NOAA COASTAL MAPPING PROGRAM
PROJECT COMPLETION REPORT

PROJECT GU0701

Apra Harbor, Guam

Introduction

Coastal Mapping Program (CMP) Project GU0701 provides highly accurate digital shoreline data for the area of 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 coastal zone management applications.

Project Design

The design of Project GU0701 was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for timely updates to NOAA's Electronic Navigational Chart series. 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 satellite imagery in order to ascertain the need for more current shoreline data. Refer to the Apra Harbor, Guam CSCAP analysis memo for details regarding the chart comparison process.

Field Operations

Field operations consisted of the collection of ground control points (GCP) using static GPS data as a means of enhancing the geopositioning of the satellite image. The GPS data was collected by the Pacific Region Geodetic Advisor, National Geodetic Survey. Thirty-nine well-distributed GCPs were surveyed throughout the area of Apra Harbor covered by the IKONOS image. These points were based on preferred point location information provided by the RSD Applications Branch (AB). Please refer to the Apra Harbor, Guam Photo ID Project Report for details regarding control point collection methods and accuracy.

Georeferencing

One IKONOS non-orthorectified color image acquired from Space Imaging Inc. was georeferenced using Erdas IMAGINE image processing software (version 9.1) on a Windows platform. Ten GPS ground points were used as control and manually measured within the satellite imagery using the Raster Geometric Correction tool in IMAGINE. After subsequent processing, analysis, and refinement, the satellite imagery was resampled using the Nearest Neighbor sampling method with a 1st order polynomial model. Twenty-five points were then used as check points in order to assess the accuracy of the resampled imagery. The RMS of the residuals for each check point was used to compute a predicted horizontal circular error (CE) of 0.5 meters based on a 95% confidence level. This CE95 was tripled to yield a conservative predictor of the accuracy

of well defined points measured during compilation. As a final check, the resampled imagery was examined in ESRI's ArcGIS® software (version 9.1) to ensure the horizontal integrity of the resampled imagery, and to verify the suitability of the database for use in the compilation phase. All positional data is referenced to the North American Datum of 1983. A Georeferencing Report was written and is on file with other project data within the AB Project Archive.

Compilation

The compilation of cartographic feature data for this project was accomplished by a member of AB in May 2008. Digital feature data was compiled in ESRI shapefile format from imagery using ArcGIS 9.1. Feature attributes were established using 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 cartographic features were further modified with additional descriptive information to refine general classification.

Spatial data accuracies for Project GU0701 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features extracted from georeferenced commercial satellite imagery were tested to have a horizontal accuracy of 1.5 meters at the 95% confidence level, a predicted accuracy of well-defined points based on a minimum of twenty (20) check points which were compared to an independent source of higher accuracy.

The following table provides information on satellite images used in project completion:

Image Source	Source ID	Source File Name	Acquisition Date/Time	Tide Level*
IKONOS	2006071301101550000011605418	po_220546_rgb_0000000	2006-07-13 01:10 GMT	0.7 m

* Tide levels are given in meters above MLLW and are based on actual observations recorded by the NOS reference gauge at Apra Harbor, Guam. The elevation of the MHW tidal datum at Apra Harbor is 0.7 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 May 2008. 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 9.1. 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:

RSD Applications Branch Archive

- Hardcopy of the Georeferencing Report
- Hardcopy of the Project Completion Report (PCR)
- Page size graphic plot of GC10664 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

