

H13417

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

**DESCRIPTIVE REPORT**

Type of Survey: Navigable Area

Registry Number: H13417

**LOCALITY**

State(s): Virginia

General Locality: Offshore Virginia and North Carolina

Sub-locality: 40 NM SE of Virginia Beach

**2021**

CHIEF OF PARTY  
Matthew Jaskoski, CDR/NOAA

LIBRARY & ARCHIVES

Date:

**HYDROGRAPHIC TITLE SHEET**

**H13417**

**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): **Virginia**

General Locality: **Offshore Virginia and North Carolina**

Sub-Locality: **40 NM SE of Virginia Beach**

Scale: **40000**

Dates of Survey: **04/24/2021 to 05/09/2021**

Instructions Dated: **02/25/2021**

Project Number: **OPR-D304-TJ-21**

Field Unit: **NOAA Ship *Thomas Jefferson***

Chief of Party: **Matthew Jaskoski, CDR/NOAA**

Soundings by: **Multibeam Echo Sounder**

Imagery by: **Side Scan Sonar Multibeam Echo Sounder Backscatter**

Verification by: **Atlantic 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 18N, 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 H13417

Project: OPR-D304-TJ-21

Locality: Offshore Virginia and North Carolina

Sublocality: 40 NM SE of Virginia Beach

Scale: 1:40000

April 2021 - May 2021

**NOAA Ship *Thomas Jefferson***

Chief of Party: Matthew Jaskoski, CDR/NOAA

### A. Area Surveyed

Survey H13417, located approximately 40NM offshore of Virginia Beach, VA, was conducted in accordance with coverage requirements set forth in the Project Instructions OPR-D304-TJ-21.

#### A.1 Survey Limits

Data were acquired within the following survey limits:

| Northwest Limit                      | Southeast Limit                      |
|--------------------------------------|--------------------------------------|
| 36° 59' 48.84" N<br>75° 15' 15.93" W | 36° 41' 48.52" N<br>75° 10' 13.03" W |

*Table 1: Survey Limits*

Survey data were acquired in accordance with the requirements set forth by the Project Instructions (PI) and the Hydrographic Surveys Specifications and Deliverables (HSSD) 2021 (Figure 1).

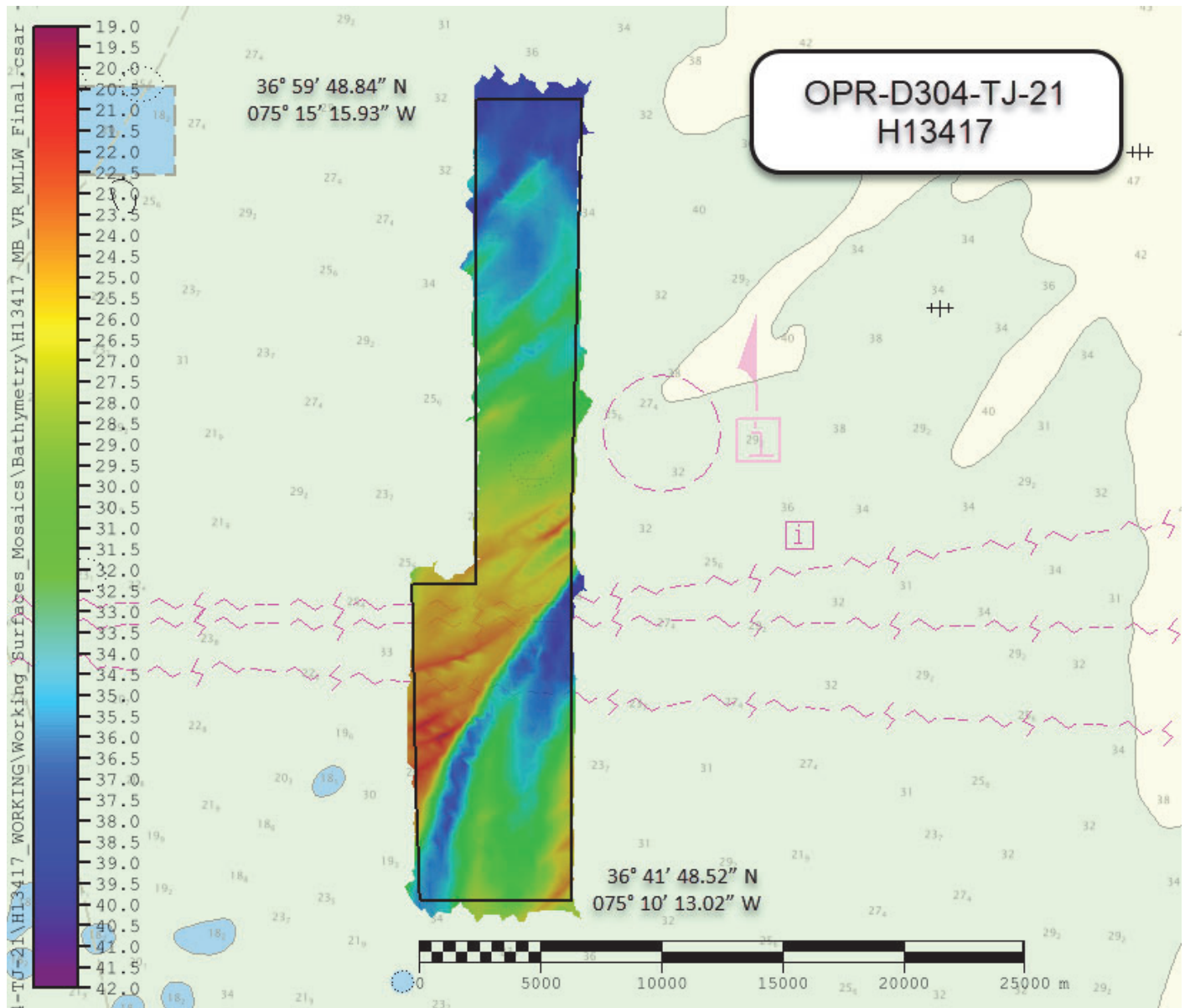


Figure 1: Survey layout for H13417, plotted over ENC US3DE01M. Black outline represents the survey limits set forth by the Project Instructions.

## A.2 Survey Purpose

This project covers approximately 47 SNM approaching Chesapeake Bay, home for two top 20 container ports in the United States, Port of Baltimore and Port of Virginia. Together these ports net over 116 million tons of imports and exports per year.\* Prior data in the project area spans from the 1880s to 1940s. The bathymetric data vintage coupled with numerous storms and hurricanes having potentially changed the seabed over the last century raises a need to survey the area. This project is part of an ongoing, multi-year hydrographic survey to support the safety of waterborne commerce to the Chesapeake Bay and transiting the

eastern seaboard. This data from this project will provide modern bathymetry for updating National Ocean Service nautical charting products as well as support the Seabed 2030 global mapping initiative.

\*From project instructions

### A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in H13417 meet multibeam echo sounder (MBES) coverage requirements for complete coverage, as required by the HSSD dated April 2021. This includes crosslines (see Section B.2.1), NOAA allowable uncertainty (see Section B.2.10), and density requirements (see Section B.2.11).

### 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 in survey area | Complete Coverage (Refer to HSSD Section 5.2.2.3)   |
| All waters in survey area | Acquire backscatter data during all multibeam data acquisition. (Refer to HSSD Section 6.2) |

*Table 2: Survey Coverage*

Sections of H13417 were surveyed to complete coverage by 100% side scan sonar (SSS) coverage with concurrent MBES per 2021 Hydrographic Survey Specifications and Deliverables (HSSD). Sections of H13417 were also surveyed by 100% complete coverage MBES (Figure 2). 100% MBES was used to address SSS holidays created by refraction.

There are four holidays that exist in the coverage acquired for H13417. Three of the holidays occur outside the assigned sheet limits and represent areas with coverage from prior surveys H13094 and H12502. The fourth holiday exists within the assigned sheet limits of H13417 at 36°47'21.03" N 075°13'48.65" W and was created by a gap between adjacent sidescan swaths (Figure 3). While no guarantee exists that all the least depths are represented in H13417 because of this holiday, the hydrographer is confident that due to the nature of the sea floor surface, no significant features exist within this void.



