

**NOAA COASTAL MAPPING PROGRAM
PROJECT COMPLETION REPORT**

**PROJECT AK9702H
BLASHKE ISLAND TO NARROW POINT, CLARENCE STRAIT
SOUTHEAST ALASKA**

Introduction

Coastal Mapping Program (CMP) Project AK9702H, a subproject of AK9702 provides a highly accurate database of new digital shoreline data of southeastern Alaska. The project area covers the western shore of Clarence Strait from Blashke Island to Narrow Point, including Kashevarof Passage, Thorne Island, Whale Passage, and Stevenson Island.

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 complement 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 standard operating guideline of the photo mission standard operating procedure version III (2/01/1997). The instructions discussed the project's purpose, geographic area of coverage, scope and priority; tide coordination 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.

Field Operations

The photographic mission operations were conducted on August 9 and 16, 1997 and on May 15 and 27, 1998, with the NOAA Cessna Citation II aircraft. Four strips of natural color

photographs, one strip of panchromatic photographs, and four strips of infrared photographs were acquired through use of a Wild RC-30 camera with the NOS "A" lens cone at the nominal scale of 1:40,000. Airborne Kinematic GPS data was acquired during the photo mission for the color and panchromatic photographs.

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 acquisition of a static GPS dataset of the airport reference station and airborne kinematic GPS dataset was executed in compliance with GPS Controlled Photogrammetry Field Operations Manual, a RSD operational manual. Static GPS data of the airport reference station was collected on August 9, 1997 and processed in August 1997 using NGS's OMNI software to compute two fixed baseline solutions from the nearest CORS station. The final position of the GPS base station was the average of these two baseline solutions. The airborne kinematic data for all project mission flights were processed by RSD Applications Branch (AB) personnel using Trimble GPSurvey (ver. 2.30) software between March 1999 and January 2000. The NGS computed precise satellite ephemeris and standard meteorologic 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 AB Project Archive.

Aerotriangulation

Routine softcopy aerotriangulation methods were applied to establish the network of precise 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 January 2004 utilizing a digital photogrammetric workstation (DPW) which is a configuration of a computer processor and monitors, softcopy photogrammetry software (SOCET SET v. 5.0), stereographic viewing equipment and associated peripheral devices. The SOCET SET ORIMA (ver. 6.01) software module was utilized for the aerotriangulation process where the four strips of color and one strip of panchromatic aerial photographs were measured and adjusted as one block and the four strips of infrared aerial photographs were measured and adjusted as another block. Upon successful completion of the aerotriangulation process, the ORIMA software provided the RMS of the standard deviations of the residuals for all aerotriangulated ground points, which were used to compute a predicted horizontal circular error of 1.2 meters for the color and panchromatic photographs and 1.2 meters for the infrared photographs. All accuracies were based on a 95% confidence level. An Aerotriangulation Report is on file with other project data within 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 referenced to the UTM Coordinate System, zone 8N, (NAD83).

Compilation

The data compilation phase of the project was accomplished by the RSD Applications Branch (AB) in August 2004. The digital mapping was performed using a DPW in conjunction with the Socet Set (v. 5.0) Feature Extraction module. Feature identification and the assignment of cartographic codes were based on image analysis of 1:40,000 scale natural color, panchromatic, and infrared photographs and information extracted from the appropriate NOAA Nautical Charts, US Coast Guard Light List and US Coast Pilot. 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 2.4 meters for all photography. All accuracies were based at the 95% confidence level. This predicted accuracy of compiled, well defined points is derived by doubling the circular error derived from aerotriangulation statistics.

Color imagery strip 40-18 was used for photo control only and not needed for compilation phase.

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

Date	Time (UTC)	Roll #	Strip #	Photo #	Scale	Tide Stage (MLLW)*
8-9-1997	2307-2313	97ACN11	40-13	2198-2205	1:40,000	3.0-3.4 m
8-9-1997	2320-2328	97ACN11	40-15	2206-2214	1:40,000	3.2-3.4 m
8-9-1997	2337-2344	97ACN11	40-17	2224-2239	1:40,000	3.6-3.8 m
8-16-1997	2036-2046	97AP02	40-14	2448-2456	1:40,000	4.1- 4.4 m
5-15-1998	1821-1828	98AR03	40R-17	1759-1773	1:40,000	-.2 - -.4 m
5-15-1998	1840-1849	98AR03	40R-15	1782-1790	1:40,000	-.2 - -.3 m
5-15-1998	1856-1903	98AR03	40R-14	1792-1800	1:40,000	-0.1 - -.2 m
5-27-1998	1952-1957	98AR04	40R-13	2129-2133	1:40,000	+1.9-3.0 m

*The Tidal Stage is based on actual observations recorded by the NOS gauge at Ketchikan, AK at the time of photography and interpolated from the substations that fell within close proximity to the project area mapped (Substations used: Exchange Cove, Thorne Island, Lake Bay, Ratz Harbor, and Union Bay)

Note: Strip 40IR-13 Roll 98AR04 was not used for Mean Low Low Water (MLLW) compilation due to the lack of tidal coordination at the time of imagery. Therefore there is no MLLW designation along the west end of Whale Passage in the northwestern portion of the project area.

