

H13739

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: H13739

LOCALITY

State(s): American Samoa

General Locality: American Samoa and PRIA

Sub-locality: Palmyra

2023

CHIEF OF PARTY
Héctor L. Casanova CAPT/NOAA

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

H13739

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State(s): **American Samoa**

General Locality: **American Samoa and PRIA**

Sub-Locality: **Palmyra**

Scale: **5000**

Dates of Survey: **06/24/2023 to 06/25/2023**

Instructions Dated: **01/30/2023**

Project Number: **OPR-T382-RA-23**

Field Unit: **NOAA Ship *Rainier***

Chief of Party: **Héctor L. Casanova CAPT/NOAA**

Soundings by: **Multibeam Echo Sounder**

Imagery by: **Multibeam Echo Sounder Backscatter**

Verification by: **Pacific Hydrographic Branch**

Soundings Acquired in: **meters at Mean Lower Low Water**

Remarks:

Any revisions to the Descriptive Report (DR) applied during office processing are shown in red italic text. The DR is maintained as a field unit product, therefore all information and recommendations within this report are considered preliminary unless otherwise noted. The final disposition of survey data is represented in the NOAA nautical chart products. All pertinent records for this survey are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via <https://www.ncei.noaa.gov/>. Products created during office processing were generated in NAD83 UTM 3N, MLLW. All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.

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Descriptive Report to Accompany Survey H13739

Project: OPR-T382-RA-23

Locality: American Samoa and PRIA

Sublocality: Palmyra

Scale: 1:5000

June 2023 - June 2023

NOAA Ship *Rainier*

Chief of Party: Héctor L. Casanova CAPT/NOAA

A. Area Surveyed

This survey area is referred to as H13739, "Palmyra" (Sheet 10) within the Project Instructions. The assigned survey area encompassed an estimated 10,413 square nautical miles and is located in the Pacific Remote Island Area (PRIA) in the Central Pacific Ocean. H13739 also includes Kingman Reef, located approximated 30 nautical miles North-Northwest of Palmyra Island.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
7° 26' 12.99" N 163° 34' 27.51" W	5° 4' 9.42" N 161° 15' 27.38" W

Table 1: Survey Limits

Data were acquired within the assigned survey limits as required in the Project Instructions and HSSD unless otherwise denoted.

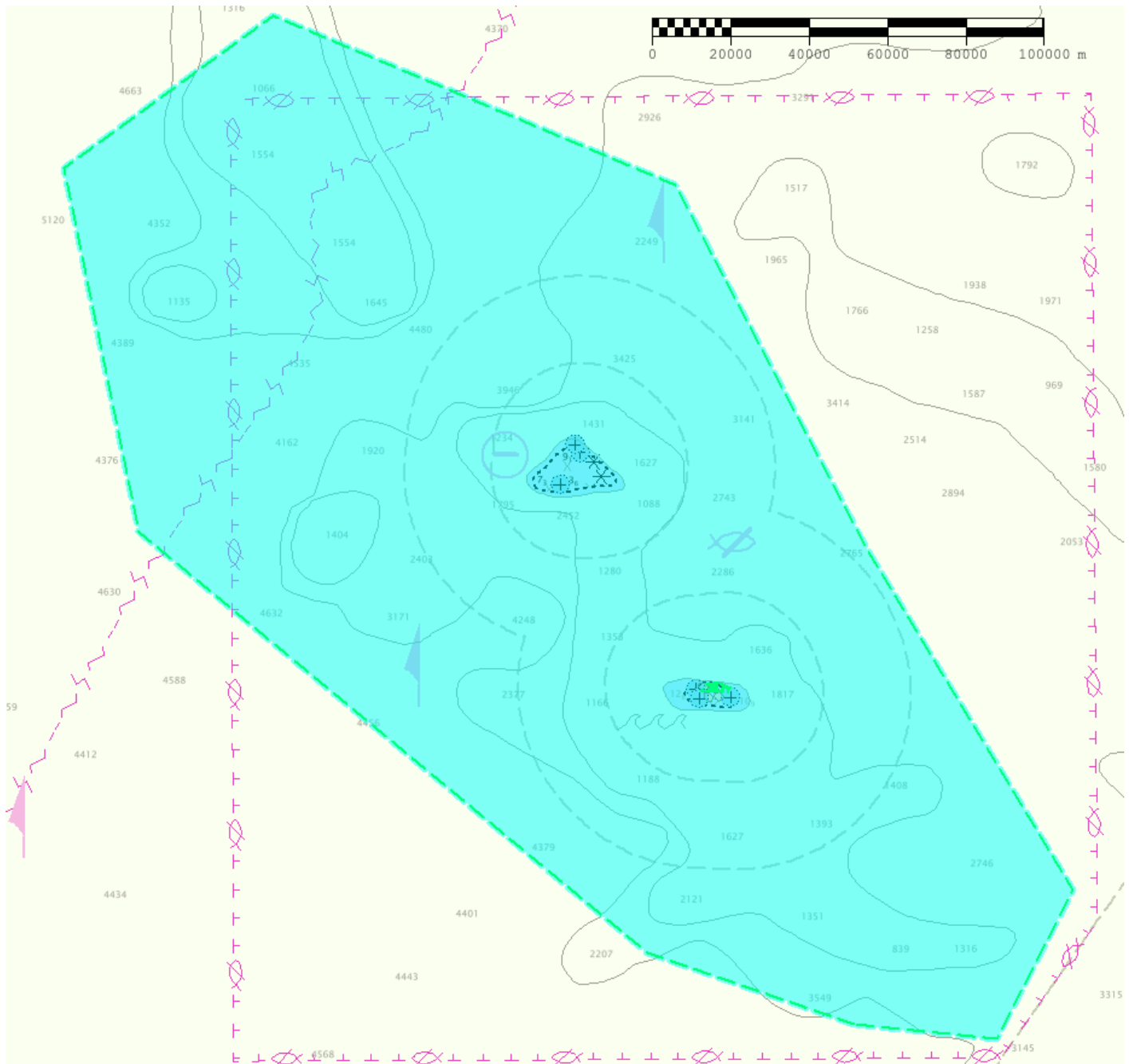


Figure 1: H13739 assigned survey limits (Chart US1HA01M).

A.2 Survey Purpose

The ecosystems surrounding the U.S. Territory of American Samoa and PRIA are experiencing stress imposed by climate change and other environmental factors. For this project, NOAA Ship RAINIER will be operating around Palmyra to conduct an extensive hydrographic survey to map bathymetry and habitat around the islands, pinnacles, and reefs in support of nautical charting and habitat mapping.

With the collaboration and partnership of the National Centers for Coastal and Ocean Science (NCCOS), the NOAA Coral Reef Conservation Program (CRCP), and the National Marine Fisheries Service (NMFS), this survey will also study the health of coral reef systems, ocean chemistry, and fisheries habitat. This team has developed a strategy to map the waters from nearshore to depths greater than 1,000 meters. Within the project area, the ship's crew will collect bathymetric data to update charts and backscatter data to characterize habitat, while visiting scientists from NCRMP will perform coral reef assessment dives and other oceanographic observations.