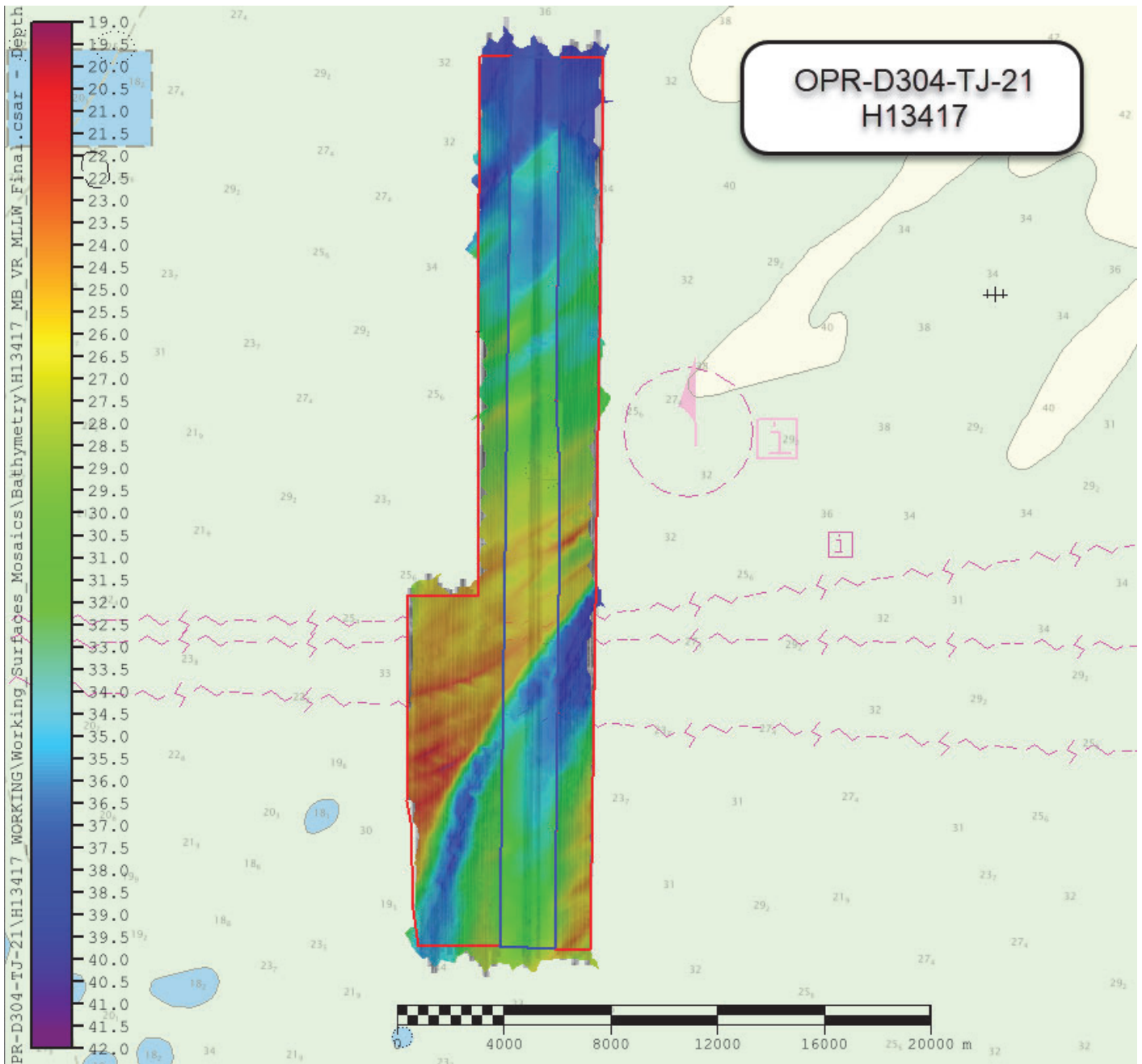
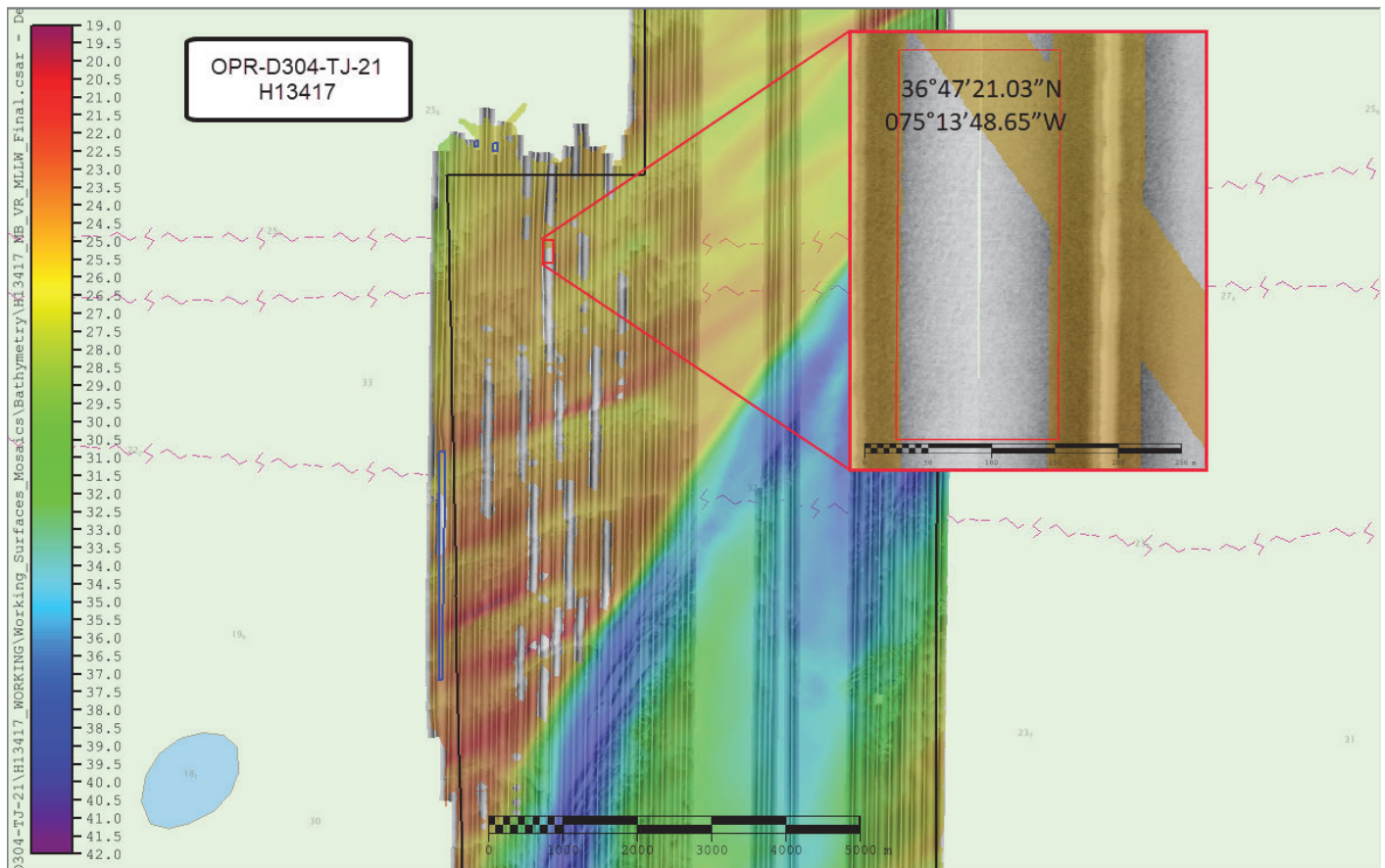


Figure 2: Complete coverage options for H13417. Red outlines area of 100% SSS with concurrent MBES. Blue outlines area of 100% complete coverage MBES.



*\*Figure 3: Holidays in coverage acquired for H13417. Areas outlined in blue have prior coverage and are outside the sheet limits. Red outline area is a gap in SSS coverage within assigned sheet limits (in black).*

*\* Location documented in image is incorrect and is located in 36°48'21.03"N 075°13'15.65"W.*

## A.5 Survey Statistics

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

|   | <b>HULL ID</b>              | <i>S-222</i> | <i>2903</i> | <i>2904</i> | <i>Total</i> |
|---|-----------------------------|--------------|-------------|-------------|--------------|
| <b>LNM</b>  | <b>SBES Mainscheme</b>      | 0            | 0           | 0           | 0            |
|   | <b>MBES Mainscheme</b>      | 741.09       | 34.69       | 24.27       | 800.06       |
|   | <b>Lidar Mainscheme</b>     | 0            | 0           | 0           | 0            |
|   | <b>SSS Mainscheme</b>       | 0            | 0           | 0           | 0            |
|   | <b>SBES/SSS Mainscheme</b>  | 0            | 0           | 0           | 0            |
|   | <b>MBES/SSS Mainscheme</b>  | 505.04       | 0           | 0           | 505.04       |
|   | <b>SBES/MBES Crosslines</b> | 46.27        | 0           | 0           | 46.27        |
|   | <b>Lidar Crosslines</b>     | 0            | 0           | 0           | 0            |
| <b>Number of Bottom Samples</b>                     |                             |              |             |             | 7            |
| <b>Number Maritime Boundary Points Investigated</b> |                             |              |             |             | 0            |
| <b>Number of DPs</b>                                |                             |              |             |             | 0            |
| <b>Number of Items Investigated by Dive Ops</b>     |                             |              |             |             | 0            |
| <b>Total SNM</b>                                    |                             |              |             |             | <b>47*</b>   |

