W00180

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No.

Registry No. W00180

LOCALITY

State Alaska

General Locality Eastern Gulf of Alaska

Sublocality Cape St. Elias to Dixon Entrance

2005

CHIEF OF PARTY
Lt. Mark Van Waes

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28 (11-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

REGISTER NO.

W00180

HYDROGRAPHIC TITLE SHEET

INSTRUCTIONS - The hydrographic sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the office.

FIELD NO.

State: Alaska

General Locality: Eastern Gulf of Alaska

Sublocality: Cape St. Elias to Dixon Entrance

Scale:

Date of Survey: 6/24/2005 - 9/ 1/2005

Instructions Dated: n/a

Project No.:

Vessel: R/V Kilo Moana

Chief of Party: Lt. Mark Van Waes

Surveyed by: NOAA and University of New Hampshire

Soundings taken by echo sounder, hand lead, pole: Kongsberg-Simrad EM120

Graphic record scaled by: NOAA

Graphic record checked by: NOAA

Evaluation by: Matt Andring

Automated plot by: HP Designjet1050c

Verification by: Physical Scientist: M. Andring, Cartographer: B. Taylor

Soundings in: Fathoms at MSL

REMARKS: Revisions and annotations appearing as endnotes were generated by the cartographer during office processing.

All depths listed in this report are referenced to mean sea level unless otherwise noted.

UTM Zones 6, 7, and 8

DESCRIPTIVE REPORT

TO ACCOMPANY

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA SURVEY
EASTERN GULF OF ALASKA

R/V KILO MOANA
CRUISES KM0514-1 AND KM0514-2

JUNE 24 – SEPTEMBER 1, 2005

JAMES V. GARDNER AND LARRY A. MAYER, CHIEF SCIENTISTS
LT MARK VAN WAES, NOAA, LEAD HYDROGRAPHER

A. AREA SURVEYED

This survey was completed as a partnership between NOAA and the Center for Coastal and Ocean Mapping/Joint Hydrographic Center at the University of New Hampshire in support of efforts pursuant to the United Nations Convention on the Law of the Sea (UNCLOS). The survey area encompassed by this third US Law of the Sea mapping cruise includes nearly 47,000 square nautical miles of the eastern half of the Gulf of Alaska, extending from Dixon Entrance in the south to Cape St. Elias in the north.

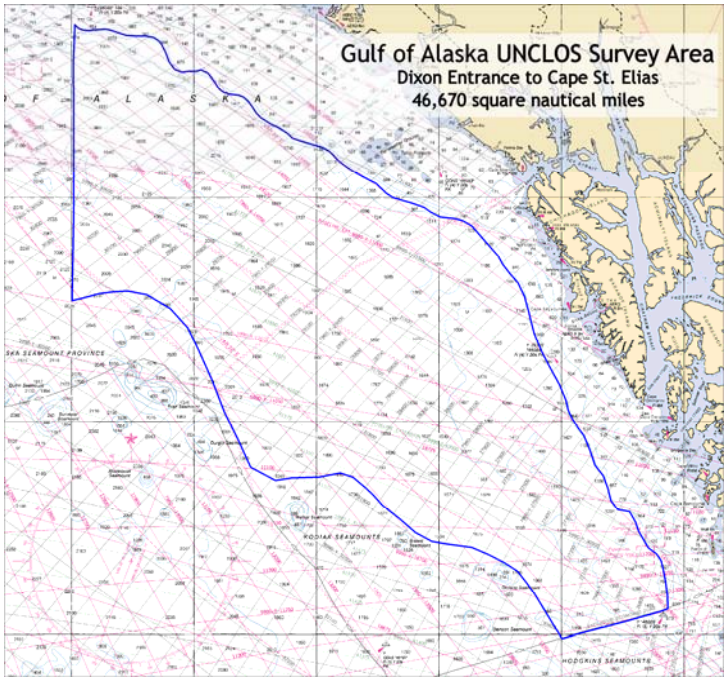

Figure 1 – KM0514 Survey Area

No letter instructions accompanied this survey, and the project was not assigned a survey number by the Office of Coast Survey (OCS) Hydrographic Surveys Division (HSD).

B. DATA ACQUISITION AND PROCESSING

A complete description of data acquisition and processing systems, survey vessels, quality control procedures, and data processing methods can be found in the *Data Acquisition and Processing Report* (DAPR), submitted under separate cover.[1] Items specific to this survey, and any deviations from the DAPR are discussed in the following sections.