Data collected during this mission are pivotal to long-term biological and oceanographic monitoring of coral reef ecosystems around American Samoa and PRIA. This 2023 expedition will add to information collected during prior monitoring and mapping surveys. Oceanographic and ecological time series data will allow scientists to evaluate potential changes in environmental conditions and coral reef health in the American Samoa and PRIA. This will enable federal and state resource managers to more effectively conserve the coral reef ecosystems of American Samoa and PRIA, and to manage ecosystems services. Data collected during this survey also support monitoring components of the NCRMP Coral Reef Ecosystem Integrated Observing System. This modern hydrographic survey will address gaps in the Seabed 2030 project, provide critical data to update National Ocean Service (NOS) nautical charting products, identify hazards, and improve maritime safety. Survey data from this project are intended to supersede all prior survey data in the common area.

A modern bathymetric survey in this area will identify hazards and changes to the seafloor, provide critical data for updating National Ocean Service (NOS) nautical charting products, and improve maritime safety. It will also address gaps to support the Seabed 2030 global mapping initiative. Survey data from this project are intended to supersede all prior survey data in the common area.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Pydro QC Tools (v.3.10.7) Grid QA (v.6) was used to analyze H13739 multibeam echosounder (MBES) data density. The submitted H13739 finalized variable-resolution (VR) surface met HSSD density requirements but not full coverage requirements as shown in the plots below.

For project OPR-T382-RA-23, Resolution Requirements graphs produced by Pydro's Grid QA tool have been showing relatively low percentages of grid nodes meeting full coverage resolution requirements. The likely cause of this issue is RAINIER's use of 64m grids in depths greater than 1,000 meters to maintain a reasonable data density. Since the Grid QA tool was written to match the HSRR specifications with a maximum 32m grid in all waters greater than 640m, RAINIER grids created using the 64m increase in resolution will always fail the resolution requirements check in areas exceeding 1,000 meters. This will of course decrease the percentage of grid nodes meeting coverage resolution requirements. For surveys with a large percentage of area greater than 1,000 meters in depth, this reduction can be significant. The OCS QC Tools team has been made aware of this issue and are trying to work out a solution for this deviation from the specifications. See the Supplemental Records of the sheet submission for more information. Project data collection began at Palmyra prior to obtaining guidance on this issue, with large portions of the H13739 sheet exceeding the modified 1,500 meters depth threshold, resulting in a lower than normal resolution with only 5 percent meeting required specifications (See Figure 3).

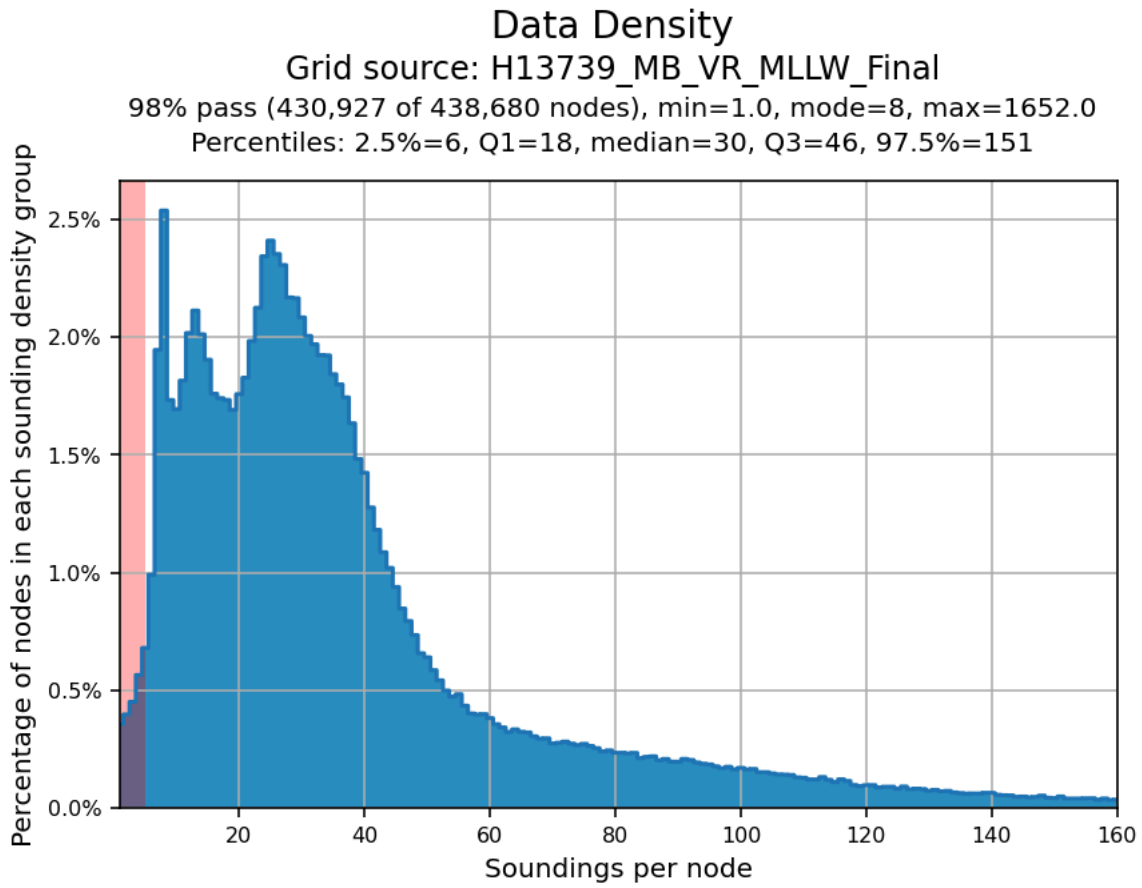


Figure 2: Pydro derived plot showing HSSD density compliance of H13739 finalized variable-resolution MBES data.

