NOAA COASTAL MAPPING PROGRAM
PROJECT COMPLETION REPORT

PROJECT VA0503

Ports of Norfolk and Newport News, Virginia

Introduction

Coastal Mapping Program (CMP) Project VA0503 provides highly accurate digital shoreline data for key areas of change within Norfolk-Newport News, Virginia. 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 VA0503 was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for timely updates to 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, "Results of CSCAP Change Analysis for Norfolk-Newport News, Virginia (VA0503)," November 01, 2005, for details regarding the chart comparison process.

Field Operations

Routine CMP field operations did not apply for this entire project based on the origin of the project source data. For most of the project, preexisting sources of horizontal control were used for the georeferencing process. Where there wasn't horizontal control available, GPS control points were collected in the field to fill in the gaps.

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 Remote Sensing Division, Office NOAA. A series of well-distributed ground control points were surveyed for the selected area based on information provided by the Applications Branch. Please refer to the, "Norfolk-Newport News Ground Control Point Positioning Report", for details regarding equipment, data collection, and data processing.

Georeferencing

Eight IKONOS non-orthorectified color images with a spatial resolution of 1 meter, acquired from Space Imaging, Inc., were georeferenced using Erdas IMAGINE 9.0 software on a Windows platform. Ground control points (GCP's) were collected in the

field and photogrammetrically measured from metric quality aerial photography, 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. Once control points were measured, the satellite imagery was resampled using the Nearest Neighbor sampling method. The RMS of the standard deviations of the residuals for measured check points were used to compute a predicted horizontal circular error at the 95% confidence level (CE95) for each image. This value varied between 1.1 meters and 1.4 meters for the given images used. This CE value was tripled and then added to the CE95 of the reference grid to yield a conservative predictor of the accuracy of well defined points measured during the compilation process. Positional data is referenced to the North American Datum of 1983 (NAD 83).

Compilation

The compilation of cartographic feature data for this project was accomplished by a member of the Applications Branch (AB) of RSD in June 2006. Digital feature data was compiled in ESRI shapefile format from imagery using ESRI's ArcGIS 9.1 desktop GIS software. Feature attributes were established according to 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 given, to refine general classification. There was a lack of tidal information in the project area, however, as there was no available data for the day or the tidal substation when the photography was flown.

Spatial data accuracies for Project VA0503 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were tested to have a range of horizontal accuracy falling between 3.5 meters and 4.3 meters at the 95% confidence level (see Table 1). 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.

Table 1 – Source image information.

Image #	Image Source	Source ID	Source File Name	Acquisition Date/Time	Horizontal Accuracy
1	IKONOS	2005092815581860000011614638	2va0503_ik_0000001_utm_nad83_georef.tif	2005-09-28 15:58 GMT	4.3m
2	IKONOS	2005092815583390000011614637	3va0503_ik_0010000_utm_nad83_georef.tif	2005-09-28 15:22 GMT	4.1m
3	IKONOS	2005092815581860000011614638	5va0503_ik_0000002_utm_nad83_georef.tif	2005-09-28 15:22 GMT	3.8m
4	IKONOS	2005092815583390000011614637	6va0503_ik_0010001_utm_nad83_georef.tif	2005-09-28 15:22 GMT	4.0m
5	IKONOS	2005092815584960000011614636	7va0503_ik_0020001_utm_nad83_georef.tif	2005-09-28 15:22 GMT	3.7m
6	IKONOS	2005092815583390000011614637	8va0503_ik_0010002_utm_nad83_georef.tif	2005-09-28 15:22 GMT	3.6m

7	IKONOS	2005092815583390000011614637	9va0503_ik_0010003_utm_nad83_georef.tif	2005-09-28 15:22 GMT	3.8m
8	IKONOS	2005092815584960000011614636	10va0503_ik_0020002_utm_nad83_georef.tif	2005-09-28 15:22 GMT	3.5m

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 July 2007. 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 Project Completion Report (PCR)
- Page-size graphic plot of GC10617 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

Remote Sensing Division Electronic Data Library

- GC10617 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- Chart Evaluation File (CEF) in shapefile format

