

# **NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT**

## ***PROJECT HI0701***

### ***Port of Kahului, Hawaii***

#### **Introduction**

Coastal Mapping Program (CMP) Project HI0701 provides highly accurate digital shoreline data for key areas of change within Kahului Harbor, on the island of Maui, 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 HI0701 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 (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 December 3<sup>rd</sup>, 2007, "Results of CSCAP Change Analysis for Kahului, Hawaii (HI0701)," for details regarding the chart comparison process.

#### **Field Operations**

Field operations consisted of the collection of static GPS data as a means of enhancing the geopositioning of commercial satellite imagery. The GPS data was collected by a member of the Observation and Analysis Branch, National Geodetic Survey in September 2009. A series of well-distributed ground control points were surveyed throughout the project area based on information provided by AB.

#### **Georeferencing**

One Quickbird non-orthorectified panchromatic image with a spatial resolution of 0.6 meters, acquired from Digital Globe, Inc., was georeferenced using Erdas IMAGINE 9.2 software on a Windows platform. Within IMAGINE the Raster Geometric Correction tool was used with a 1<sup>st</sup> order polynomial model. Once the control points were measured, the imagery was re-sampled using the Nearest Neighbor sampling method. The RMS of the residuals for all measured check points were used to compute a predicted horizontal circular error (CE) of 0.8 meters based on a 95% confidence level. This CE value was tripled to yield a conservative predictor of the accuracy of well defined points measured during compilation. Positional data is referenced to the North American Datum of 1983 (NAD 83).



## Compilation

The data compilation phase of this project was accomplished by a member of AB in December 2009. Digital feature data was compiled in ESRI shapefile format from the Quickbird imagery using ESRI's ArcGIS 9.3 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 HI0701 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 2.5 meters at the 95% confidence level. This predicted accuracy of compiled well-defined points is a deductive estimate based on georeferencing statistics.

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

Image #	Image Source	Source File Name	Acquisition Date/Time	Tide Level*
1	QuickBird	07SEP12213017-P1BS-005681406010_01_P001.tif	2007-09-12 21:30 GMT	0.4 m

\* Tide levels are given in meters above MLLW and are based on actual observations recorded by the NOS gauge at the time of photography at the Kahului Harbor, Maui Island, Hawaii reference station. The elevation of the MHW tidal datum is equal to 0.6 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 2010. 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 9.3. 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 GC10712 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum



**Remote Sensing Division Electronic Data Library**

- GC10712 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

**NOAA Shoreline Data Explorer**

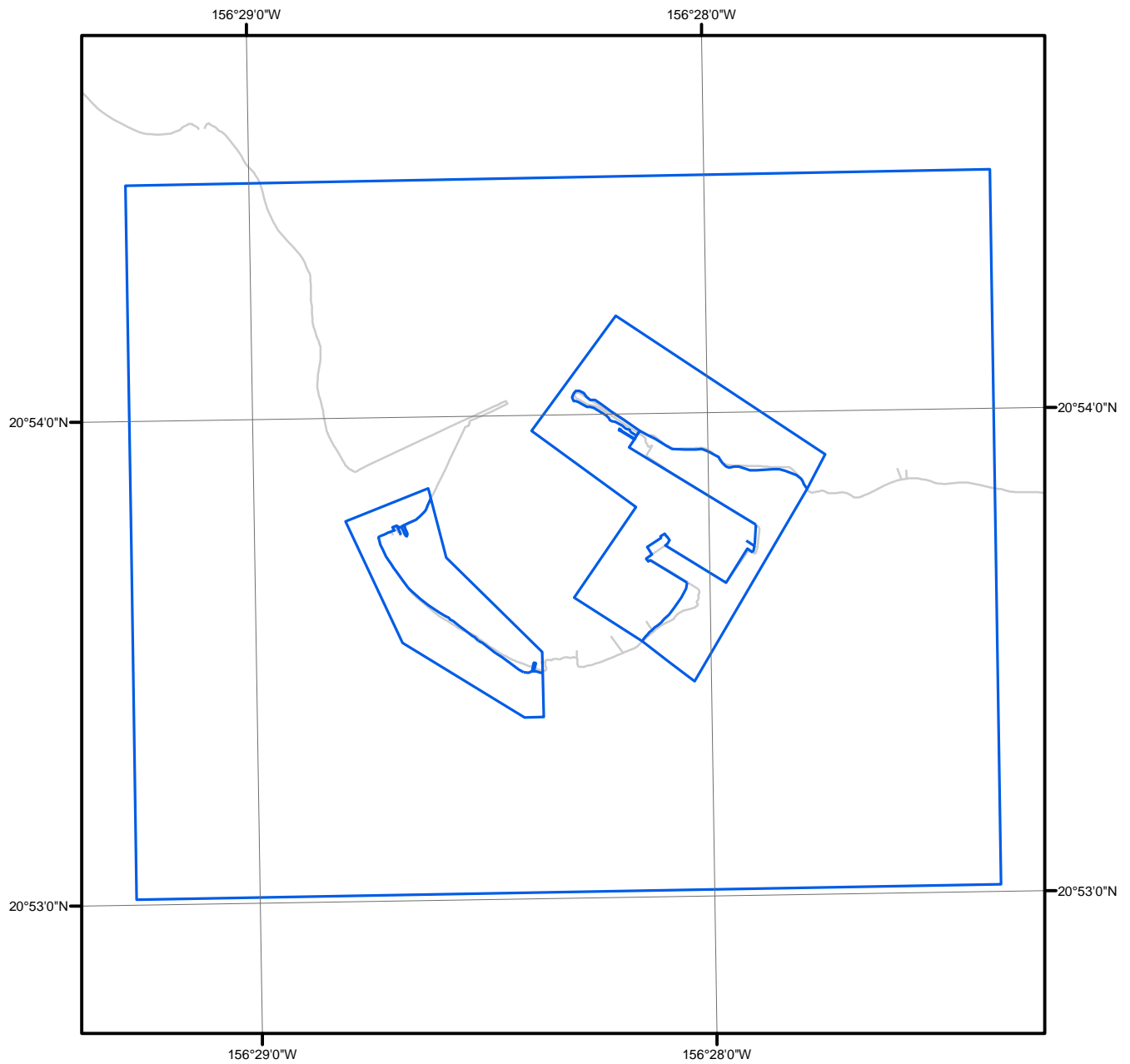
- GC10712 in shapefile format
- Metadata file for GC10712
- Digital copy of the PCR in Adobe PDF format

**End of Report**

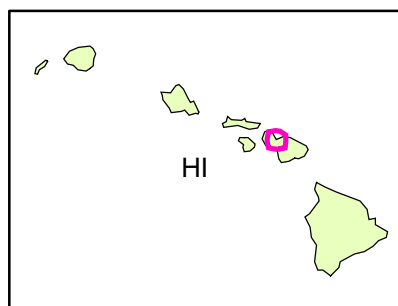


# PORT OF KAHULUI

## HAWAII



Overview



HI0701

GC10712