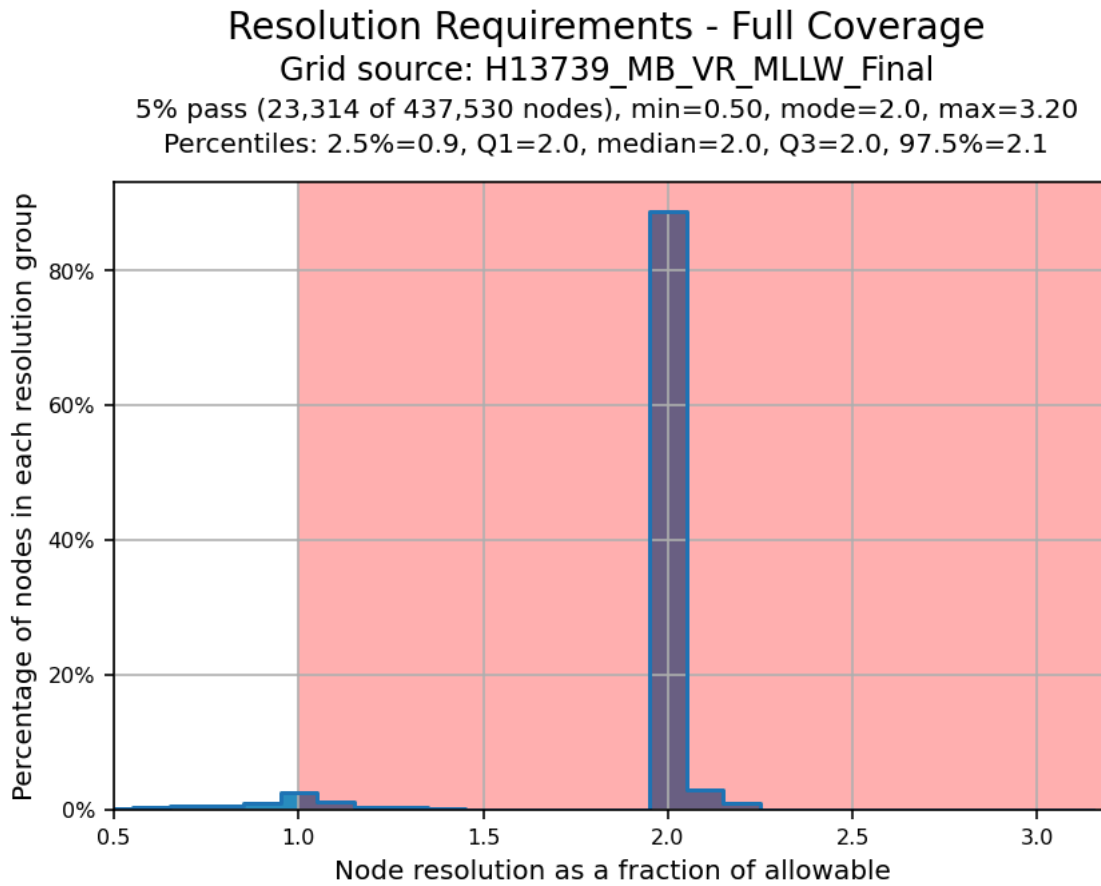


Figure 3: Pydro derived plot showing HSSD complete coverage compliance of H13739 finalized variable-resolution MBES data.

A.4 Survey Coverage

The following table lists the coverage requirements for this survey as assigned in the project instructions:

Water Depth	Coverage Required
All Waters	Complete Coverage (Refer to HSSD Section 5.2.2.3)

Table 2: Survey Coverage

Only a small fraction of the area within the assigned sheet limits was surveyed for H13739. This project's requirement to coordinate hydrographic operations with nearshore diving priorities, in addition to the limited number of project days allocated to sheet H13739, imposed significant limitations on the amount of MBES data acquired. During the initial visit to the survey area, poor weather conditions for dive operations forced the ship to move on after half a day of hydrographic surveying. Plans to return to the survey area during the

return transit north at the scheduled conclusion of the project were cancelled due to a season ending ship fire aboard Rainier.

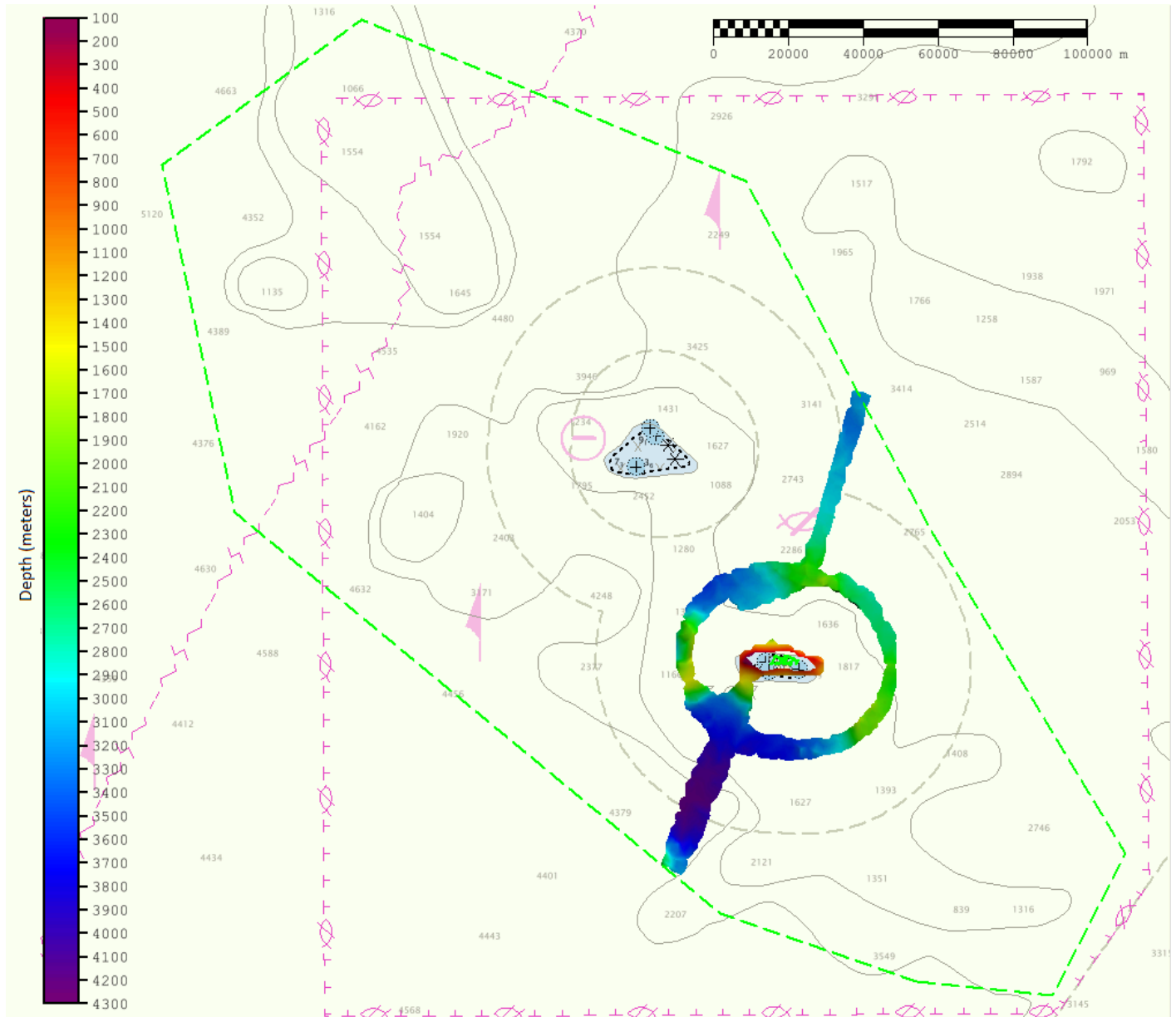


Figure 4: H13739 MBES coverage and assigned survey limits for Palmyra Atoll and Kingman Reef (Chart US1HA01M).