**\*55.14 SNM**

Table 3: Hydrographic Survey Statistics

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

| <b>Survey Dates</b> | <b>Day of the Year</b> |
|---------------------|------------------------|
| 04/24/2021          | 114                    |
| 04/25/2021          | 115                    |

| <b>Survey Dates</b> | <b>Day of the Year</b> |
|---------------------|------------------------|
| 04/26/2021          | 116                    |
| 04/27/2021          | 117                    |
| 04/28/2021          | 118                    |
| 04/29/2021          | 119                    |
| 05/02/2021          | 122                    |
| 05/03/2021          | 123                    |
| 05/04/2021          | 124                    |
| 05/05/2021          | 125                    |
| 05/06/2021          | 126                    |
| 05/07/2021          | 127                    |
| 05/09/2021          | 129                    |

*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:

| <b>Hull ID</b> | <b><i>S222</i></b> | <b><i>2903</i></b> | <b><i>2904</i></b> |
|----------------|--------------------|--------------------|--------------------|
| <b>LOA</b>     | 63.4 meters        | 8.5 meters         | 8.5 meters         |
| <b>Draft</b>   | 4.6 meters         | 1.2 meters         | 1.2 meters         |

*Table 5: Vessels Used*





*Figure 4: NOAA Ship Thomas Jefferson (S222)*





*Figure 5: NOAA Launch 2903*



*Figure 6: NOAA Launch 2904*



## B.1.2 Equipment

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

| <b>Manufacturer</b>  | <b>Model</b>  | <b>Type</b>                                 |
|----------------------|---------------|---|
| Kongsberg Maritime   | EM 2040       | MBES  |
| Klein Marine Systems | System 5000   | SSS   |
| Sea-Bird Scientific  | SBE 19plus V2 | Conductivity, Temperature, and Depth Sensor |
| AML Oceanographic    | MVP100        | Conductivity, Temperature, and Depth Sensor |
| Teledyne RESON       | SVP 70        | Sound Speed System                          |
| Applanix             | POS MV 320 v5 | Positioning and Attitude System             |
| Valeport             | Thru-Hull SVS | Sound Speed System                          |
| AML Oceanographic    | MVP-X         | Conductivity, Temperature, and Depth Sensor |

*Table 6: Major Systems Used*

Vessel configurations, equipment operations, data acquisition, and processing were consistent with specifications described in the DAPR.

## B.2 Quality Control

### B.2.1 Crosslines

S222 and HSLs 2903 and 2904 collected 46.2694 linear nautical miles of MBES crosslines, or 3.85% of mainscheme MBES data. A variable resolution (VR) Combined Uncertainty and Bathymetry Estimator (CUBE) surface of mainscheme data and a VR CUBE surface of crossline data were differenced - the resulting mean was 0.03m with a standard deviation of 0.05m (Figures 7 and 8). While the crossline mileage collected on H13417 does not meet the specifications set forth in the HSSD 5.2.4.2 of 4% of mainscheme mileage, the crosslines acquired have good temporal and geographic distribution, and there is no indication of any comparison issues.