Remote Sensing Division Electronic Data Library

- GC10664 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

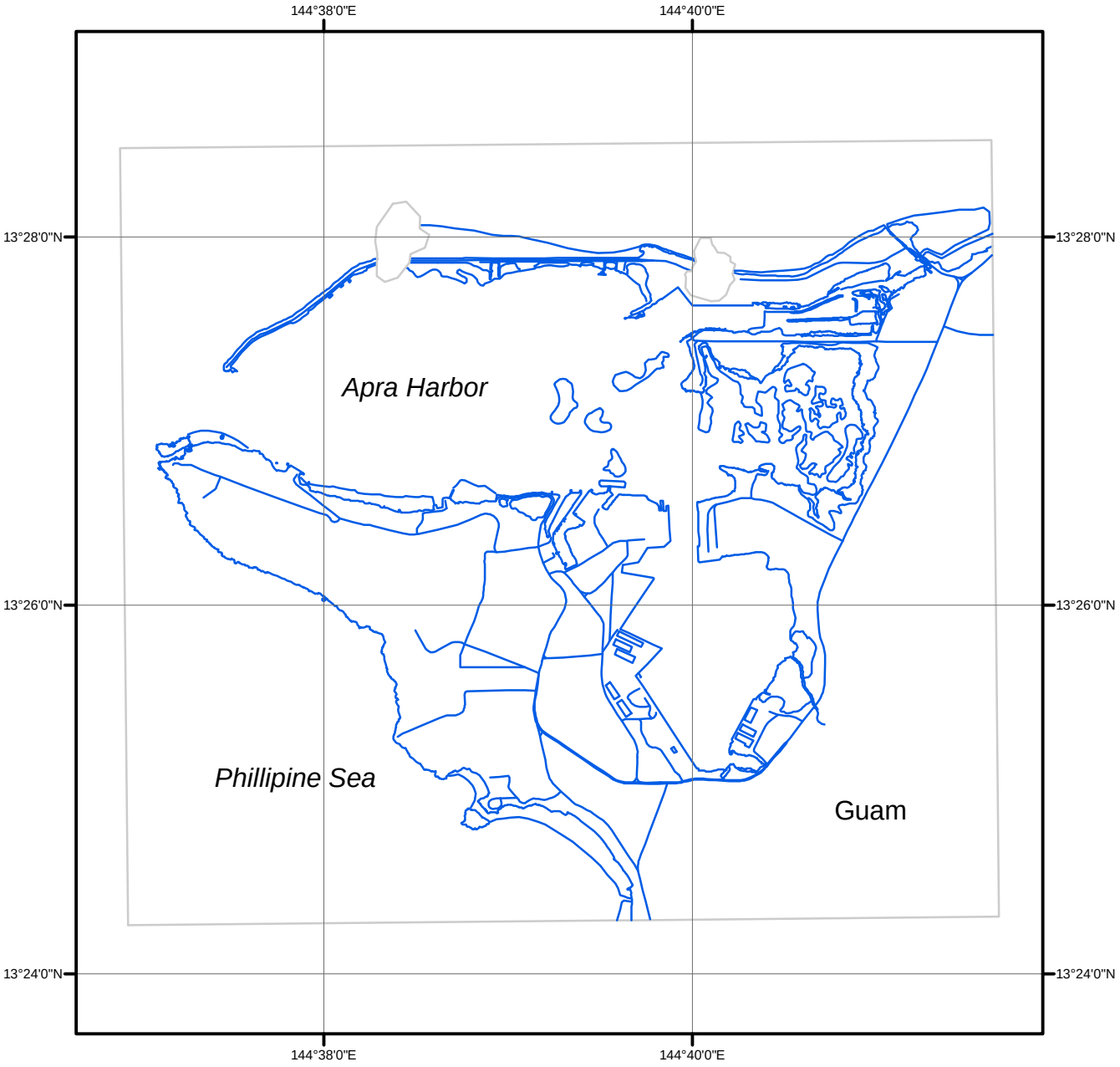
NOAA Shoreline Data Explorer

- GC10664 in shapefile format
- Metadata file for GC10664
- Digital copy of the PCR in Adobe PDF format

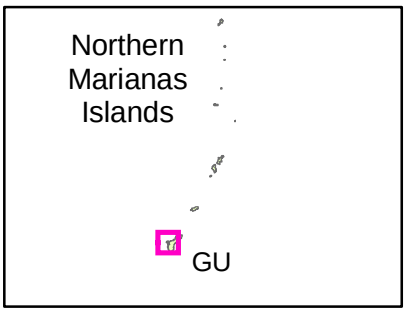
End of Report

APRA HARBOR

GUAM



Overview



GU0701

GC10664