A.6 Survey Statistics

The following table lists the mainscheme and crossline acquisition mileage for this survey:

	HULL ID	<i>S221</i>	<i>Total</i>
LNM	SBES Mainscheme	0.0	0.0
	MBES Mainscheme	195.32	195.32
	Lidar Mainscheme	0.0	0.0
	SSS Mainscheme	0.0	0.0
	SBES/SSS Mainscheme	0.0	0.0
	MBES/SSS Mainscheme	0.0	0.0
	SBES/MBES Crosslines	0.0	0.0
	Lidar Crosslines	0.0	0.0
Number of Bottom Samples			0
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			524.32

Table 3: Hydrographic Survey Statistics

The following table lists the specific dates of data acquisition for this survey:

Survey Dates	Day of the Year
06/24/2023	175
06/25/2023	176

Table 4: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the Data Acquisition and Processing Report (DAPR) for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR are discussed in the following sections.

B.1.1 Vessels

The following vessels were used for data acquisition during this survey:

Hull ID	<i>S221</i>
LOA	70.4 meters
Draft	4.7 meters

Table 5: Vessels Used

Figure 5: NOAA Ship RAINIER, Pago Pago Harbor, American Samoa 2023.

All data for H13739 were acquired by NOAA Ship RAINIER. The vessel acquired MBES data, backscatter imagery and sound speed profiles.

B.1.2 Equipment

The following major systems were used for data acquisition during this survey:

Manufacturer	Model	Type
Applanix	POS MV 320 v5	Positioning and Attitude System
Kongsberg Maritime	EM 304-MK2	MBES
Teledyne RESON	SVP 70	Sound Speed System
Lockheed Martin Sippican	Deep Blue XBT	Sound Speed System

Table 6: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

NOAA Ship RAINIER was unable to collect multibeam crossline data due to operational constraints.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via ERTDM	0.0 meters	0.11 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
S221	N/A meters/second	N/A meters/second	4 meters/second	0.05 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

Total Propagated Uncertainty (TPU) values for survey H13739 were derived from a combination of fixed values for equipment and vessel characteristics, as well as from field assigned values for sound speed uncertainties. Tidal uncertainty was provided in metadata for the NOAA vertical datum transformation model used for this survey.

In addition to the usual a priori estimates of uncertainty, real-time and post-processed uncertainty sources were also incorporated into the depth estimates of this survey. Real-time uncertainties for position, navigation and vessel motion data from Applanix POS MV were applied during acquisition and initially in post-processing. POSPac SBET and RMS files were subsequently applied in Caris HIPS to supersede POS MV uncertainties associated with GPS height and position.

Uncertainty values of the submitted finalized grid was calculated in Caris using "Uncertainty". Grid QA within Pydro QC Tools was used to analyze H13739 TVU compliance. H13739 met HSSD requirements in 99.5+ percent of grid nodes as shown in the histogram below.

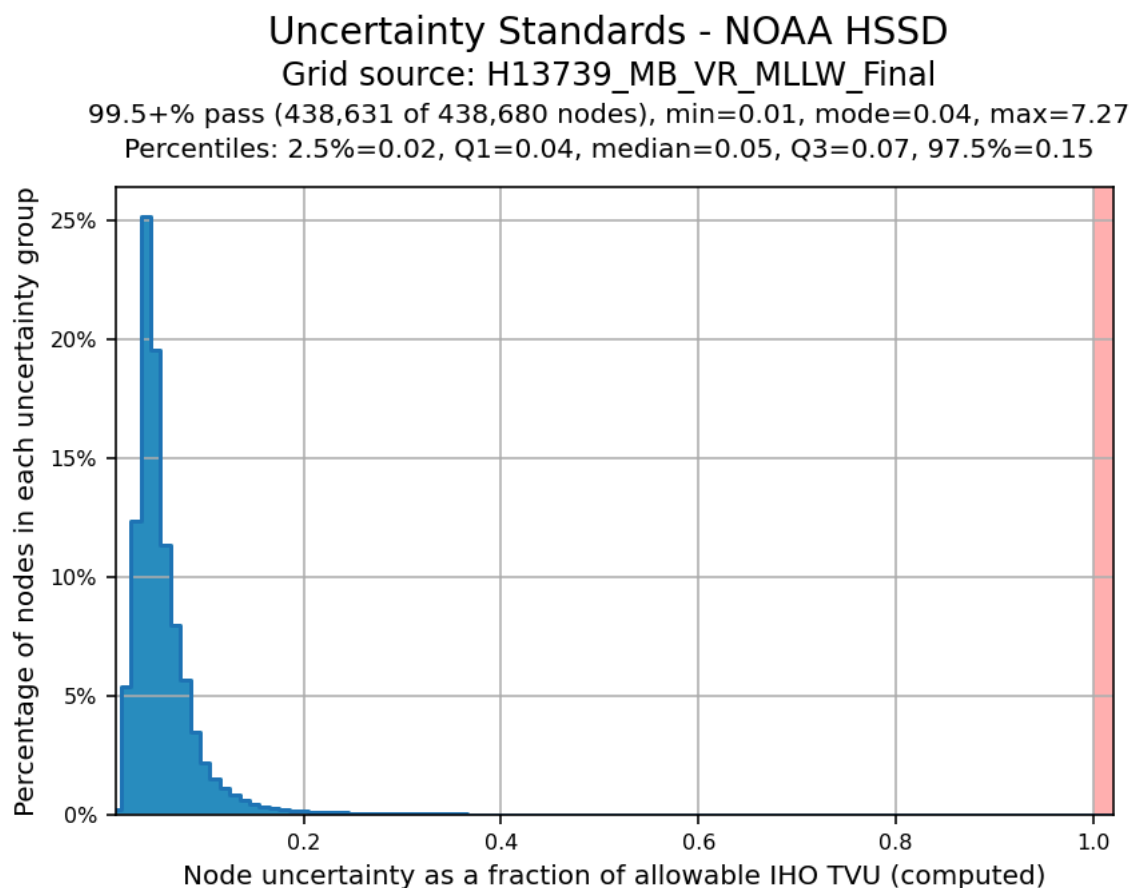


Figure 6: Pydro Grid QA derived histogram plot showing IHO TVU compliance of H13739 finalized variable-resolution MBES data.

B.2.3 Junctions

There are no contemporary surveys that junction with this survey.

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

There were no conditions or deficiencies that affected equipment operational effectiveness.

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: At least one cast every four hours or as needed.

A total of 6 sound speed profiles ("casts") using XBTs were acquired for this survey at discrete locations within the assigned area at least once every four hours, when significant changes to surface sound speed were observed, or when shifting operations to a new area, and were concatenated into a master file and applied to H13739 MBES data using the "Nearest distance within Time (4 hours)" profile selection method.