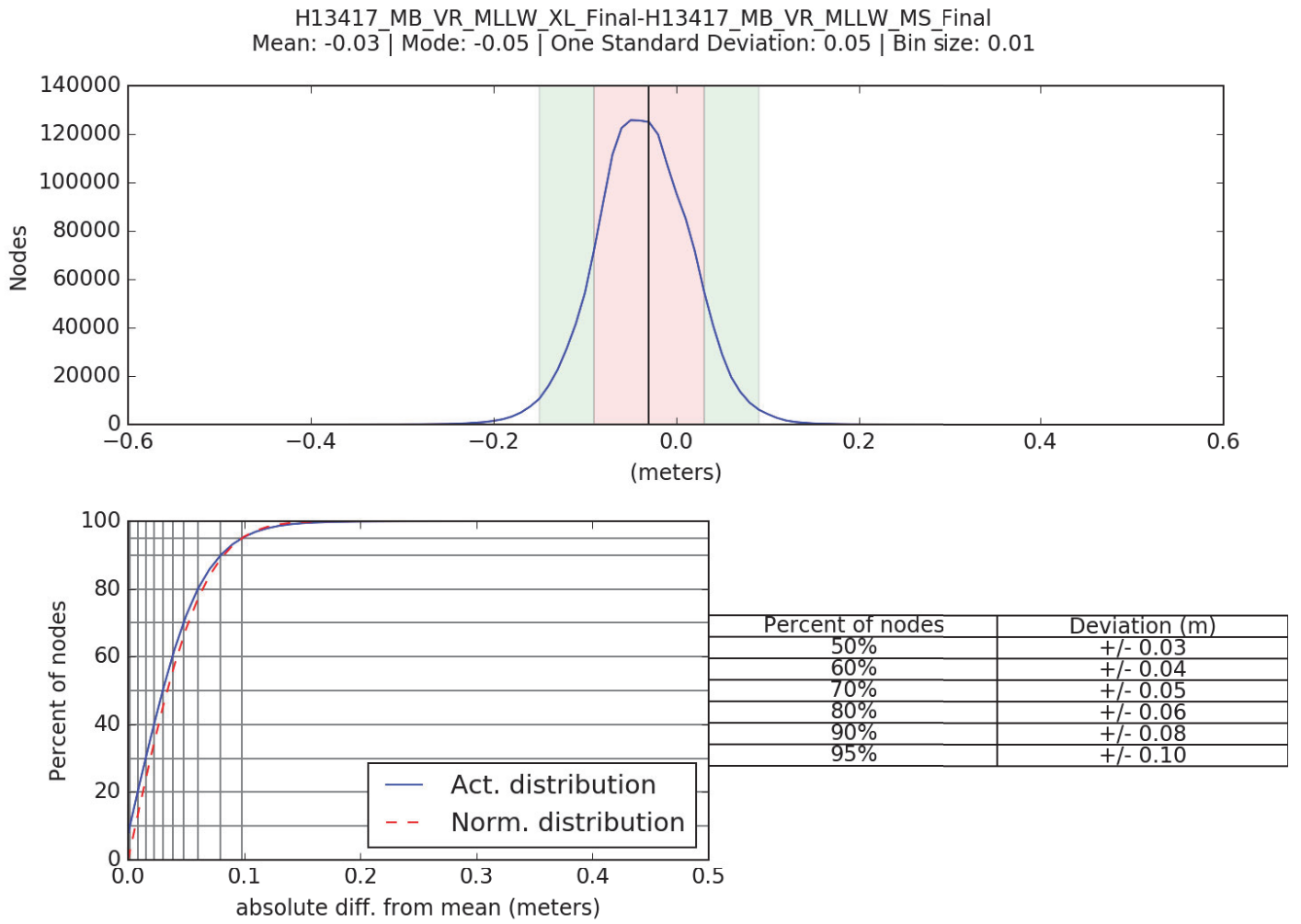


Figure 7: H13417 crossline/mainscheme comparison statistics

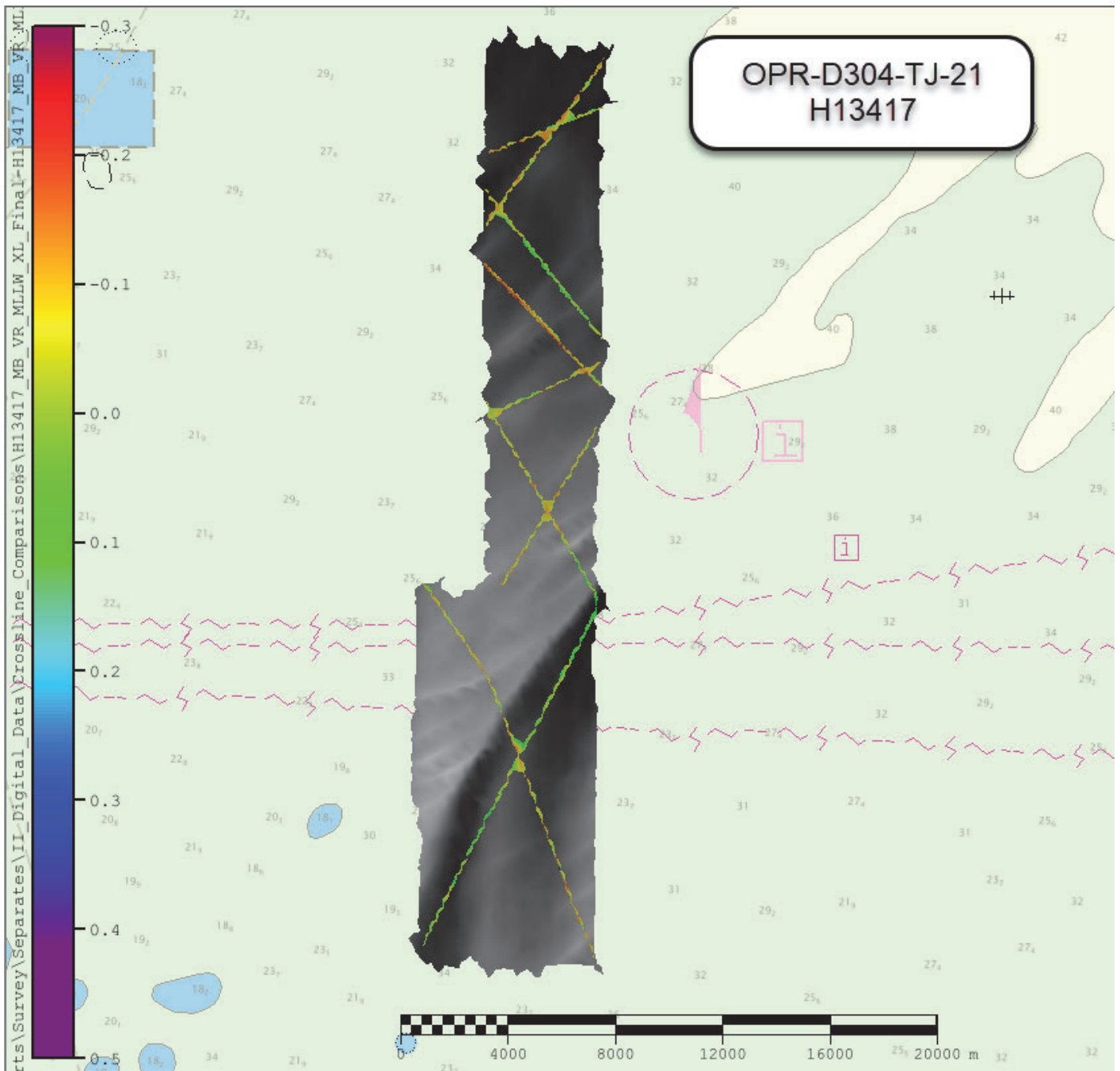


Figure 8: H13417 MBES crossline difference surface, shown in color, overlaid on mainscheme data, shown in greyscale.

### B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

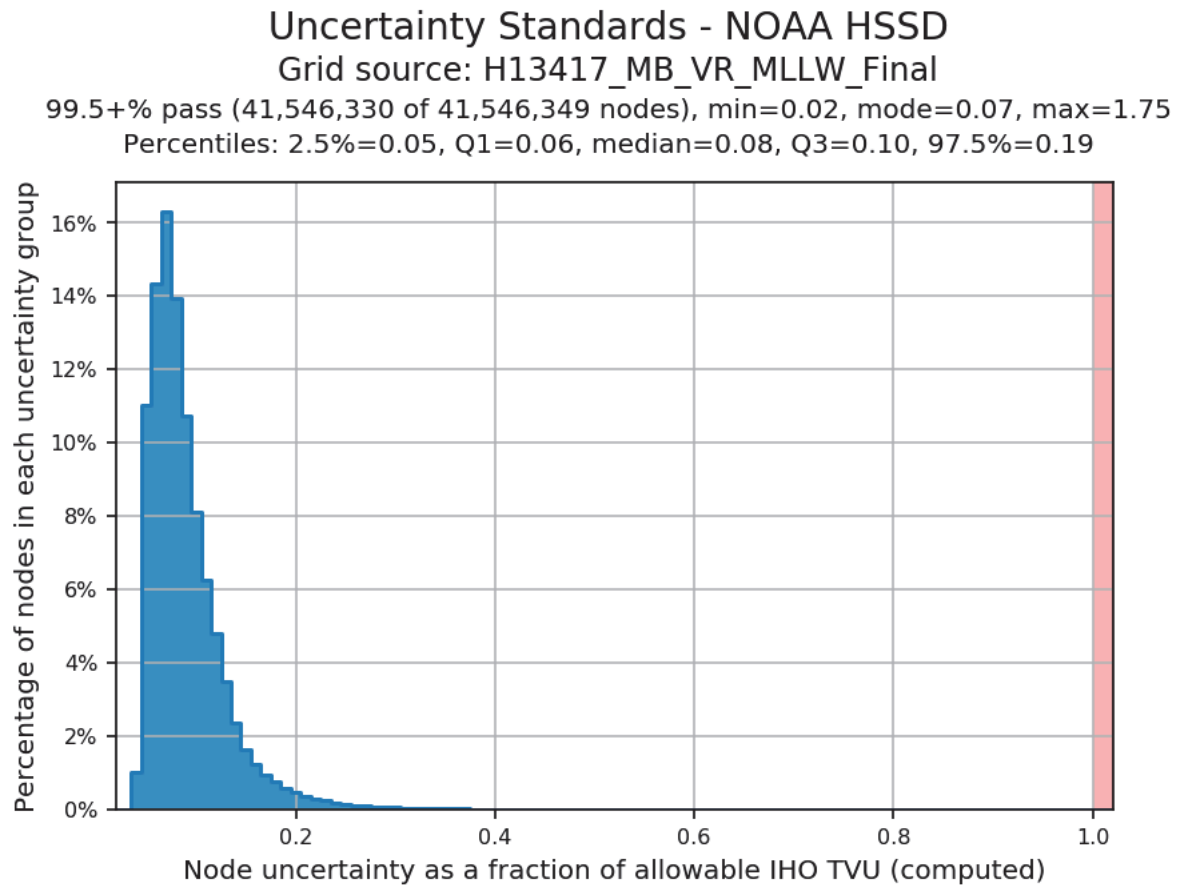
| <b>Method</b>  | <b>Measured</b> | <b>Zoning</b> |
|----------------|-----------------|---------------|
| ERS via VDATUM | 0.092 meters    | 0.0 meters    |

*Table 7: Survey Specific Tide TPU Values.*

| <b>Hull ID</b> | <b>Measured - CTD</b> | <b>Measured - MVP</b> | <b>Measured - XBT</b> | <b>Surface</b>    |
|----------------|-----------------------|-----------------------|-----------------------|-------------------|
| S222           | 4 meters/second       | 4 meters/second       | 0 meters/second       | 0.2 meters/second |
| 2903           | 4 meters/second       | 0 meters/second       | 0 meters/second       | 0.2 meters/second |
| 2904           | 4 meters/second       | 0 meters/second       | 0 meters/second       | 0.2 meters/second |

*Table 8: Survey Specific Sound Speed TPU Values.*

The bathymetric surface's uncertainty layer is compliant with HSSD 2021 uncertainty standards. Over 99.5% of all nodes pass uncertainty standards (Figure 9).



*Figure 9: H13417 uncertainty standards*

### B.2.3 Junctions

There are four historical surveys that junction with survey H13417 (Figure 10). Two surveys were conducted with H13417 while on OPR-D304-TJ-21: H13416 and H13423 (Figure 11).

