

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT MP0702

Saipan Harbor, Commonwealth of the Northern Mariana Islands

Introduction

Coastal Mapping Program (CMP) Project MP0702 provides highly accurate digital shoreline data for key areas of change in the port of Saipan Harbor, Northern Mariana Islands. 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 MP0702 was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for timely updates to the NOAA Electronic Navigational Chart (ENC) 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. A Chart Evaluation File (CEF) was forwarded to the Applications Branch (AB) of RSD once the change analysis was complete. Refer to the RB Memorandum of April 10, 2007, "Results of CSCAP Change Analysis for Saipan Harbor, CNMI (MP0702)," 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

One IKONOS standard satellite image with a spatial resolution of approximately 1 meter, acquired from GeoEye, Inc., was georeferenced using Erdas IMAGINE 9.2 software on a Windows platform. Ground control points and check points were extracted from previously compiled shoreline vectors of archived CMP project SP94PACG. The control points were imported into IMAGINE and used to georeference the satellite image. The Raster Geometric Correction tool within IMAGINE was used with a 1st order polynomial model. The imagery was re-sampled using the Nearest Neighbor sampling method. The RMS of the residuals for measured check points were used to compute a horizontal circular error at the 95% confidence interval (CE95) of 0.9 meters for the satellite image. This CE value was tripled and then added to the CE95 of the source vectors from which ground control points were extracted in order to conservatively predict the accuracy of well-defined points measured during the compilation process. A Georeferencing Report

was written and is on file with other project data within the RSD Project Archive. Positional data is based on the Universal Transverse Mercator coordinate system (Zone 55N), and referenced to the North American Datum of 1983.

Compilation

The data compilation phase of this project was accomplished by RSD in December 2008. Digital feature data was compiled in ESRI shapefile format from the satellite image using ESRI ArcGIS 9.1 desktop GIS 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 for Project MP0702 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were tested to have a horizontal accuracy of 3.5 meters at the 95% confidence level. This predicted accuracy of well-defined points is based on a minimum of twenty (20) check points that were compared to an independent source of higher accuracy.

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

Image Source	Source ID	Acquisition Date/Time	Tide Level*
IKONOS	2006091401042060000011602655	2006-09-14 01:04 GMT	0.5 m

* Tide levels are given in meters above MLLW and are based on verified water levels recorded by the NOS gauge at Guam with corrections applied to the Saipan Harbor tidal sub-station. The elevation of the MHW tidal datum at Saipan Harbor is approximately 0.54 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 January 2009. 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 9.2. 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:

RSD Applications Branch Archive

- Hardcopy of the Georeferencing Report
- Hardcopy of the Project Completion Report (PCR)
- Page size graphic plot of GC10754 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

Remote Sensing Division Electronic Data Library

- GC10754 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

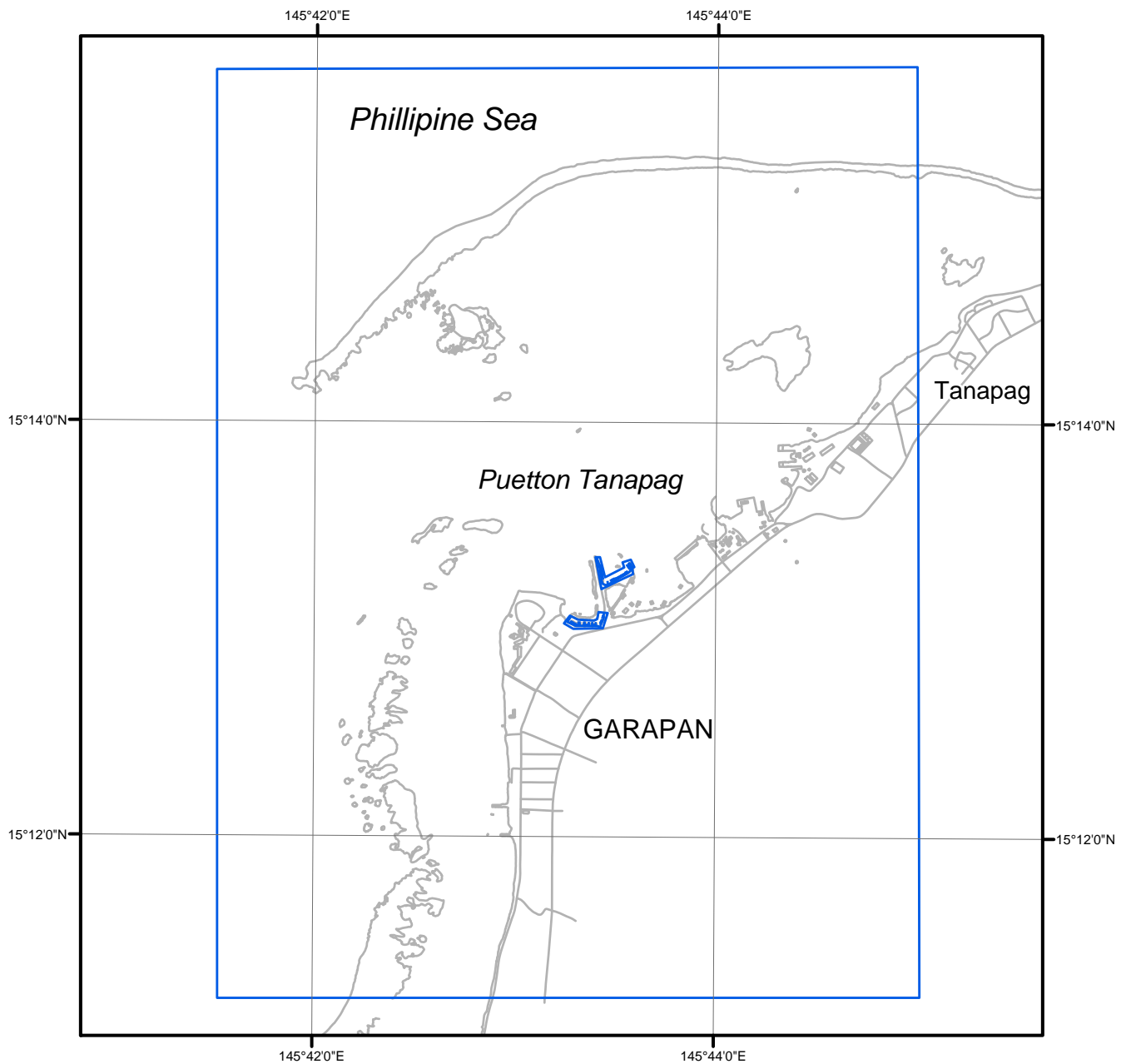
NOAA Shoreline Data Explorer

- GC10754 in shapefile format
- Metadata file for GC10754
- Digital copy of the PCR in Adobe PDF format

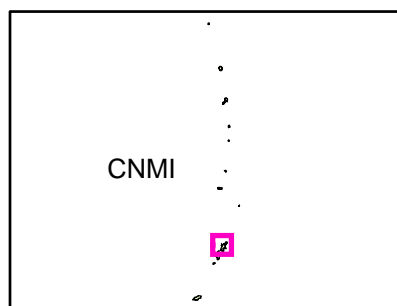
End of Report

SAIPAN HARBOR

COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS



Overview



MP0702

GC10754