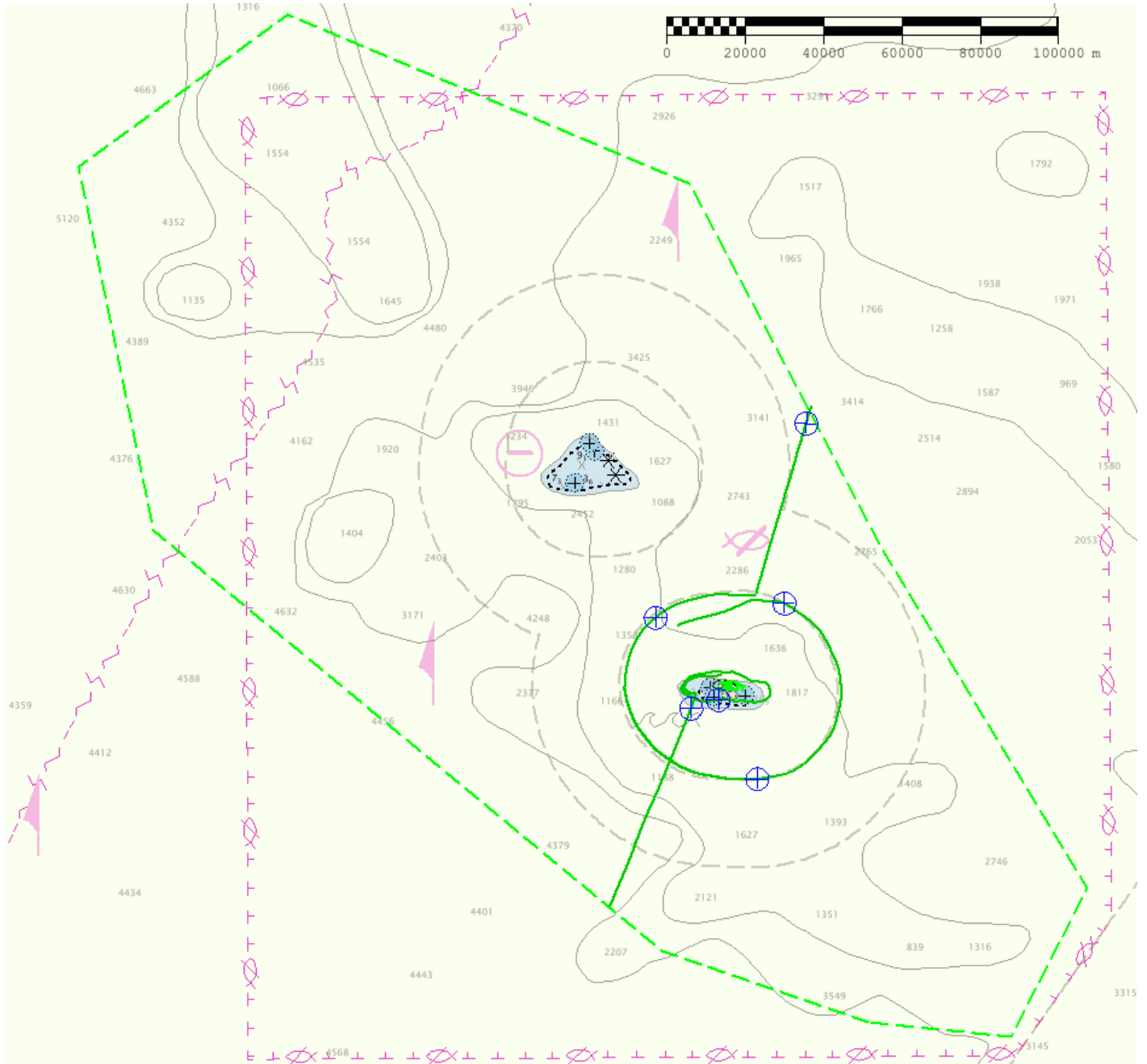


Figure 7: H13739 sound speed cast locations (Chart US1HA01M).

B.2.8 Coverage Equipment and Methods

All equipment and survey methods were used as detailed in the DAPR.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Raw backscatter data were acquired as .KMALL files logged during MBES operations and subsequently processed by RAINIER personnel. The .GSF files created during processing and backscatter mosaics have been delivered with this report. Backscatter processing procedures are described in the DAPR.



Figure 8: Overview mosaic of H13739 multibeam acoustic backscatter coverage (Chart US1HA01M).

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following software program was the primary program used for bathymetric data processing:

Manufacturer	Name	Version
CARIS	HIPS and SIPS	11.4.6

Table 9: Primary bathymetric data processing software

The following software program was the primary program used for imagery data processing:

Manufacturer	Name	Version
QPS	Fledermaus	7.10.2

Table 10: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Profile Version 2023v1..

B.5.2 Surfaces

The following surfaces and/or BAGs were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H13739_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	154.5 meters - 4278.0 meters	NOAA_VR	Complete MBES
H13739_MB_VR_MLLW_Final	CARIS VR Surface (CUBE)	Variable Resolution	154.5 meters - 4278.0 meters	NOAA_VR	Complete MBES

Table 11: Submitted Surfaces

Submitted H13739 surfaces were generated using NOAA recommended parameters for depth-based (Ranges) Caris variable-resolution bathymetric grids. Per correspondence with the Project Manager, the submitted surfaces were generated with the updated Range/Resolution file, NOAA_DepthRanges_CompleteCoverage_2023_RA, that includes 64 meter grids for depths exceeding 1,000 meters. See Project Correspondence for more information. In order to reduce false holes in the rendered VR surface, the maximum grid size was increased to 256 meters within the resolution settings.

Pydro QC Tools Detect Fliers (v.9) was used with default settings to identify "fliers" in a finalized H13739 VR surface. Obvious noise was rejected by the hydrographer in Caris Subset Editor. After several iterations

of data cleaning and running the tool, the program identified 1494 potential fliers in the submitted surface. Subset analysis of the remaining potential fliers revealed them to be "false positives," a result of the dynamic seafloor with significant slope in the terrain and limited data density on both the steep slopes and offshore edge of coverage. Flier Finder was also used with the Noisy Margins option enabled with a resulting 1712 potential fliers identified, and further investigation determined them to be "false positives" (See Figures 9 & 10).

Pydro QC Tools Holiday Finder (v.4) was used with default settings for full coverage to find holidays in the finalized H13739 surface. Holiday Finder detected 55 "certain" holidays in the Complete Coverage surface. Located at depths greater than 2000 meters, holidays were determined to be the result of low coverage at depth or acoustic shadows from rugose bottom features (See Figures 11 & 12). Due to operational constraints prohibiting further development and collection of overlapping coverage data, coverage gaps remained unresolved, but neither represent a danger to navigation nor impact the reliability of the data. All acoustic and gap holidays have the least depth of shallower sounding in proximity.