B1. EQUIPMENT

This survey was conducted from the R/V KILO MOANA (AGOR 26), a small waterplane area, twin hull (SWATH) design oceanographic research ship designed to perform general purpose oceanographic research in coastal and deep ocean areas. The R/V KILO MOANA is owned by the United States Navy and operated by the University of Hawaii. Detailed information about the vessel can be found in Appendix A to the DAPR. Table 1 outlines the primary equipment used to collect data for this survey.

Equipment	Type
Kongsberg-Simrad EM120	Multi-Beam Echosounder
Applanix POS/MV 320 Version 3	Position and Attitude
SeaBird SBE 911+ CTD	Sound speed profiling
Sippican T-7 Expendable Bathythermograph	Sound speed profiling

Table 1 – Survey equipment

Software

During the initial processing on board the ship, all data were processed using Caris HIPS and SIPS 5.4 software. In the interim between that time and the finalization of the survey for submission, HIPS and SIPS 6.1 Service Pack 1 was released. Final data processing was conducted using this version of the software.

B2. QUALITY CONTROL

Crosslines

Multibeam echosounder (MBES) crosslines totaled 484.30 linear nautical miles, comprising approximately 4.4% of MBES hydrography (10,897.46 lnm total, with 484.30 lnm crosslines). The mainscheme bathymetry was manually compared to the crossline nadir beams using Caris HIPS subset mode and was found to agree well in all areas.

Junctions

No junction survey information was available for this survey.

Data Quality Factors

Sound Speed

Due to a faulty temperature sensor, for which a replacement was not available, the Brooke Ocean Technology Moving Vessel Profiler (MVP) was not able to be used as planned. Instead, periodic deep CTD casts were taken, interspersed with expendable bathythermograph (XBT) launches approximately every six hours. Sound speed profiles derived from the XBT data were compared to the previous CTD profiles, with a new CTD profile obtained when the XBT profile deviated significantly.

End-of-line tilting

It was noted during the second leg of the cruise that on long survey lines the data would tend to "tilt" to one side. The suspected source of this tilt was a drift in the POS/MV. Maneuvering the ship off line (conducting a Williamson turn, for example) was found to reset the POS/MV. After this discovery, lines were shortened and Williamson turns executed to reduce the tilt effect. See Figures 2 and 3 below.