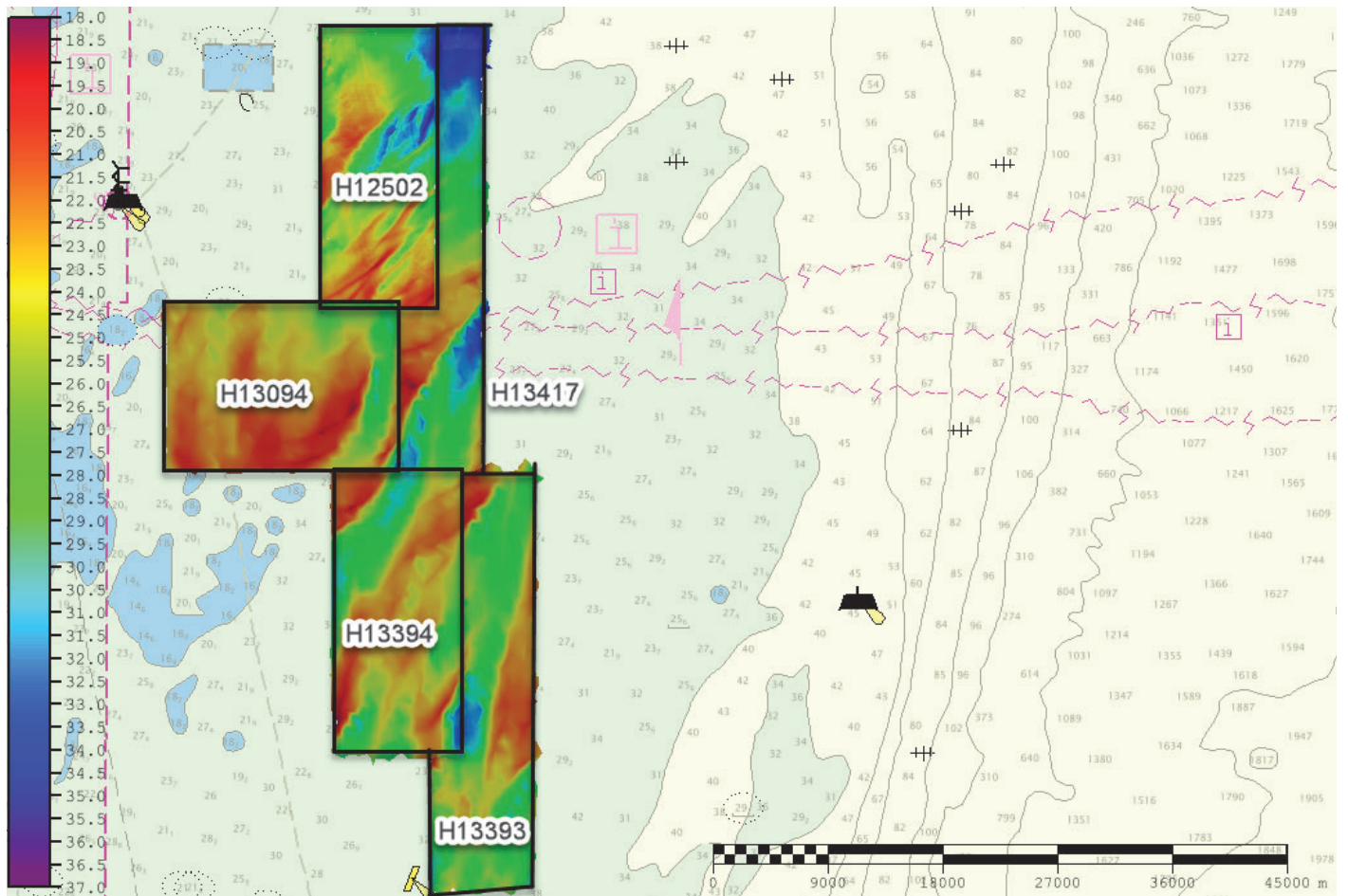


Figure 10: H13417 and junctioning historical sheets H13094, H12502, H13393, and H13394

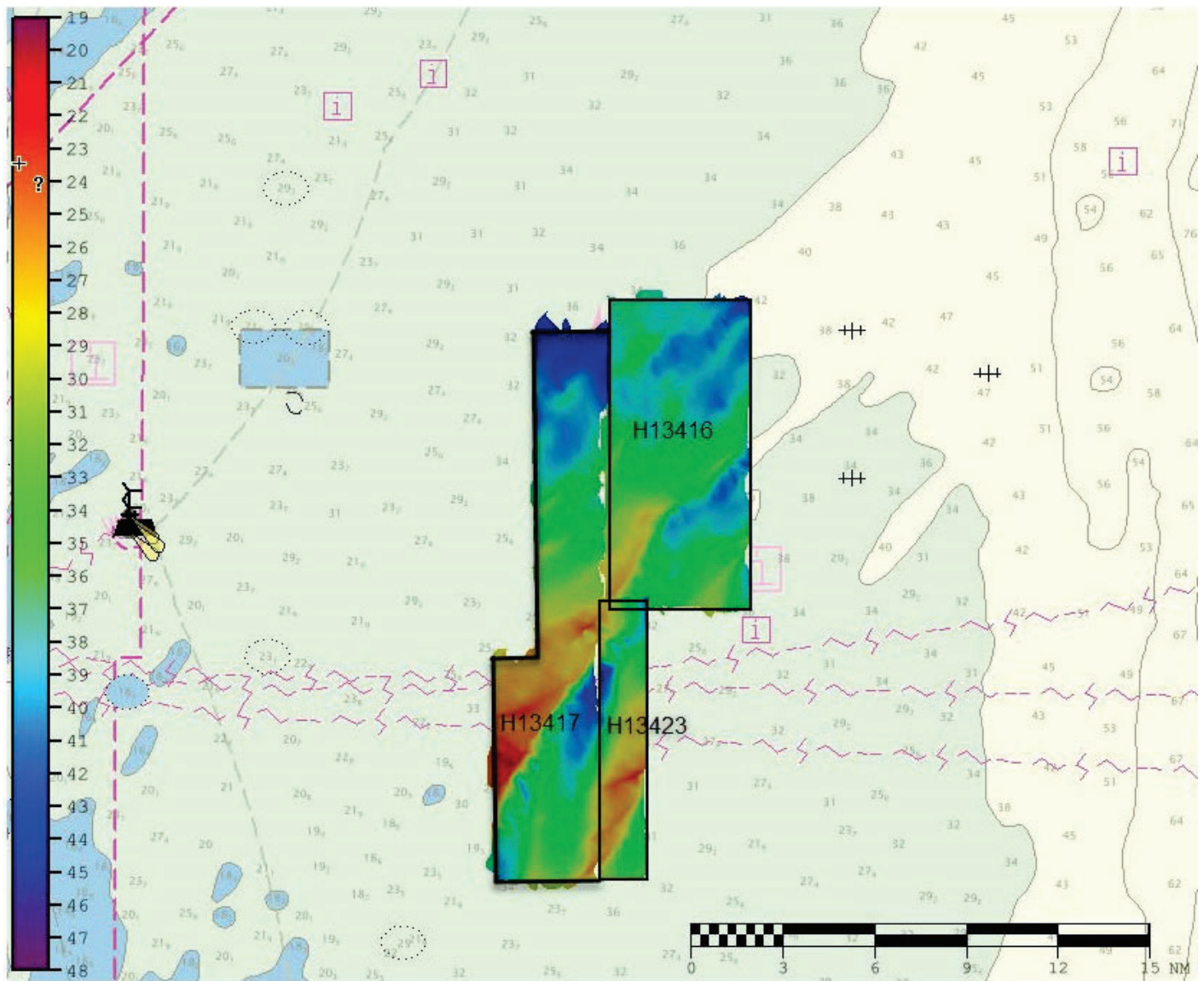


Figure 11: Surveys conducted after H13417 during OPR-D304-TJ-21.

The following junctions were made with this survey:

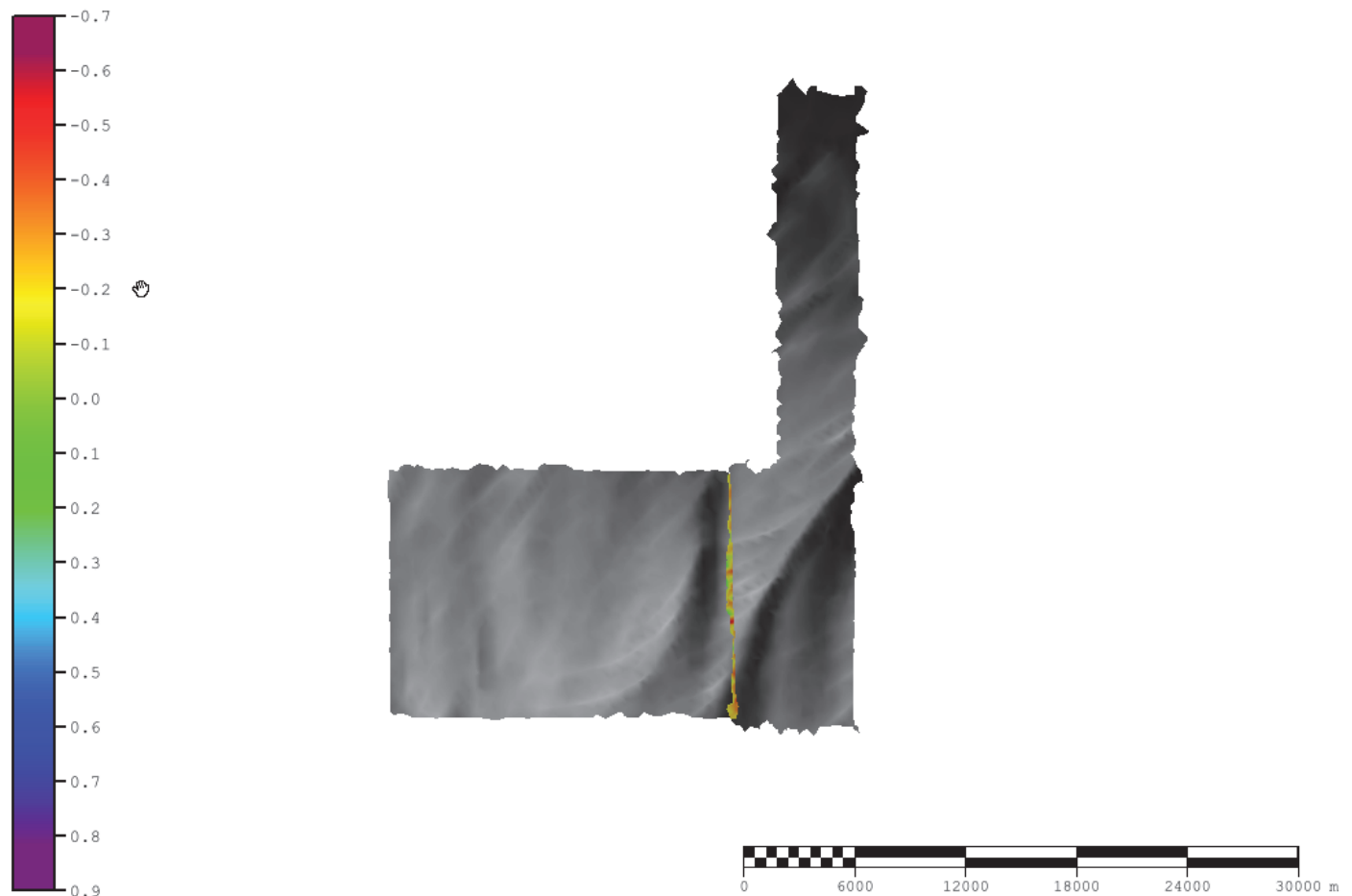
| Registry Number | Scale   | Year | Field Unit                     | Relative Location |
|-----------------|---------|------|--------------------------------|-------------------|
| H13094          | 1:40000 | 2018 | NOAA Ship Ferdinand R. Hassler | E                 |
| H13393          | 1:40000 | 2020 | NOAA Ship Thomas Jefferson     | SE                |
| H13394          | 1:40000 | 2020 | NOAA Ship Ferdinand R. Hassler | SE                |
| H12502          | 1:40000 | 2021 | NOAA Ship Ferdinand R. Hassler | E                 |