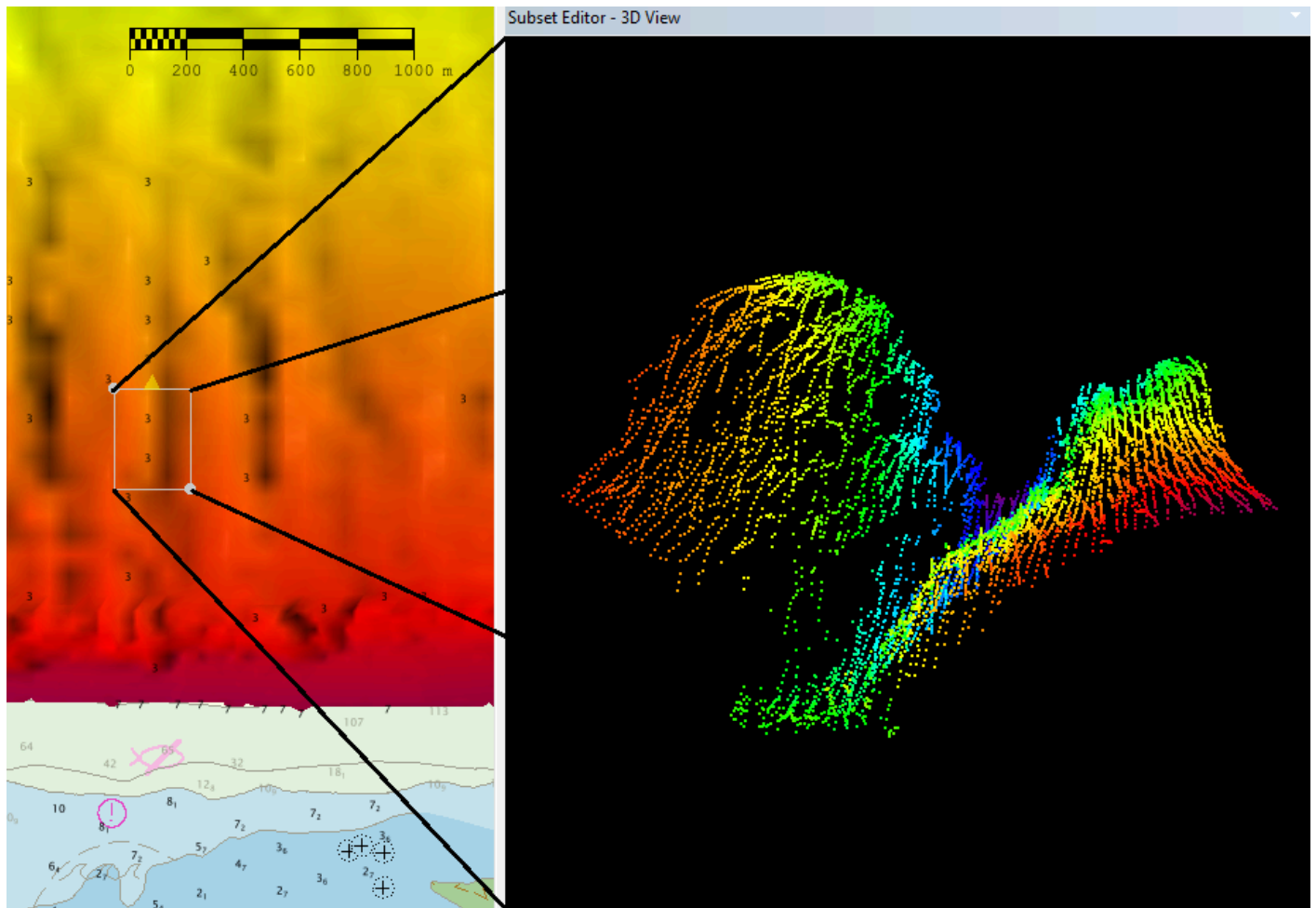


Figure 9: Example of fliers determined to be false, associated with rugose bottom (Chart US5SP22M).

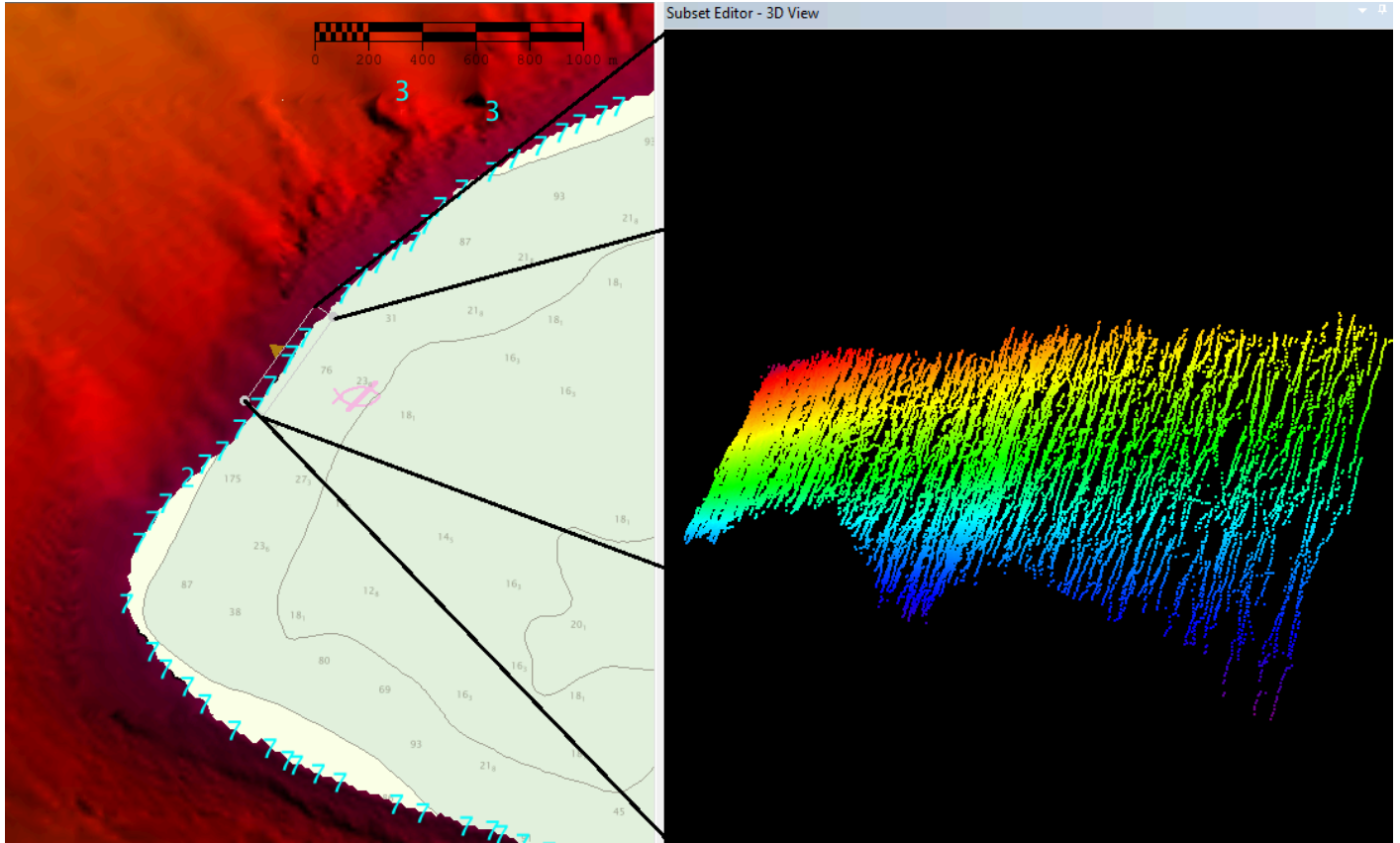


Figure 10: Example of nearshore edge fliers determined to be false (Chart US5SP22M).

