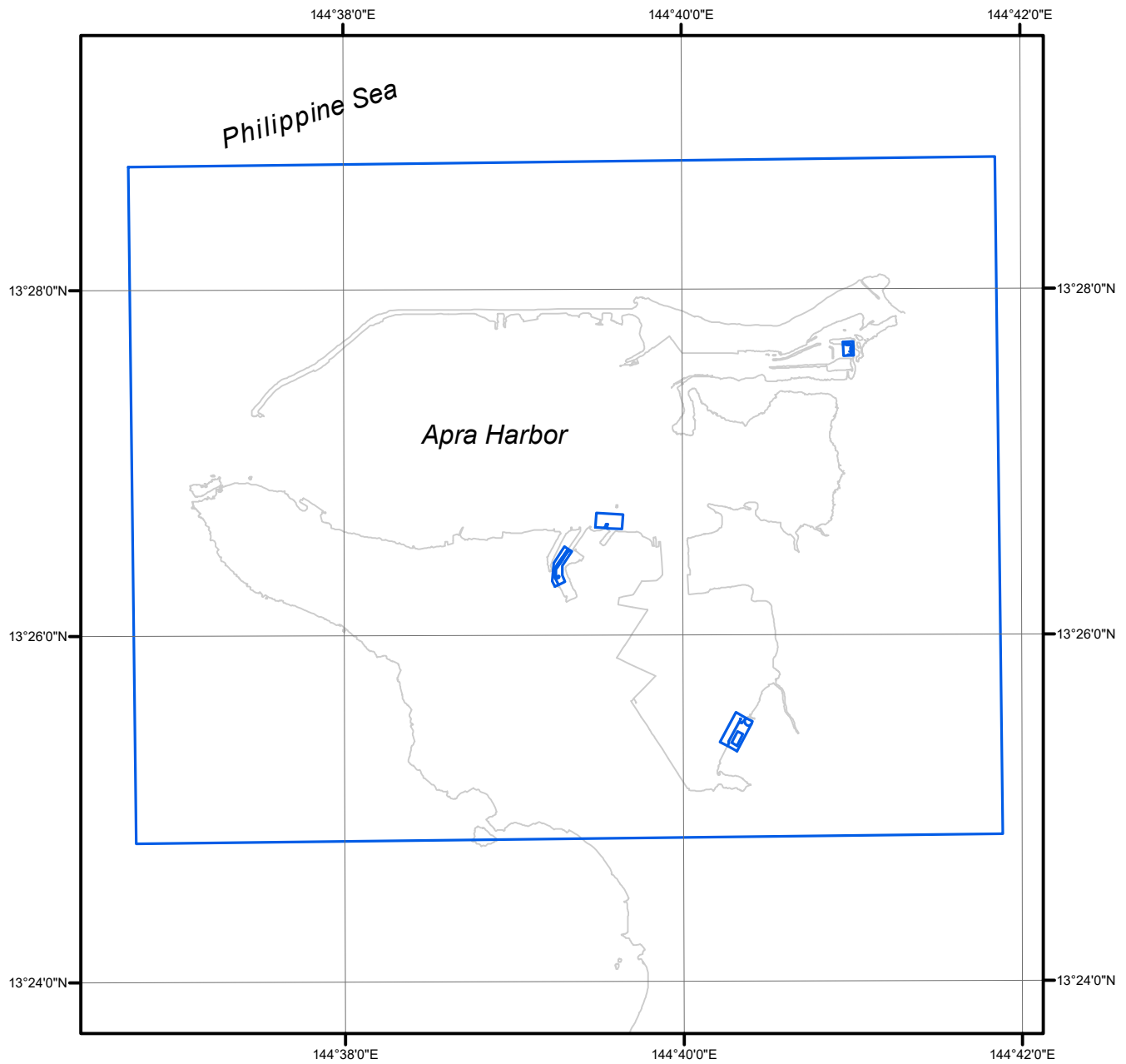
NOAA Shoreline Data Explorer

- GC11480 in shapefile format
- Metadata file for GC11480
- PCR in Adobe PDF format

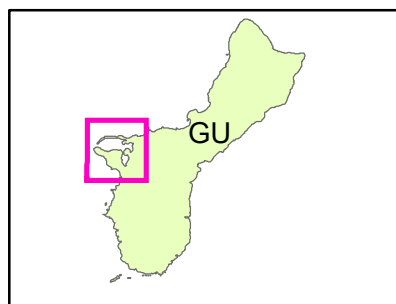
End of Report

APRA HARBOR

GUAM



Overview



GU1901-CS-T

GC11480