NOAA COASTAL MAPPING PROGRAM
PROJECT COMPLETION REPORT

PROJECT HI0601C

Honolulu Harbor, Hawaii

Introduction

Coastal Mapping Program (CMP) Project HI0601C provides highly accurate digital shoreline data for key areas of change within Honolulu Harbor, Hawaii. 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 HI0601C 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. Refer to the RB analysis memorandum 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 QuickBird non-orthorectified panchromatic image with a spatial resolution of 0.6 meters, acquired from DigitalGlobe, Inc., was georeferenced using Erdas IMAGINE 9.0 software in a Windows computing environment. Ground control points (GCPs), photogrammetrically measured from metric quality aerial photography, were imported into IMAGINE and used to georeference the satellite imagery. Within IMAGINE the Raster Geometric Correction tool was used with a 1st order polynomial model. The imagery was resampled using the Nearest Neighbor sampling method. The RMS of the residuals for measured check points was used to compute a predicted horizontal circular error at the 95% confidence interval (CE95) of 0.5 meters for the satellite image. This CE value was tripled and then added to the CE95 of the source imagery from which ground control points were extracted, in order to conservatively predict the accuracy of well-defined points measured during the compilation process. Positional data is based on the UTM Coordinate System (Zone 4), and referenced to the North American Datum of 1983.

Compilation

The data compilation phase of this project was accomplished by RSD Applications Branch personnel in April 2008. Digital feature data was compiled in ESRI shapefile format from imagery using ESRI's 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 cartographic features were further modified with additional descriptive information to refine general classification.

Spatial data accuracies for Project HI0601C were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were tested to have a horizontal accuracy of 2.4 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*
QuickBird	05DEC31212213_P3DM_RC5C5_005544325010	2005-12-31 / 21:22 GMT	0.10

* Tide levels are given in meters above MLLW and are based on actual observations recorded by the NOS gauge in Honolulu Harbor at the time of imagery acquisition. The elevation of the MHW tidal datum is equal to 0.4 meters above MLLW.

Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a senior member of the Applications Branch of RSD. QC activities for this project were finalized by May 2008. The review process also included analysis of the georeferencing results and evaluation of the identification and attribution of cartographic features 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 HI0001C Aerotriangulation Report
- Hardcopy of the Georeferencing Report
- Hardcopy of the Project Completion Report (PCR)
- Page-size graphic plot of GC10649 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

Remote Sensing Division Electronic Data Library
- GC10649 in shapefile format
- Digital copy of the PCR in Adobe PDF format
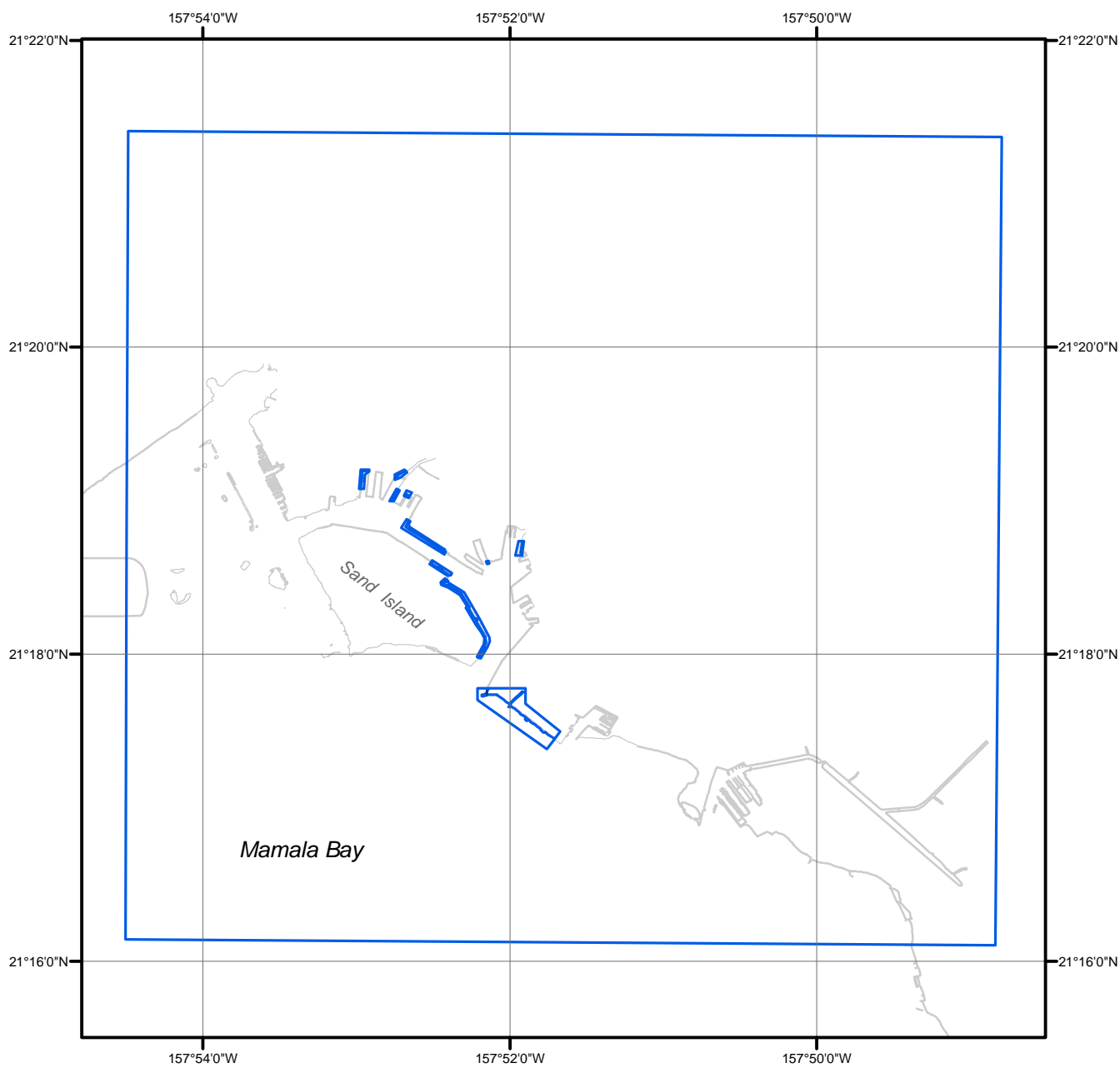- Chart Evaluation File (CEF) in shapefile format

NOAA Shoreline Data Explorer
- GC10649 in shapefile format
- Metadata file for GC10649
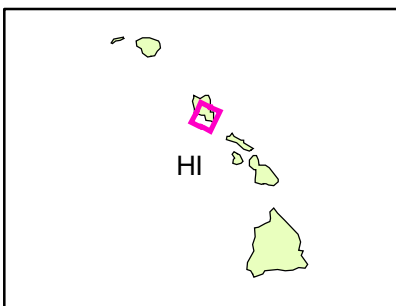- Digital copy of the PCR in Adobe PDF format

End of Report

HONOLULU HARBOR

HAWAII

21°22'0"N — 157°54'0"W — 157°52'0"W — 157°50'0"W — 21°22'0"N

21°20'0"N — 21°20'0"N

21°18'0"N — 21°18'0"N

Sand Island

Mamala Bay

21°16'0"N — 21°16'0"N

157°54'0"W — 157°52'0"W — 157°50'0"W

Overview

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HI0601C

GC10649