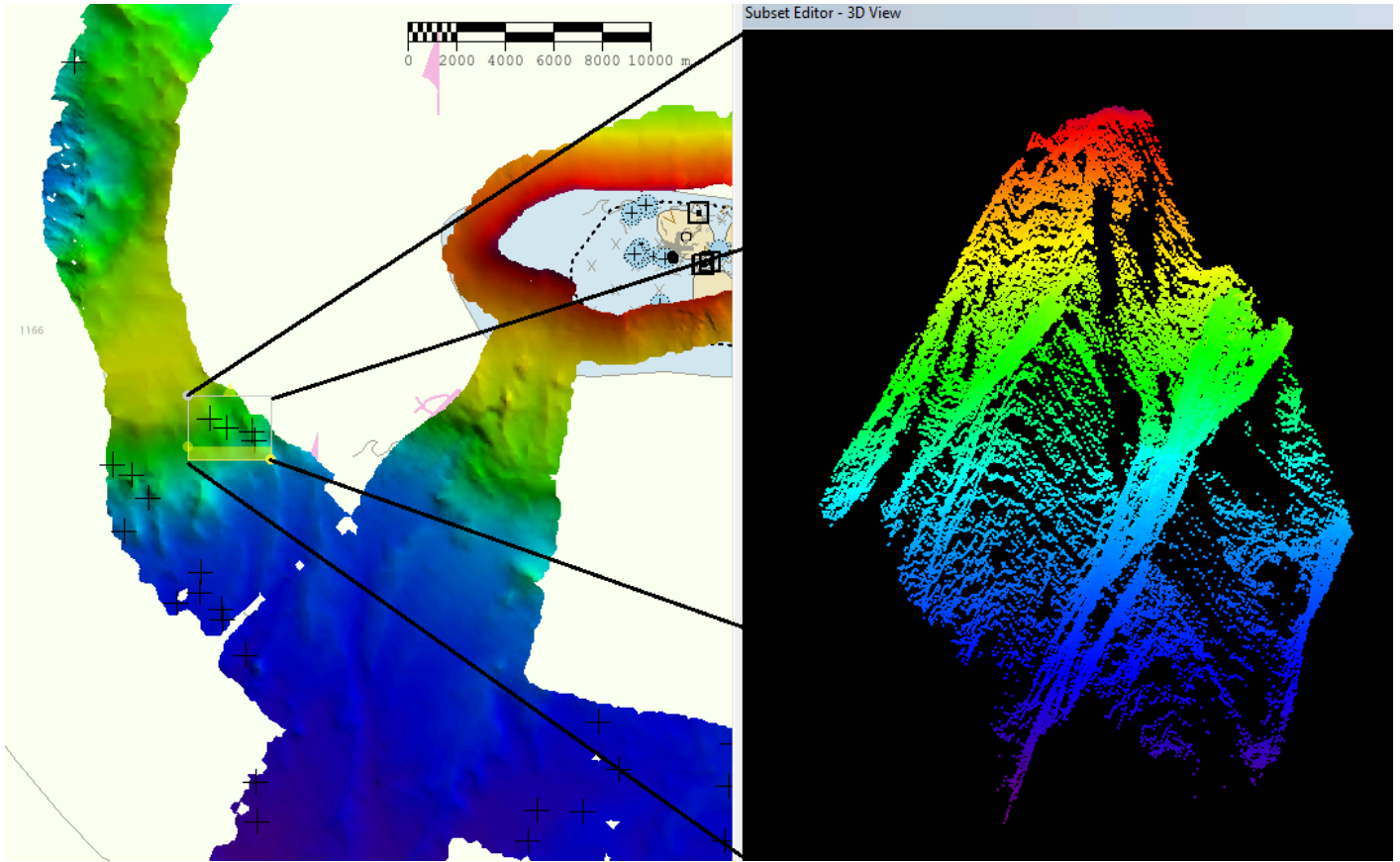


Figure 11: Example of holidays detected by QC Tools Holiday Finder resulting from acoustic shadows (Chart US1HA01M).

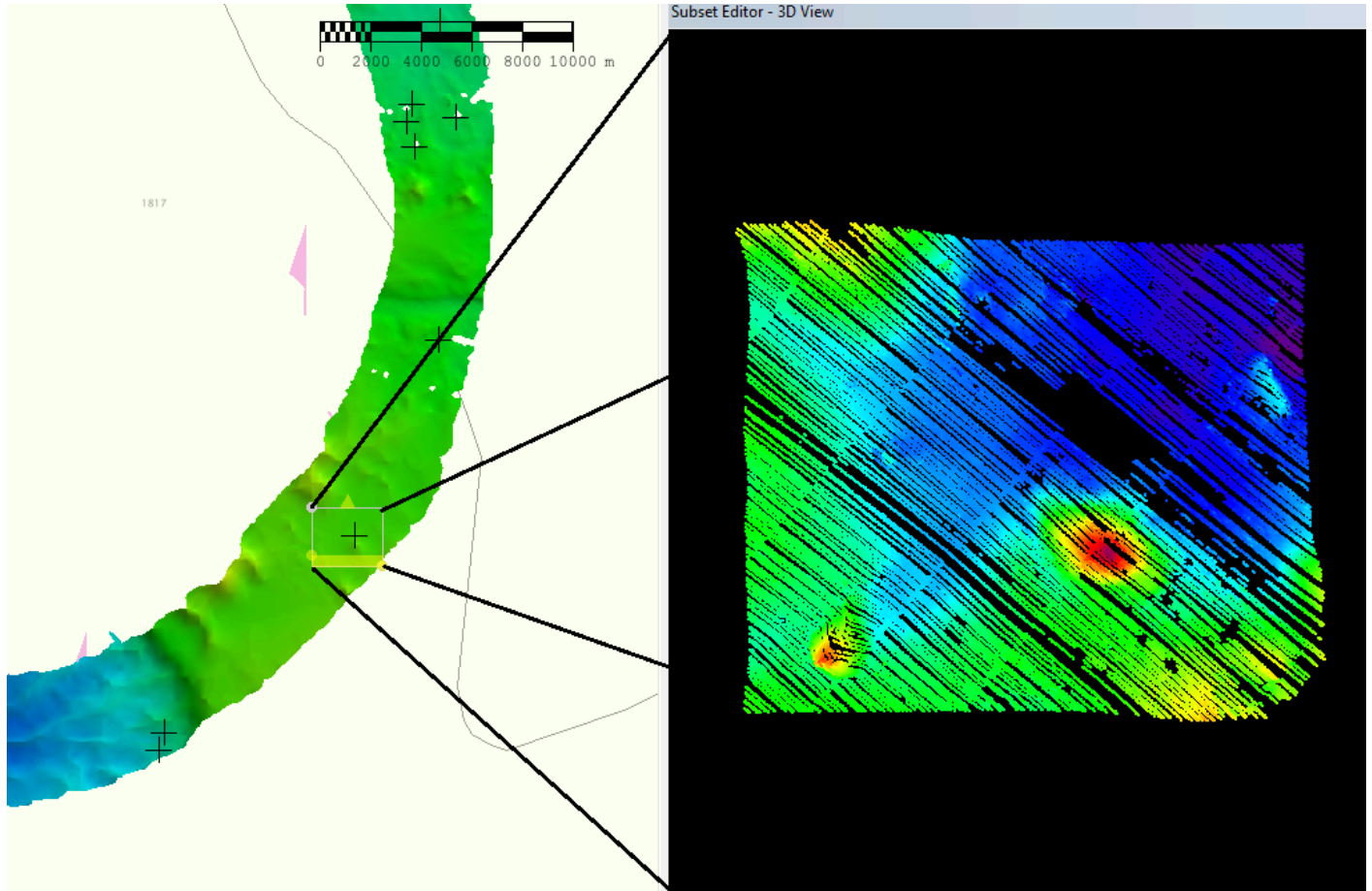


Figure 12: Example of holidays detected by QC Tools Holiday Finder resulting from gaps in coverage at depth (Chart US1HA01M).