Table 9: Junctioning Surveys



H13094

The east side of Survey H13094 junctioned with Survey H13417 (Figure 12). A single resolution CUBE surface of H13094 data at the 1m resolution and a variable resolution CUBE surface of H13417 data were differenced. The mean difference between bathymetric surface nodes was 0.04m with a standard deviation of 0.12m. Statistics and visual inspection indicate that surveys H13417 and H13094 are in general agreement (Figure 13).



*Figure 12: Junction difference surface between Survey H13417 and H13094 in color. Visual inspection indicates that the surveys are in general agreement.*

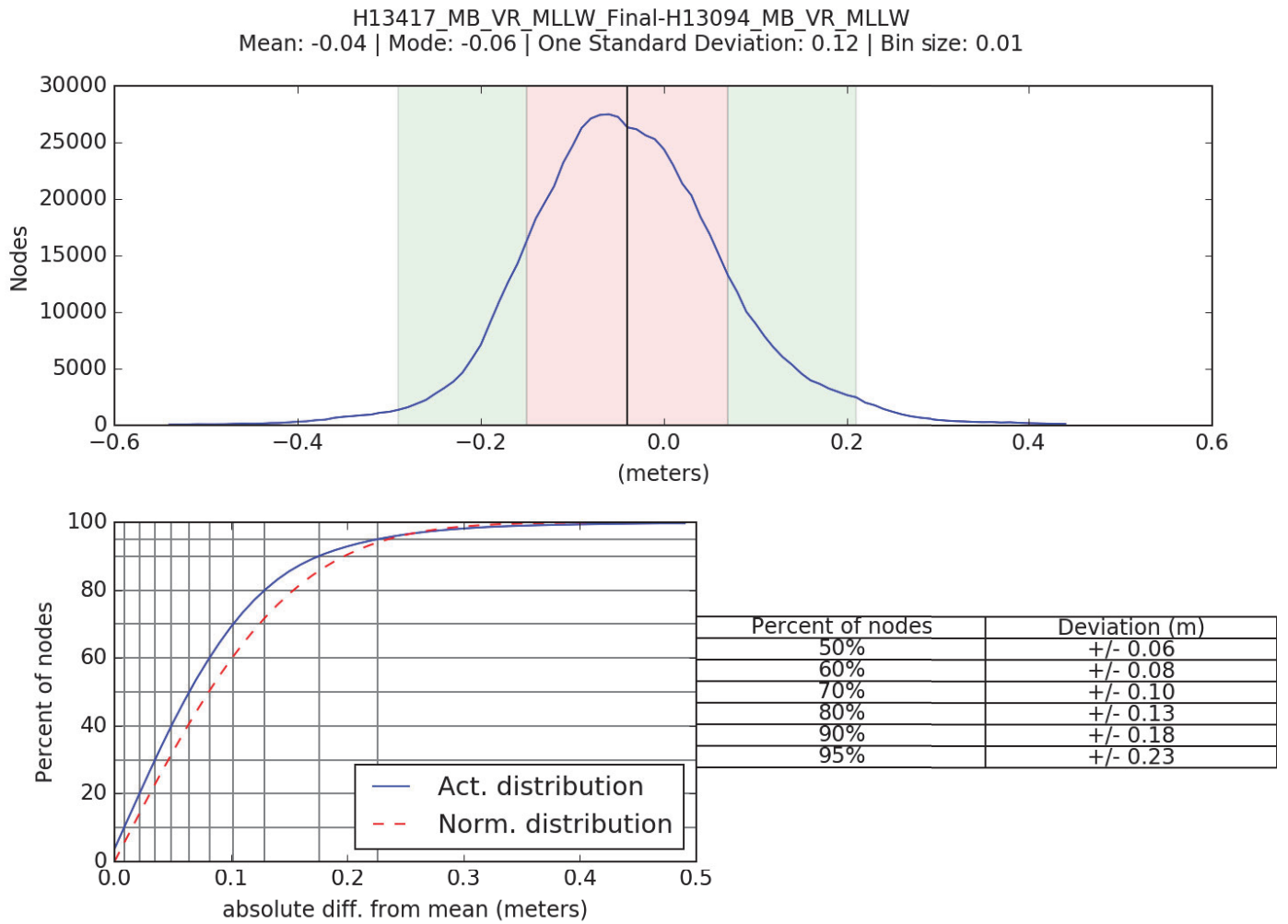


Figure 13: H13417 and H13094 surface difference comparison statistics.

H13393

The southeast side of Survey H13393 junctioned with Survey H13417 (Figure 14). A single resolution CUBE surface of H13393 data at the 1m resolution and a variable resolution CUBE surface of H13417 data were differenced. The mean difference between bathymetric surface nodes was 0.02m with a standard deviation of 0.07m. Statistics and visual inspection indicate that surveys H13417 and H13393 are in general agreement (Figure 15).





*Figure 14: Junction difference surface between Survey H13417 and H13393 in color. Visual inspection indicates that the surveys are in general agreement.*

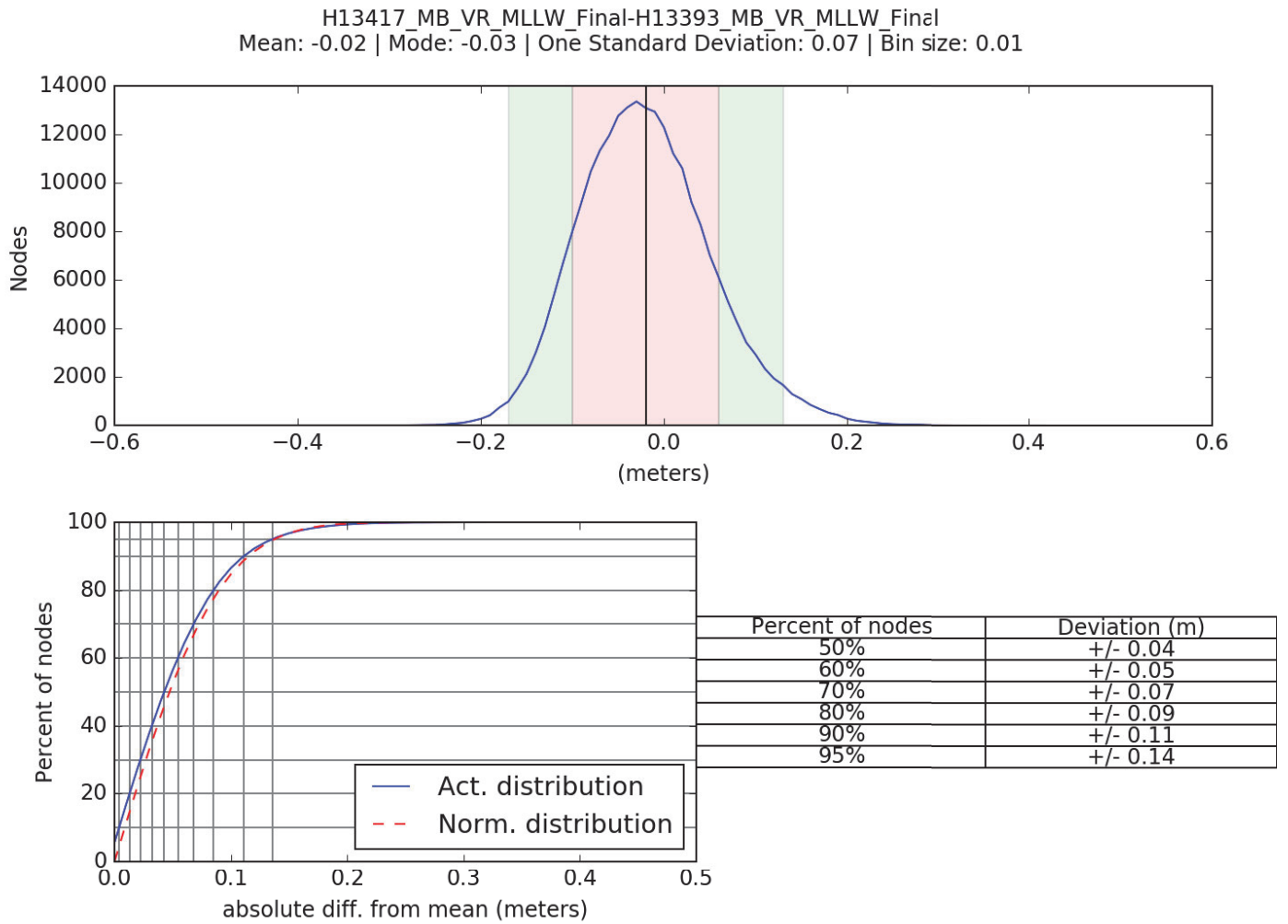


Figure 15: H13417 and H13393 surface difference comparison statistics.