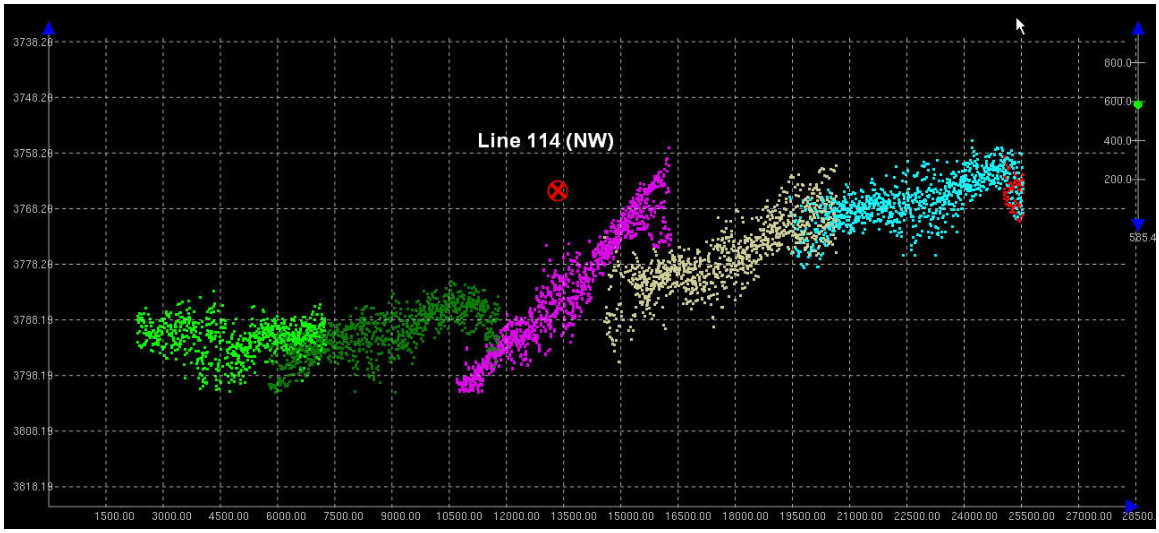

Figure 2 – Example of end-of-line tilting

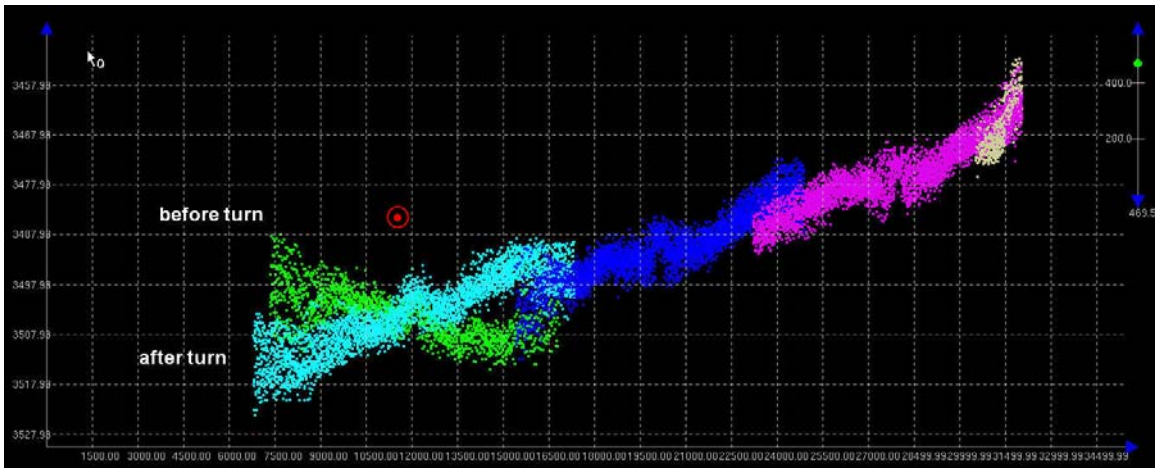

Figure 3 – Example of effect of maneuvering on end-of-line tilting

In addition to shortening lines and maneuvering to reset the POS/MV, during data cleaning lines were filtered based on distance from nadir and manually cleaned in subset mode to ensure best possible contiguity from one line to the next without sacrificing adequate swath overlap.

B3. CORRECTIONS TO ECHO SOUNDINGS

Echo soundings were corrected in accordance with the procedures outlined in the accompanying DAPR.

C. VERTICAL AND HORIZONTAL CONTROL

This survey did not require static GPS observations or horizontal control work, and no tide level correctors were applied to the data. Therefore no Horizontal and Vertical Control Report will be submitted.

C1. HORIZONTAL CONTROL

All horizontal positions for this survey were geo-referenced to the WGS-84 ellipsoid.

C2. VERTICAL CONTROL

The vertical datum of this survey is Mean Sea Level (MSL).

D. RESULTS AND RECOMMENDATIONS

D1. CHART COMPARISON

The survey data were compared to the depths on the following chart:[2]

Chart	Scale	Edition and Date	Latest Notice to Mariners Applied
16016	1:969,756	20th Ed, November 2003	December 23, 2006

Table 2 – Charts compared with survey data

Chart comparison was carried out by overlaying a 100m BASE surface with the chart in Caris BASE Manager software. The BASE surface generally agreed well with charted soundings (i.e. within the approximately 2.5 square nautical mile area covered by a charted depth, at least one BASE grid node agreed closely with the charted depth). The only areas where any significant differences were found were in the most shallow areas of the survey to the east and north, and in the area surrounding an uncharted seamount in the northwest portion of the survey area. These discrepancies are notable, but are in such a depth of water as to not be a concern for safety of navigation. (See Figures 4 and 5.)[3]