Final Review

The final review was completed by a senior AB CMP team member in September 2004. The DCFE 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 hard copy plots of the project data with the largest scale nautical charts available and the natural color, panchromatic, and infrared photographs.

The following NOAA nautical charts were used for the chart comparison process:

- 17382 Zarembo Island and Approaches 1:80,000 15th ed. March 2003.
- 17401 Lake Bay Approaches 1:10,000 11th ed. Feb 2004.
- 17420 Hecate Strait to Etolin Island 1:229,376 28th ed. Sept 2001
- 17423 Harbor Charts - Clarence Strait and Behm Canal, including Ratz Harbor 1:10,000 13th ed. Feb 1998.

Project Final Data and Products

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

RSD Applications Branch Project Archive

- Hard copy of GPS Processing Report
- Hard copy of Aerotriangulation Report
- Page size graphic plot of DCFF contents
- Hard copy of the Project Completion Report

RSD Electronic Data Library:

- Project Database
- DCFF: GC10550
- Digital copy of DCFF in Shapefile format
- Digital Copy of Project Completion Report

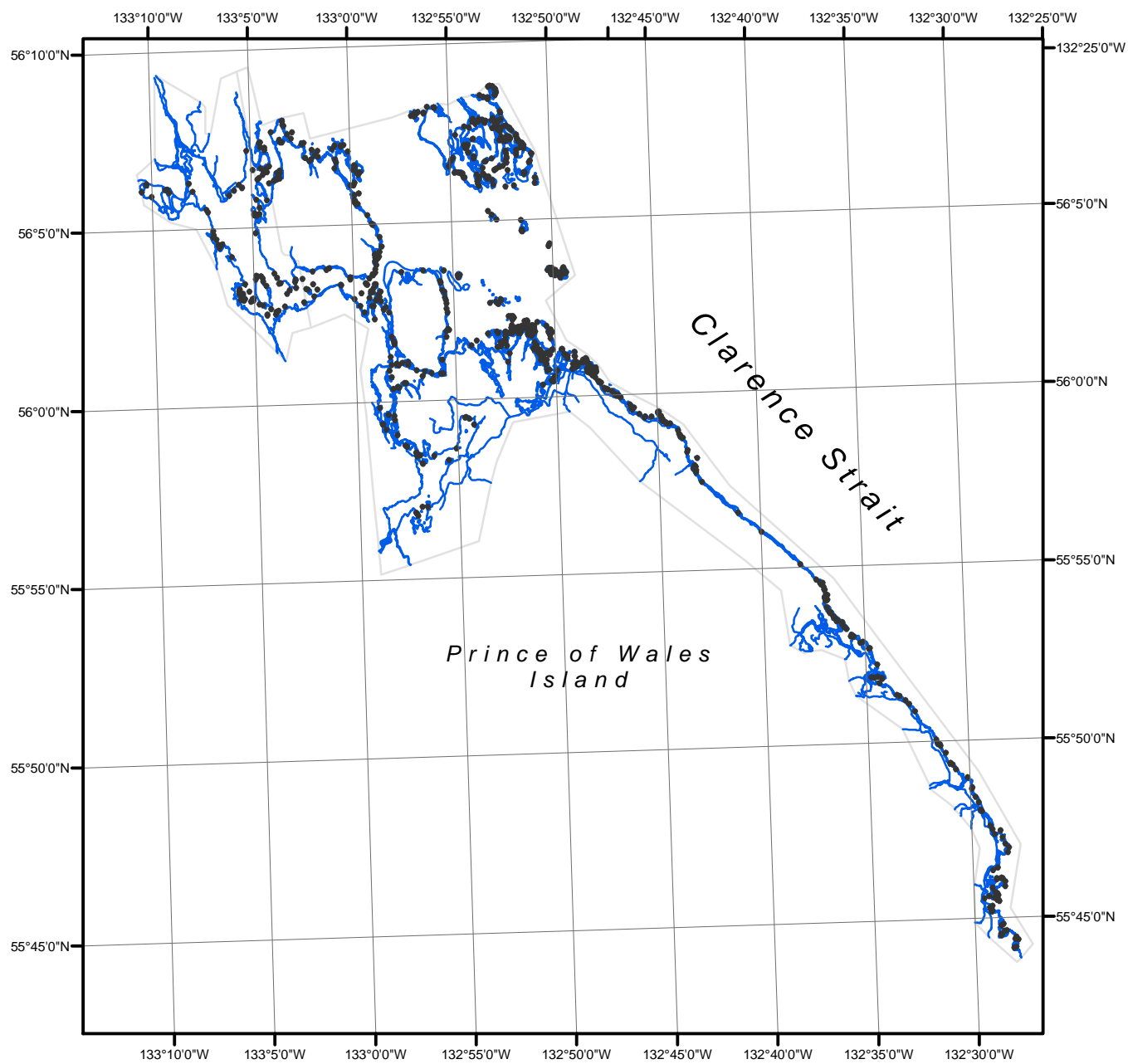
NOAA Shoreline Data Explorer

- DCFF: GC10550
- Metadata file for GC10550
- Digital Copy of the Project Completion Report

End of Report

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ALASKA



Overview



AK9702H

GC10550