### H13394

The northeast side of Survey H13394 junctioned with Survey H13417 (Figure 16). A single resolution CUBE surface of H13394 data at the 1m resolution and a variable resolution CUBE surface of H13417 data were differenced. The mean difference between bathymetric surface nodes was 0.00m with a standard deviation of 0.07m. Statistics and visual inspection indicate that surveys H13417 and H13394 are in general agreement (Figure 17).



*Figure 16: Junction difference surface between Survey H13417 and H13394 in color. Visual inspection indicates that the surveys are in general agreement.*

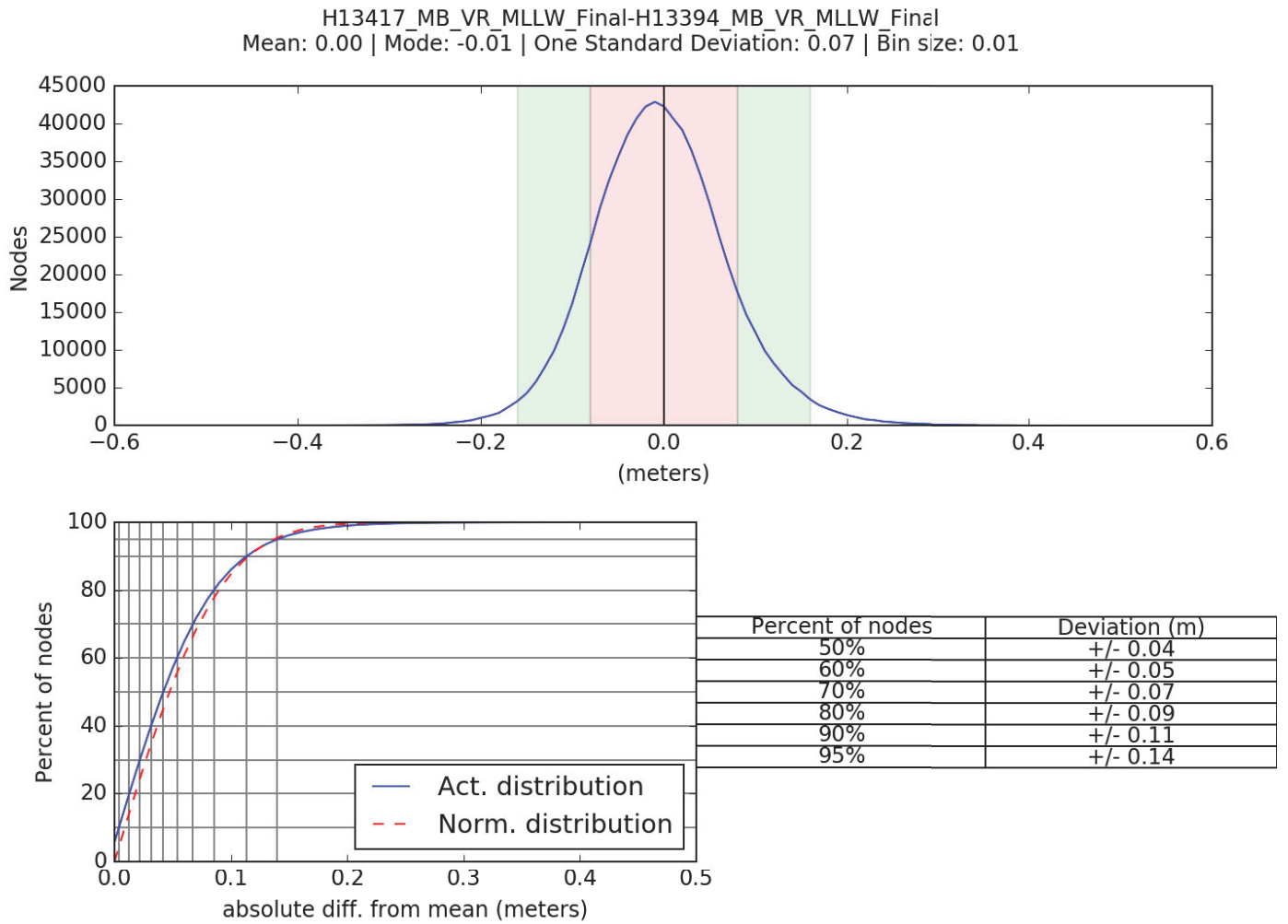
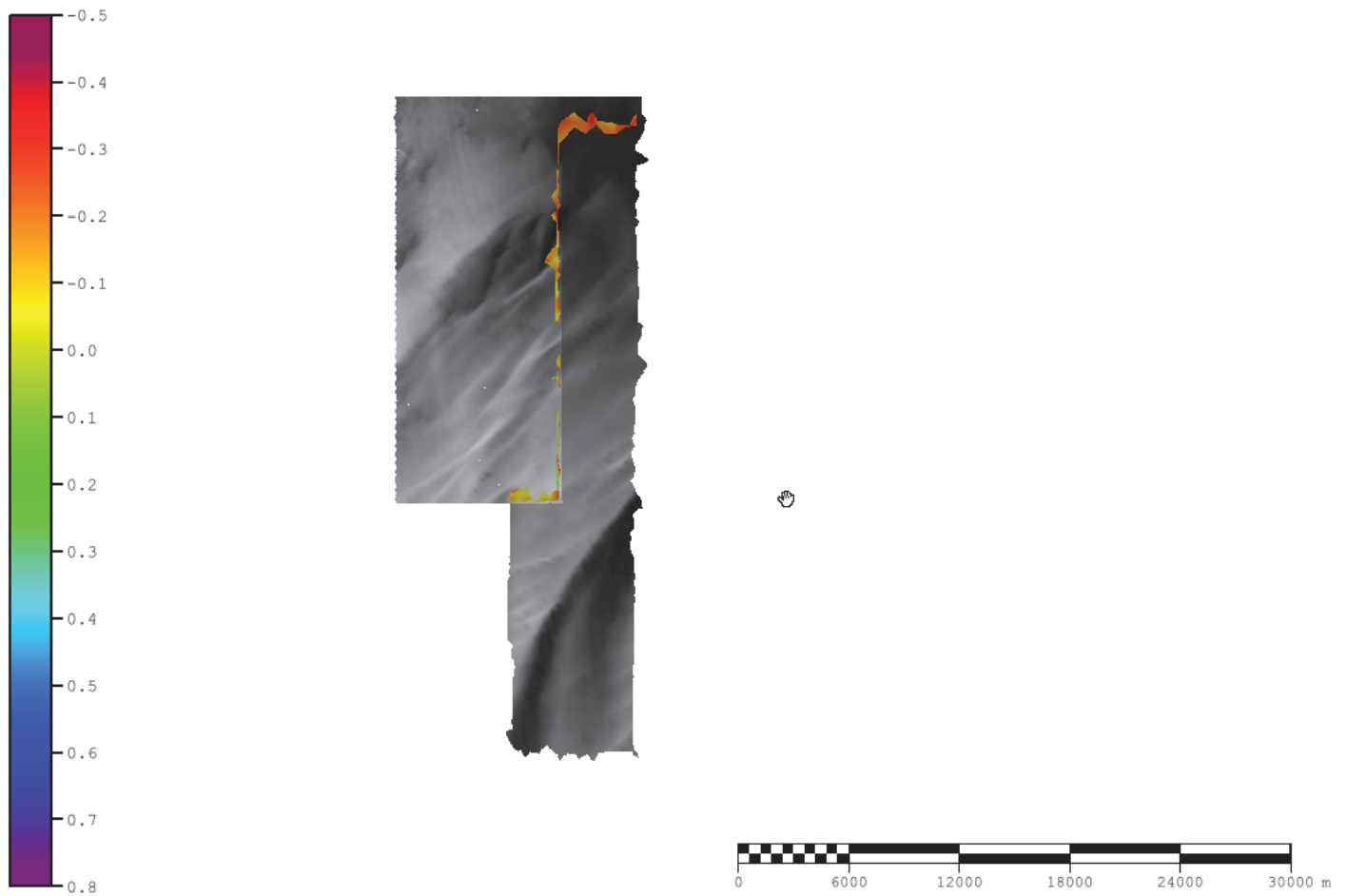


Figure 17: H13417 and H13394 surface difference comparison statistics.