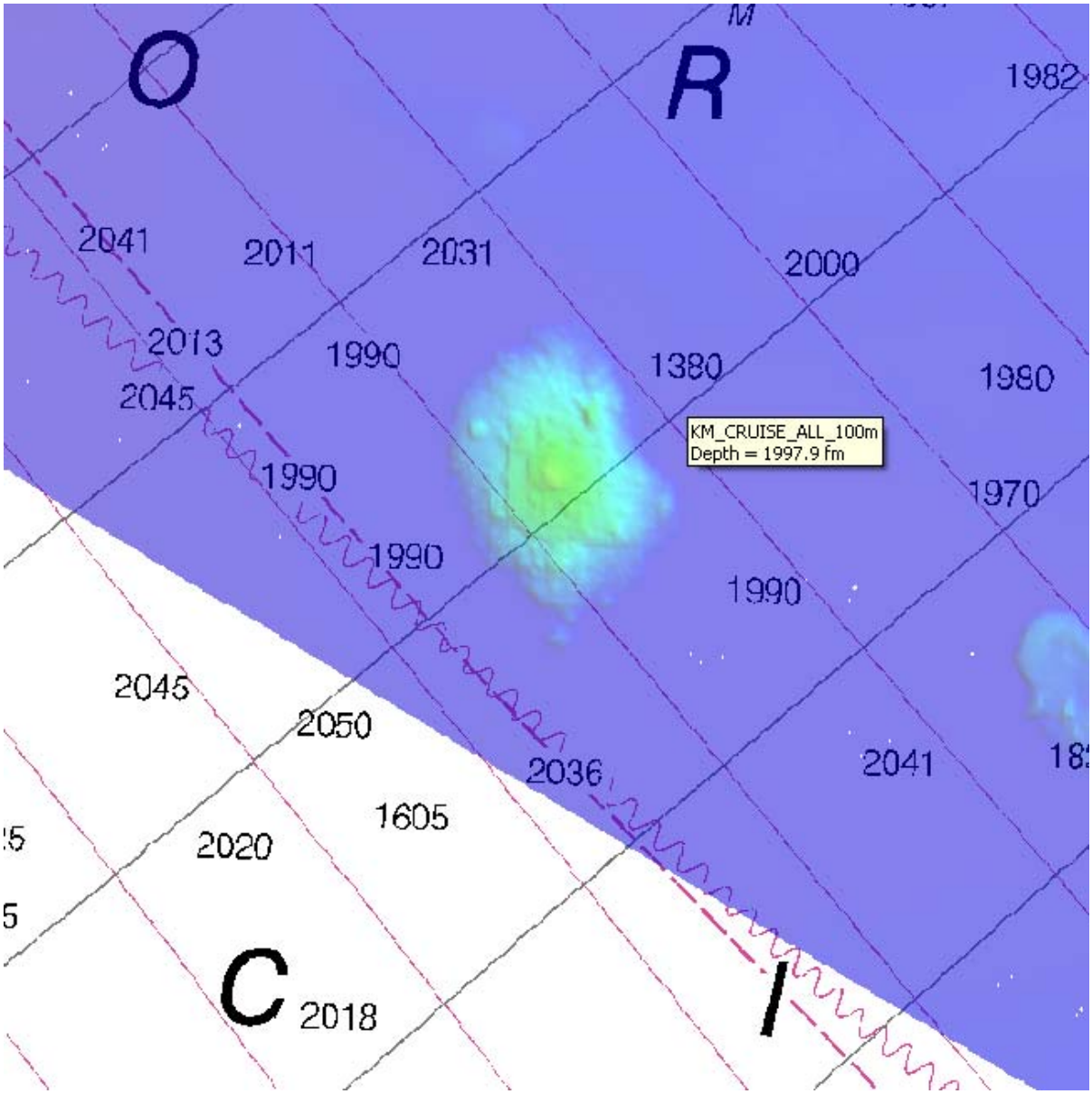

Figure 4 – Example of incorrect depth near northwestern seamount

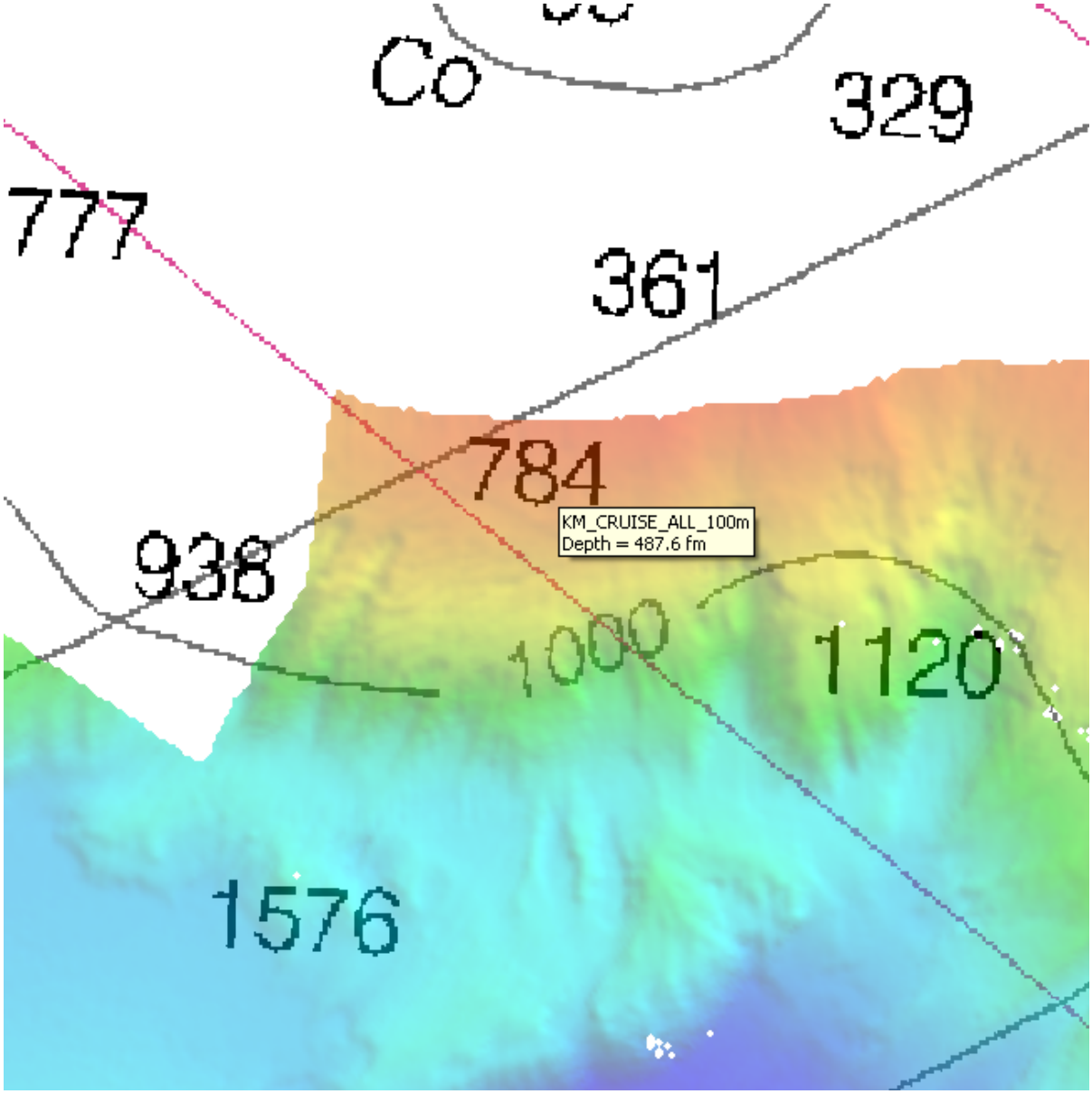

Figure 5 – Example of incorrect depth near northern edge of survey area

D2. ADDITIONAL RESULTS

Prior Survey Comparison

There were no prior survey comparisons completed.

Shoreline Investigation

There was no shoreline investigation completed for this survey.

Aids to Navigation

There were no aids to navigation positioned.

Overhead Features

There were no overhead features observed.

Submarine Cables and Pipelines

There were no submarine cables or pipelines located.

Ferry Routes

There were no ferry routes identified, nor were any ferries observed operating in the area.

Bottom Samples

There were no bottom samples collected for this survey.[4]

Miscellaneous

Numerous submarine canyons as well as two seamounts were discovered during the course of the survey. While having no impact on safe navigation, these features may be of scientific interest.[5]

E. APPROVAL

As Lead Hydrographer, I have ensured that standard field surveying and processing procedures were adhered to during this project in accordance with the NOS Hydrographic Surveys Specifications and Deliverables, as updated for March, 2003. Any necessary deviations have been documented.