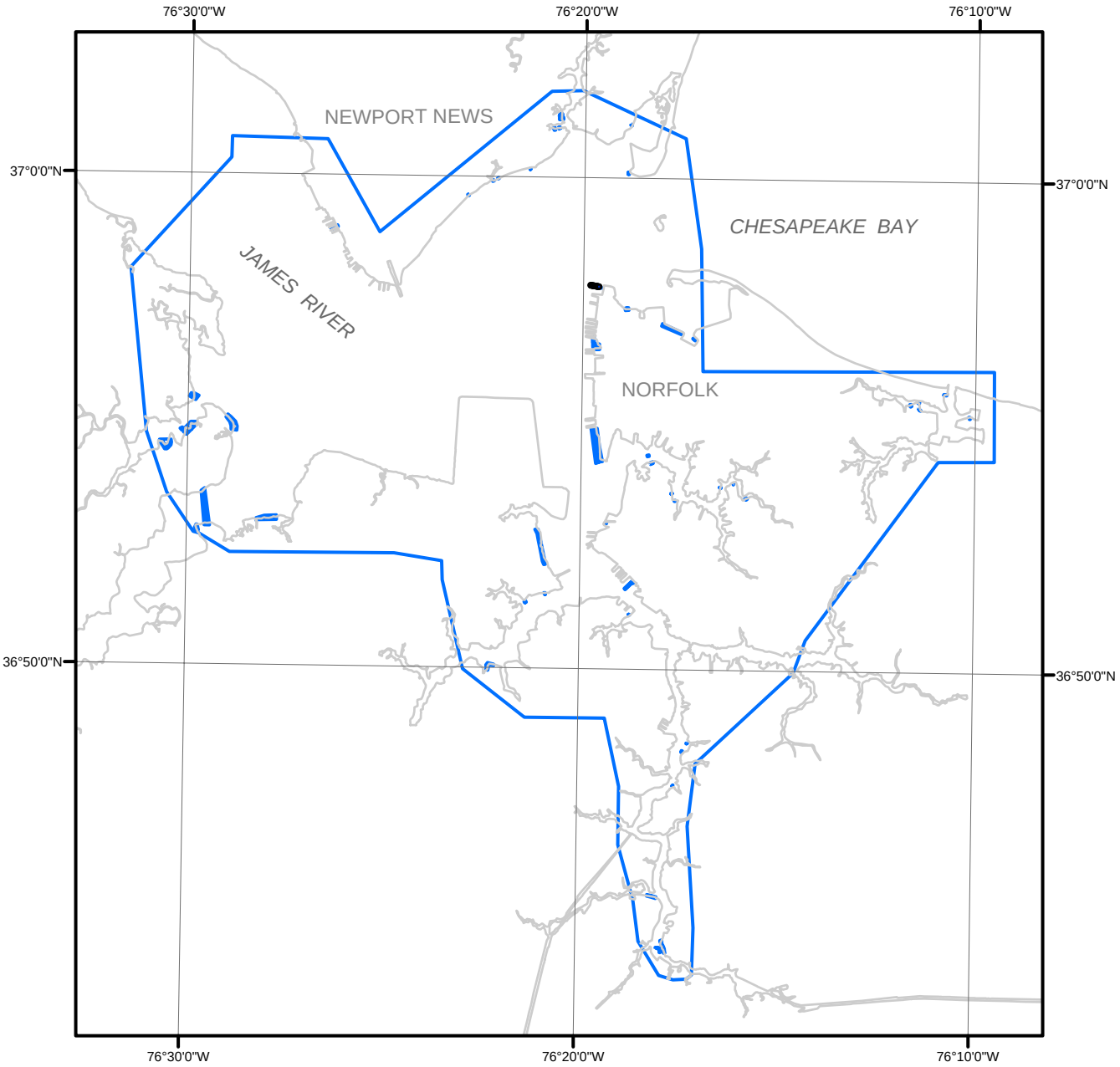
NOAA Shoreline Data Explorer

- GC10617 in shapefile format
- Metadata file for GC10617
- Digital copy of the PCR in Adobe PDF format

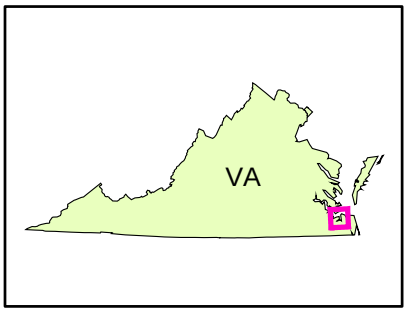
End of Report

PORTS OF NORFORK AND NEWPORT NEWS

VIRGINIA



Overview



VA0503

GC10617