C. Vertical and Horizontal Control

Additional information discussing the vertical or horizontal control for this survey can be found in the accompanying DAPR.

C.1 Vertical Control

The vertical datum for this project is Mean Lower Low Water.

ERS Datum Transformation

The following ellipsoid-to-chart vertical datum transformation was used:

Method	Ellipsoid to Chart Datum Separation File
ERS via VDATUM	OPR-T382- RA-23_Jarvis_Palmyra_ERTDM_NAD83(PA11)- MHW_16cm1sigma.csar OPR-T382- RA-23_Jarvis_Palmyra_ERTDM_NAD83(PA11)- MLLW_16cm1sigma.csar

Table 12: ERS method and SEP file

All submitted H13739 MBES data were vertically referenced to the ellipsoid. VDATUM models included with the Project Instructions were used for referencing H13739 data to MLLW and MHW.

C.2 Horizontal Control

The horizontal datum for this project is North American Datum 1983 (PA11).

The projection used for this project is Universal Transverse Mercator (UTM) Zone 3.

The following PPK methods were used for horizontal control:

- RTX

RTK

Precise Positioning-Real time Extended (PP-RTX) processing methods were used in Applanix POSPac MMS (v8.9) software to produce SBETs for post-processing horizontal correction of submitted H13739 MBES data.

D. Results and Recommendations

D.1 Chart Comparison

Shoreline Feature Verification

As discussed in section A.4 of this report, operational constraints and an on-board fire hampered the time spent surveying sheet H13739 and limited acquisition to only the ship. Due to these constraints, limited feature verification was conducted only on the few features that were observed from the ship. These features were addressed as required with S57 attribution and recorded in the H13739 Final Feature File (FFF) to best represent the features at chart scale. All other features in the Composite Source File (CSF) provided with the Project Instructions were simply attributed with the remark “Not Investigated” and recommendation “Retain as Charted”.

D.1.1 Electronic Navigational Charts

The following are the largest scale ENC's, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date
US1HA01M	1:3121170	24	10/24/2022	10/24/2022
US5SP21M	1:25000	3	09/05/2017	09/05/2017
US5SP22M	1:47750	4	08/09/2017	08/09/2017
US5SP25M	1:10000	3	01/18/2018	01/18/2018

Table 13: Largest Scale ENC's

D.1.2 Shoal and Hazardous Features

Project Managers identified one foul area located approximately 2 nautical miles southeast of Kingman Reef that has been marked for deletion due to being attributed to chart differences between chart US1HA01M and US5SP25M.

D.1.3 Charted Features

Charted features exist for this survey, but were not investigated.

D.1.4 Uncharted Features

No uncharted features exist for this survey.

D.1.5 Channels

Channels exist within the survey limits but were not investigated.

D.2 Additional Results**D.2.1 Aids to Navigation**

No Aids to navigation (ATONs) exist for this survey.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

No bottom samples were required for this survey.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

Submarine features exist for this survey, but were not investigated.

D.2.6 Platforms

Platforms exist for this survey, but were not investigated.

D.2.7 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.8 Abnormal Seafloor or Environmental Conditions

No abnormal seafloor or environmental conditions exist for this survey.

D.2.9 Construction and Dredging

Present and/or planned construction or dredging exists within the survey limits, but was not investigated.

D.2.10 New Survey Recommendations

Due to operational constraints, much of Sheet 13739 remained unsurveyed, including both nearshore and offshore regions. We recommend that unsurveyed areas assigned within Sheet H13739 be completed when practical to provide a more comprehensive survey of the area.

D.2.11 ENC Scale Recommendations


No new ENC scales are recommended for this area.

E. Approval Sheet

As Chief of Party, field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys Specifications and Deliverables, Field Procedures Manual, Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Approver Name	Approver Title	Approval Date	Signature
Héctor L. Casanova, CAPT/NOAA	Chief of Party	02/06/2024	 Digitally signed by CASANOVA,HECTOR.LUIS.1231816461 DN: c=US, o=U.S. Government, ou=DOD, ou=PKI, ou=NOAA, ou=CASANOVA,HECTOR.LUIS.1231816461 Date: 2024.02.06 10:35:00 -10'00'
Grant L. Garrison, LT/NOAA	Field Operations Officer	02/06/2024	GRANT.GARRISON.LAWRENCE.1523750115 Digitally signed by GRANT.GARRISON.LAWRENCE.1523750115 Date: 2024.02.06 12:34:35 -10'00'
James B. Jacobson	Chief Survey Technician	02/06/2024	 JACOBSON.JAMES.BRYAN.1269664017 2024.02.06 14:08:58 -08'00'
Thomas A. Murphy	Sheet Manager	02/06/2024	MURPHY.THOMAS.ANDREW.1608363633 Digitally signed by MURPHY.THOMAS.ANDREW.1608363633 Date: 2024.02.06 11:57:00 -10'00'

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continuously Operating Reference Station
CTD	Conductivity Temperature Depth
CEF	Chart Evaluation File
CSF	Composite Source File
CST	Chief Survey Technician
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Detached Position
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
ERS	Ellipsoidal Referenced Survey
ERTDM	Ellipsoidally Referenced Tidal Datum Model
ERZT	Ellipsoidally Referenced Zoned Tides
FFF	Final Feature File
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division

Acronym	Definition
HSSD	Hydrographic Survey Specifications and Deliverables
HSTB	Hydrographic Systems Technology Branch
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	Linear Nautical Miles
MBAB	Multibeam Echosounder Acoustic Backscatter
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NALL	Navigable Area Limit Line
NTM	Notice to Mariners
NMEA	National Marine Electronics Association
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRT	Navigation Response Team
NSD	Navigation Services Division
OCS	Office of Coast Survey
OMAO	Office of Marine and Aviation Operations (NOAA)
OPS	Operations Branch
MBES	Multibeam Echosounder
NWLON	National Water Level Observation Network
PDBS	Phase Differencing Bathymetric Sonar
PHB	Pacific Hydrographic Branch
POS/MV	Position and Orientation System for Marine Vessels
PPK	Post Processed Kinematic
PPP	Precise Point Positioning
PPS	Pulse per second

Acronym	Definition
PRF	Project Reference File
PS	Physical Scientist
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
RTX	Real Time Extended
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
SSSAB	Side Scan Sonar Acoustic Backscatter
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPU	Total Propagated Uncertainty
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDF	Zone Definition File