All of the information contained in this report is complete and accurate to the best of my knowledge.

Submitted:

Gary C. Nelson
for Lt. Mark Van Waes
2009.03.12 07:36:59 -07'00'

LT Mark Van Waes, NOAA
Lead Hydrographer

Revisions compiled during office processing by the cartographer

[1] Filed with the hydrographic data.
[2] During PHB processing, W00180 was also compared with the following charts:
- Chart 17320, 18th Edition, continuous maintenance raster dated 2/20/09
- Chart 17400, 17th Edition, continuous maintenance raster dated 2/20/09
- Chart 16760, 10th Edition, continuous maintenance raster dated 2/24/09
- Chart 16016, 21st Edition, continuous maintenance raster dated 2/11/09
- Chart 501, 12th Edition, continuous maintenance raster dated 3/5/09

[3] Concur. Chart all areas as shown on the smooth sheet and Hdrawings.
[4] Concur. Retain charted bottom samples.
[5] Concur.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE OFFICE OF COAST SURVEY
Pacific Hydrographic Branch Seattle, Washington
98115-6349
February 18, 2009

David Neander
2009.02.19
15:46:51 -08'00'

MEMORANDUM TO: Captain David Neander, NOAA
Chief, Pacific Hydrographic Branch

Digitally signed by Kurt Brown
Date: 2009.02.19 15:42:27
-08'00'

