NOAA COASTAL MAPPING PROGRAM

PROJECT COMPLETION REPORT

PROJECT IL0301

CHICAGO HARBOR, ILLINOIS

Introduction

Coastal Mapping Program (CMP) Project IL0301 provides highly accurate digital shoreline data for key areas of change within Chicago Harbor, Illinois. The digital cartographic feature file (DCFF) 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 IL0301 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 Chicago North CSCAP Analysis memo 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 Navigation Response Team 6 of the Navigational Services Division, Office of Coast Survey. A series of well-distributed ground control points were surveyed throughout the project area based on information provided by the Applications Branch. Please refer to the Chicago Harbor Ground Control Point Positioning Report for details regarding equipment, data collection and data processing.

Georeferencing

IKONOS non-orthorectified panchromatic imagery with a spatial resolution of 1 meter, acquired from SpaceImaging, Inc., was georeferenced using Erdas Imagine 8.5 software on a Windows platform. Within Imagine, the Raster Geometric Correction tool was used with a 1st order Polynomial model. Once the control points were measured, the imagery was resampled using the Nearest Neighbor sampling method. The RMS of the standard deviations of the residuals for each measured control point were used to compute a predicted horizontal circular error (CE) of 1.6 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.

Compilation

The compilation of cartographic feature data for this project was accomplished by a member of the Applications Branch of RSD in August 2004. Digital feature data was compiled in ESRI shapefile format from imagery using ESRI's ArcGIS 8.3 desktop GIS software. Feature attributes were established using the C-COAST specification file, which provides the definition and attribution scheme for the full range of cartographic features pertinent to the CMP. Cartographic features were compiled to meet a horizontal accuracy of 4.9 meters at the 95% confidence level. This predicted accuracy of compiled well-defined points is a deductive estimate based on georeferencing statistics.

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. The final QC review was completed in August 2004. The review process included analysis of the georeferencing results and assessment 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 DCFF using ArcGIS 8.3. 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

- Textual (hard) copy of the Project Completion Report (PCR)
- Page size graphic plot of DCFF contents, attached to PCR
- CSCAP evaluation minute memorandum
- Chicago Harbor Ground Control Point Positioning Report

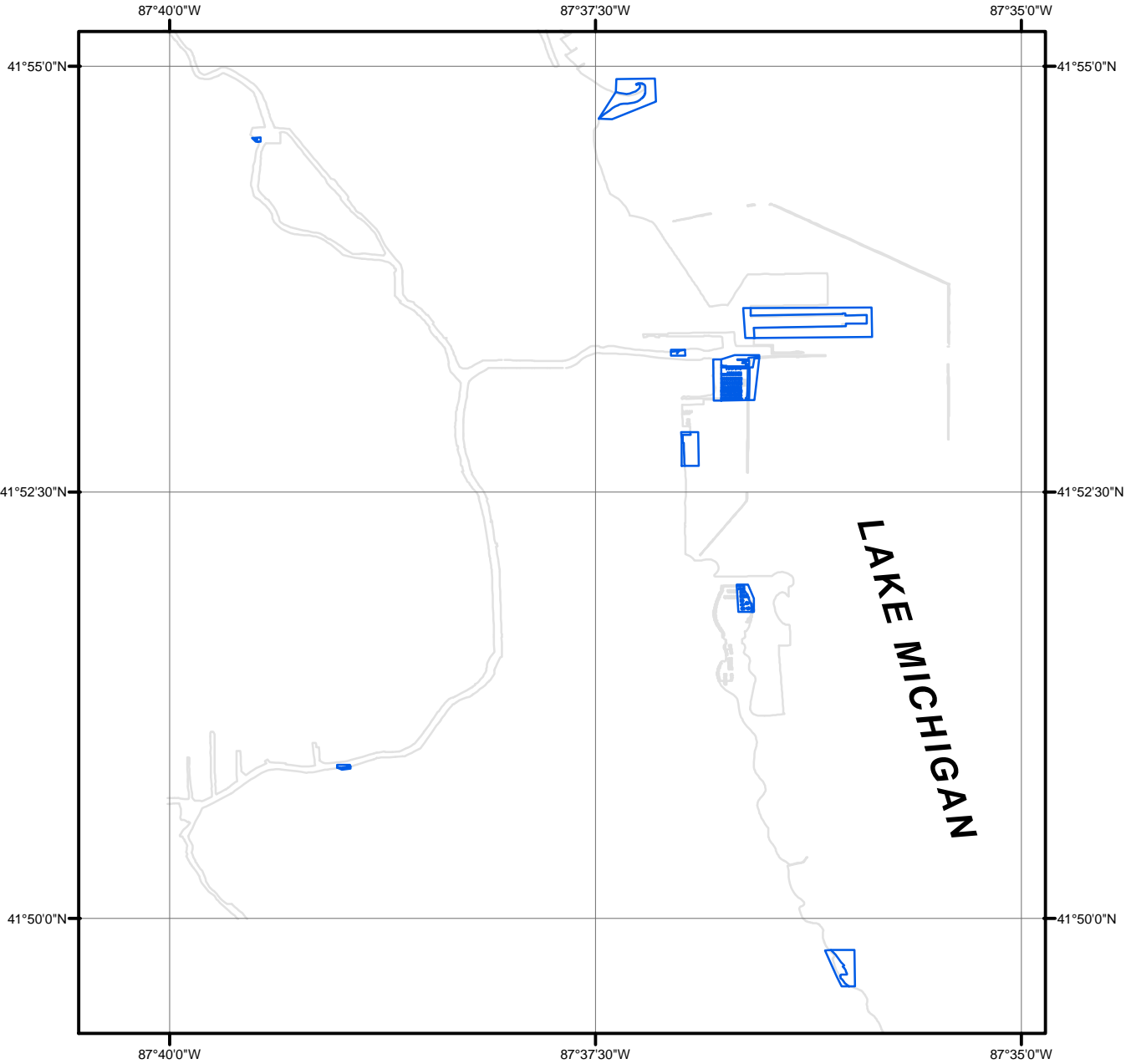### Remote Sensing Division Electronic Data Library

- Digital copy of DCFF GC10563 in ESRI shapefile format
- Digital copy of the PCR in Adobe PDF format
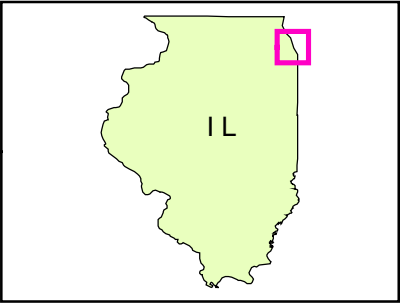- Chart Evaluation File

NOAA Shoreline Data Explorer

- DCFF for GC10563
- Metadata file for GC10563
- Digital copy of the PCR in Adobe PDF format

End of Report

CHICAGO HARBOR

CHICAGO, ILLINOIS

87°40'0"W 87°37'30"W 87°35'0"W

41°55'0"N 41°55'0"N

LAKE MICHIGAN

41°52'30"N 41°52'30"N

41°50'0"N 41°50'0"N

87°40'0"W 87°37'30"W 87°35'0"W

Overview

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GC 10563