

NOAA COASTAL MAPPING PROGRAM

PROJECT COMPLETION REPORT

PROJECT NY9904C

JAMAICA BAY, NEW YORK

Introduction

Coastal Mapping Program (CMP) project NY9904C provides a highly accurate database of new digital shoreline data for the southern coast of Long Island, New York, from Rockaway Inlet to Hempstead Bay.

Successful completion of this project resulted in a densification of the National Spatial Reference System (NSRS), a set of controlled metric quality aerial photographs, and digital cartographic feature files (DCFF) of the coastal zone which compliment the Nautical Charting Program (NCP) and other geographic information systems.

The project database consists of information measured and extracted from aerial photographs and metadata related to photogrammetric compilation. Base mapping was conducted in a digital environment using stereo softcopy photogrammetry and associated cartographic practices. Project survey data is referenced to the North American Datum of 1983 (NAD 83).

Project Design

The Requirements Branch (RB) of the Remote Sensing Division (RSD) formulated the photographic mission instructions for this project following the guidelines of the Photo Mission Standard Operating Procedure Version III (2/01/97). The instructions discussed the project's purpose, geographic area of coverage, scope and priority; photographic requirements; flight line priority; Global Positioning System (GPS) data collection procedures and guidelines for both kinematic and static surveys; data recording and handling instructions; and contact and communication information.

The RB created a Project Layout Diagram, flight maps and input files for the aircraft's flight management system, and information on airports that may be used as a base of operation. Additional information disseminated at a briefing held for the photo mission crew included data on tide predictions, sun angle computations, flight line priorities, and geodetic control stations which could be used as GPS reference stations.

Additional project requirements were submitted by the Office of Coast Survey (OCS) regarding Electronic Navigational Chart (ENC) production which had the effect of increasing the compilation scale and level of feature inclusion.

Field Operations

The field operations consisted of the collection of static and kinematic GPS data and the acquisition of aerial photographs. The photographic mission operations were conducted on October 15, 1999, with the NOAA Cessna Citation II aircraft. Two strips of natural color photographs were acquired through use of a Wild RC-30 camera with the NOS "A" lens cone at the nominal scale of 1:48,000.

A base station was established at the airport using static GPS. Airborne kinematic GPS data was collected to determine precise camera positions in order to establish a control network necessary for aerotriangulation. GPS data collection operations were conducted in accordance with the GPS Controlled Photogrammetry Field Operations Manual (10/25/99). No ground control (panels) was established prior to aerial photographic operations.

GPS Data Reduction

Global Positioning System (GPS) data was collected and processed to provide precise positions of camera centers for application as photogrammetric control in the aerotriangulation phase of project completion. The static GPS data was collected on 10/7/1999 and was processed in November 2002 using the NGS Online Processing User Service (OPUS) software to compute fixed baseline solutions from three CORS stations. The final NAD83 position reported by OPUS was the average of these three baseline solutions. The airborne kinematic data was processed using Applanix POSGPS (ver. 3.1) software in November 2002. The NGS computed precise satellite ephemeris and standard meteorological data were applied during the data reduction process. A GPS Data Processing Report was written and is on file with other project data within the RSD Applications Branch (AB) Project Archive.

Aerotriangulation

Routine softcopy aerotriangulation methods were applied to establish the network of precise GPS camera positions and other control for mapping, and to provide model parameters and orientation elements required for digital compilation. This work was initiated by the RSD AB CMP personnel in December 2003 utilizing a digital photogrammetric workstation (DPW) which is a configuration of a computer processor and monitors, softcopy photogrammetry software (SOCET SET ver. 5.0), stereographic viewing equipment and associated peripheral devices. The ORIMA (ver. 6.0) software module was utilized for the aerotriangulation process. The two strips of aerial photographs were measured and adjusted as one block. Upon successful completion of the aerotriangulation process, the ORIMA software provided the RMS of the standard deviations of the residuals for each aerotriangulated ground point which were used to compute a predicted horizontal circular error of 1.3 meters based on a 95% confidence level. An Aerotriangulation Report was written and is on file with other project data in the RSD AB Project Archive.

The project database consists of project parameters and options, camera calibration data, interior orientation parameters, airborne GPS antenna position and offset data, adjusted exterior orientation parameters, and positional listing of all measured points. Positional data is based on NAD 83, and is referenced to the UTM Coordinate System, zone 18N.

Compilation

The data compilation phase of the project was accomplished by AB personnel in April 2005. The digital mapping was performed using a DPW in conjunction with the SOCET SET Feature Extraction module. Feature identification and the assignment of cartographic codes were based on image analysis of 1:48,000 scale natural color photographs and information extracted from the appropriate NOAA Nautical Charts, US Coast Guard Light List and other ancillary sources. Cartographic feature attribution was assigned in compliance with the Coastal Cartographic Object Attribute Source Table (C-COAST). Nomenclature was assigned to selected cartographic features to refine general classification.

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 derived by doubling the circular error derived from aerotriangulation statistics.

The following provides information on aerial photographs used in the project completion process:

Date	Time (UTC)	Roll Number	Photo Numbers	Scale (Nominal)	Tide Level* (MLLW)
10-15-99	1559-1601	99ACN28	5190-5196	1:48,000	1.3 meters
10-15-99	1610-1614	99ACN28	5197-5205	1:48,000	1.3 meters

* Tide levels are based upon calculations using actual observations at the NOS tide station in Sandy Hook, NY, at the time of photography.