FROM: Matt Andring
Hydrographic Survey Intern

SUBJECT: Review of Outside Source Data Surveys W00180
U.S. Naval Oceanographic Office (NAVOCEANO)
Gulf of Alaska, Dixon Entrance to Cape St. Elias

I have reviewed outside source hydrographic survey W00180 with regard to data integrity and completeness of the data submission package, survey field procedures, data processing and quality assurance methods, and overall data accuracy and data quality. Survey W00180 complies with specifications and requirements set forth in the NOS Hydrographic Surveys Specifications and Deliverables Manual, with the following exceptions:

- No records of sensor calibrations were included in the data submission.
- Crosslines only comprised 4.4% of MBES hydrography.
- Due to the depth of the area surveyed tide correctors were not applied. In most areas of the survey tides fall within the margin of error for the multibeam system, and in all areas they are navigationally insignificant. In Caris a zero tide file called zerotide.tid was created and applied to all data when merged.

Special attention should be given to the following:

- Soundings were rounded to whole fathoms using standard rounding. The difference in depth between using NOAA rounding and this method is well within the spec for vertical error at all depths in the survey area.

Final Recommendations:

- Survey W00180 should be accepted.
- Survey W00180 should fully supersede prior data.
- A .dxf file W00180_Fathoms_Grid2.dxf has been created for smooth sheet compilation.
- W00180 should be given high priority due to the survey's inclusion in a new chart edition.

Reviewed and approved: _____
Digitally signed by Kurt Brown
Date: 2009.02.19 15:38:42
-08'00'

PS Kurt Brown, NOAA
Acting Hydrographic Team Leader, PHB

Registry No: W00180

State: Alaska

General Locality: Gulf of Alaska

Sub Locality: Dixon Entrance to Cape St. Elias

Dates of Survey: June 24, 2005 - September 1, 2005

OSD Supplier: Naval Oceanographic Office

OSD Project No: KM0514-1 and KM0514-2

Reviewer: Matt Andring **Review Date:** February 18, 2009

I. DATA INVENTORY

A. Reports

Report Type	Format	Document Title	Date
Descriptive Report or equivalent	.pdf	KM0514 Descriptive Report.pdf	8/29/07
Data Acquisition and Processing Report or equivalent	.pdf	KM0514 Data Acquisition and Processing Report	8/29/07
Horizontal and Vertical Control Report or equivalent	n/a	see Section C of Descriptive Report	
System Certification Report or Equivalent	not provided		
Other	n/a		

B. Data

Data Type	Format	Description (Raw, Processed)
Smooth Sheet Sounding Plots	n/a	
XYZ ASCII Files	n/a	
Multibeam	Caris HDCS	Raw and Processed data files
Side Scan Sonar	n/a	
LIDAR	n/a	
Single Beam	n/a	Yes

Data Type	Format	Description (Raw, Processed)
Detached Position Point Feature	n/a	
Kinematic / Static GPS	n/a	
Sound Velocity		
Water Levels	.tid	zerotide.tid
AWOIS	n/a	
DtoN	n/a	
Shoreline	n/a	
Bottom Sample	n/a	

yes All data open correctly and without error (MBES lines, SSS lines, VBES, Crosslines, Fieldsheets, Smooth Sheets, Sessions, DTM's, BASE grids, Mosaics, and DP's).

C. Sensors

List all sensor(s) that were used to acquire data.

Sensor	Manufacturer	System	Model	Vessel / Platform
multibeam	Kongsberg Simrad		EM120	R/V Kilo Moana
Single Beam	Knudsen Engineering		320 B/R	R/V Kilo Moana
Position/IMU	Applanix		POS/MV 320 v3	R/V Kilo Moana
Position	Thales Navigation		ADU5	R/V Kilo Moana
SVP	Sippican		T-7 XBT	R/V Kilo Moana
SVP	SeaBird		SBE 911+ STD	R/V Kilo Moana
SVP	Brooke Ocean Tech.		MVP-300	R/V Kilo Moana
		EM120		

Yes Are all sensors listed above capable of meeting NOAA HSSDM accuracy and object detection requirements? Provide information in the comments section.

II. DATA ACQUISITION AND PROCESSING

A. System Calibrations and/or Certifications

Y A sensor offset and alignment survey was conducted to NOAA HSSDM requirements

Y Offset values provided

Y Patch tests were conducted for shallow-water multibeam systems

Y Alignment bias and latency values provided

Note 1 Draft measurements were conducted

✔ Static Draft ___ Dynamic Draft ___ Loading

Y Draft values were provided

Yes Sensors were calibrated in accordance with manufacturer requirements and NOAA specifications

Yes Calibration reports were provided.

B. Sound Velocity Corrections

Note 2 Sound velocity sampling regimen is in accordance with NOAA HSSDM requirements

Yes Sound velocity profiles were supplied

n/a All profiles appear valid

C. Water Levels

Note 3 Water level measuring equipment and methods are consistent with NOAA equipment and methods and are capable of meeting specifications

Equipment / method used: n/a

Yes Tide corrector files were supplied

Y All tide correctors appear valid

No Water level correctors applied to sounding data

___ Verified ___ Observed ___ Predicted ___ NOAA Zoning ___ Other zoning

n/a Water level error estimate provided by CO-OPS

Water level / zoning error estimate: n/a

E. Survey Methodology

Yes The surveyor has conducted adequate quality control of horizontal positioning data

Yes DTM, BASE surface, and/or mosaics indicate that seafloor coverage requirements (per NOAA HSSDM) were met and no significant coverage holidays exist.

Yes All least depths over shoals, wrecks, rocks, obstructions, and other features have been determined

Note 4 The Hydrographer has conducted the required quantity of cross lines, or acquired sufficient redundant data, in accordance with the HSSDM, to assess internal data consistency.

F. Data Processing and Quality Control

Yes An adequate description of data processing and quality control methods is provided in documentation.

Processing software used: Caris HIPS and SIPS 5.4/6.1

Yes Data processing methodology is robust enough and adequate to provide a dataset suitable for charting.

Yes Data have been reviewed and are cleaned appropriately with no noise, fliers, or systematic errors noted.

Yes Crossline agreement or redundant data overlap has been visually inspected by the hydrographer

Yes Disagreements have been noted

Yes A Chart comparison was conducted by the hydrographer

Yes Disagreements have been noted.

III. DATA QUALITY AND RESULTS

A. Internal Data Consistency

Yes — Full resolution data was provided in order to gauge the adequacy of cleaning and/or processing of the data.

Yes — A review of the data reveals no positioning errors exceeding NOAA specifications

Yes — Crossline agreement or redundant data overlap shows no disagreements exceeding NOAA HSSDM tolerances.

No — **A**nomalous data (fliers, noise, etc) were apparent in the BASE surface, DTM, and/or selected sounding set.

No — Are there any tide errors exceeding NOAA HSSDM requirements observable in the data

No — Are there any observable SV errors exceeding NOAA HSSDM accuracy standards.

Yes — All shoals are valid (no fliers) and the proper least depth has been retained.

n/a — Where multiple systems, platforms, and/or sensors were used, junctioning or overlapping data agree within NOAA HSSDM tolerance between platforms.

Yes — Any statistical assessment of the data (e.g. BASE standard deviation, QC reports, etc) indicate that data agree within NOAA HSSDM tolerances.

B. Error Budget Analysis

No — An error budget analysis was provided by the surveyor

n/a — The error budget analysis indicates that data are capable of meeting NOAA HSSDM standards

n/a — The evaluator concurs with the provided error budget analysis

Yes — The evaluator has conducted an error budget analysis

Yes — The error budget analysis indicates that data are capable of meeting NOAA HSSDM standards

D. Automated Wreck and Obstruction Information System (AWOIS) Items

No — AWOIS Items are located within the limits of the survey.

n/a — AWOIS Items can be sufficiently confirmed or disproved using data from this survey (Attach AWOIS pages to the certification memorandum.).

E. Dangers to Navigation

n/a Dangers to Navigation (DTONs) were selected and submitted by the surveyor / data provider

n/a DTONs have been verified by the office evaluator.

No Additional DTONs were noted during office evaluation and submitted

F. Aids to Navigation

n/a Aids to Navigation (ATONs) were positioned during this survey

n/a New ATONS were positioned during this survey

n/a Survey positions match charted positions

n/a The surveyor / data provider issued DTONs or notified the USCG for any ATON discrepancies

n/a ATON discrepancies were noted during office evaluation and submitted as DTONs.