Quality Control / Final Review

The final review was initiated by a senior AB CMP team member in May 2005. The digital cartographic feature file (DCFF) was evaluated for completeness and accuracy. Data review consisted of an on-line and off-line evaluation of digital compilation and hard copy products. The on-line review comprised of reviewing stereo models on a DPW for cartographic feature codes selection, positional accuracies of features, and nomenclature. The cartographic feature attribution was judged to conform to C-COAST specification. The offline evaluation compared the project data in shapefile format with the largest scale NOAA digital raster nautical charts available and the natural color photographs. The following nautical charts were used in the comparison process:

- 12350 Jamaica Bay and Rockaway Inlet, 1:20,000, 58th ed.
- 12352 Shinnecock Bay to East Rockaway Inlet, 1:20,000 & 1:40,000, 30th ed.
- 12402 New York Lower Bay - Northern Part, 1:15,000, 9th ed.

End Products and Deliverables

The following specifies the location and identification of the products generated during the completion of this project:

RSD Applications Branch Archive

- Hardcopy of the GPS Processing Report
- Hardcopy of the Aerotriangulation Report
- Hardcopy of the Project Completion Report (PCR)
- Page-size graphic plot of GC10553 file contents, attached to PCR

Remote Sensing Division Electronic Data Library

- Project Database
- Digital copy of DCFF GC10553 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- Chart Evaluation File in shapefile format

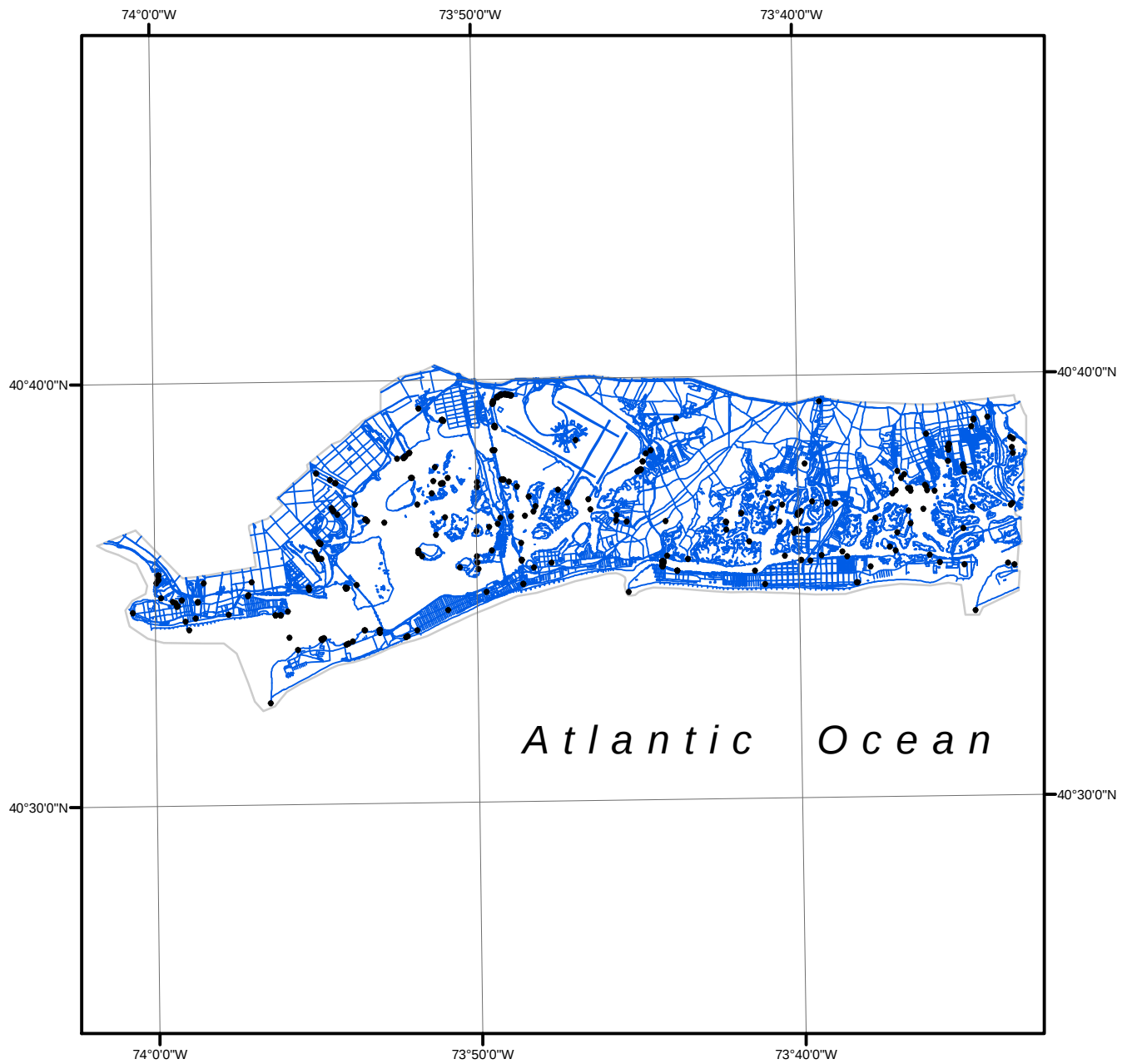
NOAA Shoreline Data Explorer

- DCFF for GC10553
- Metadata file for GC10553
- Digital copy of the PCR in Adobe PDF format

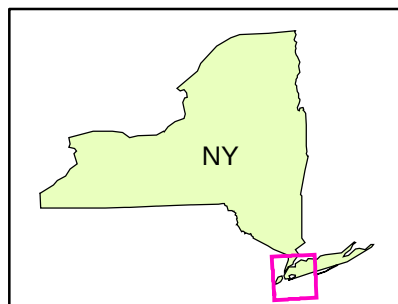
End of Report

JAMAICA BAY

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Overview



NY9904C

GC10553