G. Shoreline and Bottom Samples

No The shoreline (MHW and/or MLLW lines) were included as part of this survey

n/a Surveyed shoreline matches charted shoreline

n/a Surveyed shoreline compares with NGS/RSD source data

n/a Surveyed shoreline should be used to revise nautical charts

No Shoreline features were positioned during this survey

n/a Surveyed features match charted shoreline

n/a Surveyed features compares with NGS/RSD source data

n/a Surveyed features should be used to revise nautical charts

No Bottom samples were acquired during this survey

n/a Bottom sample spacing was in accordance with NOAA HSSDM requirements

n/a Bottom samples should be used to update NOAA charts

IV. COMMENTS

Note 1:
From KM0514 Data Acquisition and Processing Report.pdf
"Static draft was not directly measured. An assumed vessel draft of 7.01m (correlating to the ship's stationary draft at level trim, according to the pilot information sheet) was used. Dynamic draft was also not measured. A Small Waterplane Area Twin Hull (SWATH) design, KILO MOANA is equipped with four canards, two fixed on the stern and two adjustable at the bow. The forward canards are angled in such a way as to maintain the vessel's level trim at varying speeds. As such the draft value used is generally correct, to within less than a meter. In the waters surveyed for this project, the error is a fraction of a percent of water depth."

Note 2:
The Descriptive Report states that sound velocity casts were taken every 6 hours with extra casts taken if profiles were deviating significantly. Due to the offshore nature of the survey and the depths involved, this regimen should be adequate to produce accurate sound velocity for the project. Reviewer was unable to check SV casts as no CARIS .svp profiles were submitted. Sound velocity errors are not noticeable in the data.

Note 3:
Due to the depth of the area surveyed tide correctors were not applied. In most areas of the survey tides fall within the margin of error for the multibeam system, and in all areas they are navigationally insignificant. In Caris a zero tide file called zerotide.tid was created and applied to all data when merged.

Note 4:
484.30 lnm of crosslines were run comprising 4.4% of the total 10,897.46 lnm of MBES hydrography. Agreement was good in all areas.

Other notes:

The W00180_100m.bag was created for NGDC archival.

APPROVAL SHEET
W00180

Evaluated by:

Digitally signed by Kurt Brown
Date: 2009.03.12 09:24:51 -07'00'

Matt Andring, NOAA
Pacific Hydrographic Branch

Review by:

Digitally signed by Kurt Brown
Date: 2009.03.12 07:56:39 -07'00'

Kurt Brown
Hydrographic Team Leader
Pacific Hydrographic Branch

Cartography

The evaluated survey has been inspected with regard to delineation of the depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data

Compiled by:

Gary C. Nelson
For Beth Taylor
2009.03.12 07:38:07 -07'00'

Beth Taylor
Cartographer
Pacific Hydrographic Branch

Reviewed by:

Gary C. Nelson
2009.03.12 07:38:37 -07'00'

Gary Nelson
Cartographic Team Leader
Pacific Hydrographic Branch

Approval

I have reviewed the data, and reports. Data are suitable for nautical charting except where specifically recommended in this report.

Digitally signed by Charles R. Davies
DN: cn=Charles R. Davies, c=US, o=Pacific Hydrographic Branch, ou=NOAA,NOS,OCS, email=Russ.Davies@NOAA.GOV
Reason: for Dave O. Neander
Date: 2009.03.12 09:31:51 -07'00'

David O. Neander
Captain, NOAA
Chief, Pacific Hydrographic Branch

Digitally signed by Kyle R. Ward
DN: cn=Kyle R. Ward, o=NOAA, ou=HSD, email=kyle.ward@noaa.gov, c=US
Reason: AWOIS and SURF Check completed
Date: 2009.03.13 08:53:58 -04'00'

NOAA FORM 75-96
(10-83)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. W00180

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
501	3/5/09	B. TAYLOR	(Full) ~~Part Before After Marine Center Approval~~ Signed Via APPLICATION OF
			~~Drawing No.~~ SOUNDINGS, FEATURES & CURVES
			FROM SMOOTH SHEET
16016	2/11/09	B. TAYLOR	(Full) ~~Part Before After Marine Center Approval~~ Signed Via APPLICATION
			~~Drawing No.~~ OF SOUNDINGS, FEATURES & CURVES
			FROM SMOOTH SHEET
16760	2/24/09	B. TAYLOR	(Full) ~~Part Before After Marine Center Approval~~ Signed Via APPLICATION
			~~Drawing No.~~ OF SOUNDINGS, FEATURES & CURVES
			FROM SMOOTH SHEET
17320	2/20/09	B. TAYLOR	(Full) ~~Part Before After Marine Center Approval~~ Signed Via APPLICATION
			~~Drawing No~~ OF SOUNDINGS, FEATURES & CURVES
			FROM SMOOTH SHEET
17400	2/20/09	B. TAYLOR	(Full) ~~Part Before After Marine Center Approval~~ Signed Via APPLICATION OF
			~~Drawing No.~~ SOUNDINGS, FEATURES & CURVES
			FROM SMOOTH SHEET.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
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			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 1052 WHICH MAY BE USED