H12502

The east side of Survey H12502 junctioned with Survey H13417 (Figure 18). A single resolution CUBE surface of H12502 data at the 1m resolution and a variable resolution CUBE surface of H13417 data were differenced. The mean difference between bathymetric surface nodes was 0.07m with a standard deviation of 0.09m. Statistics and visual inspection indicate that surveys H13417 and H12502 are in general agreement (Figure 19).



*Figure 18: Junction difference surface between Survey H13417 and H12502 in color. Visual inspection indicates that the surveys are in general agreement.*

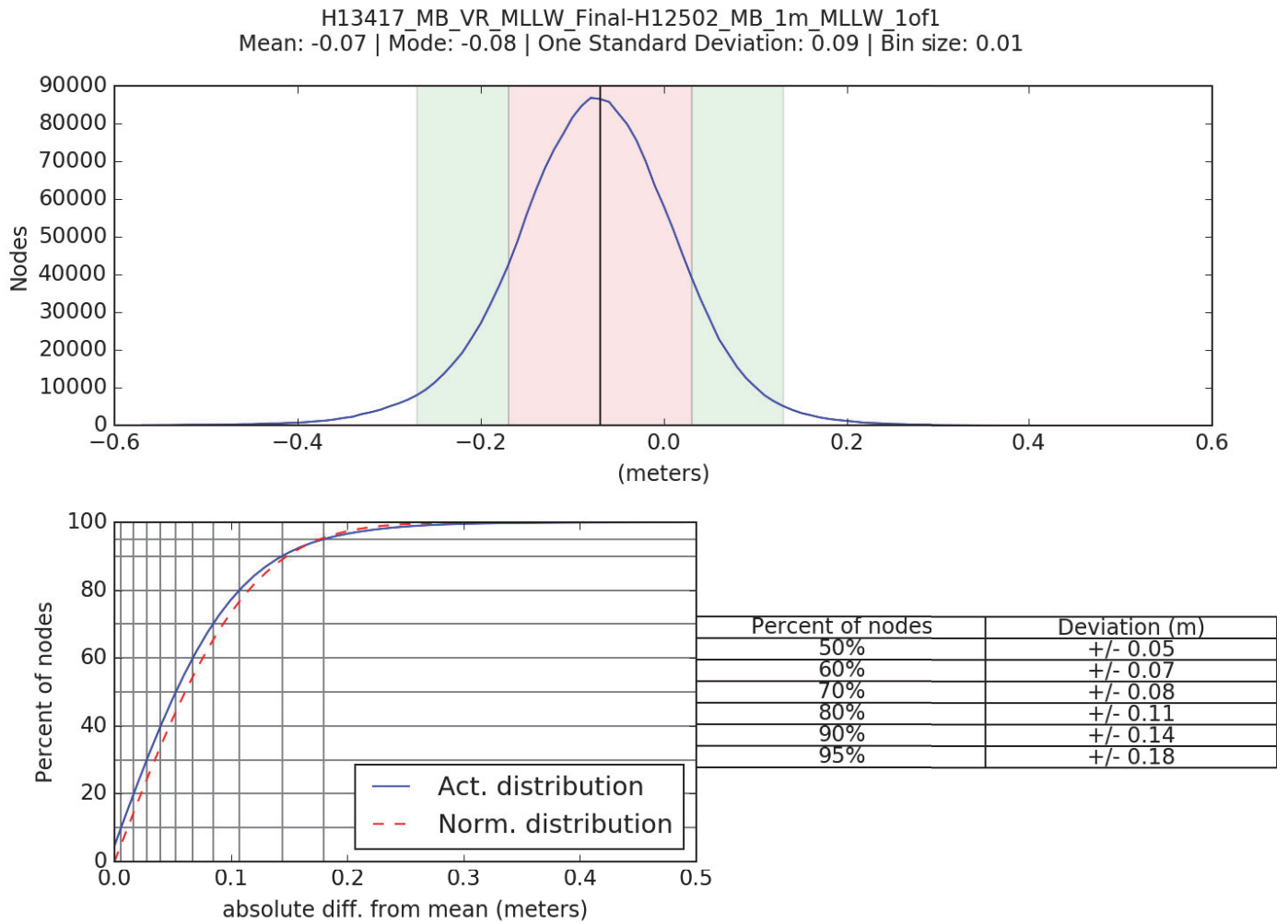


Figure 19: H13417 and H12502 surface difference comparison statistics.

### 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.

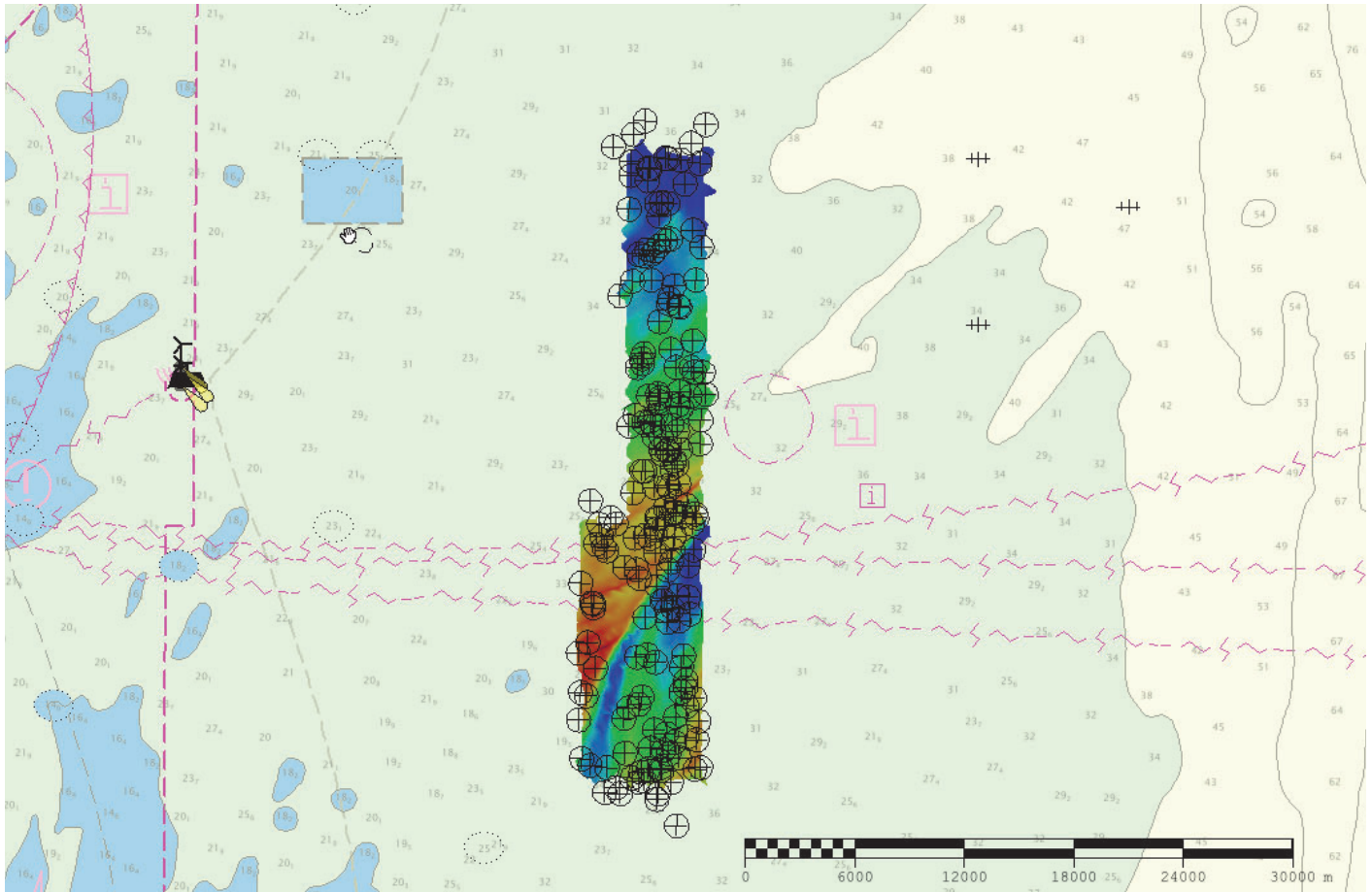
### **B.2.6 Factors Affecting Soundings**

There were no other factors that affected corrections to soundings.

### **B.2.7 Sound Speed Methods**

Sound Speed Cast Frequency: Casts were conducted at the start of acquisition each day and within four hours of each previous cast per HSSD 2021 specifications. S222 conducted casts approximately twice per hour using a Rolls Royce Brooke Ocean Moving Vessel Profiler (MVP) 100. Static casts were conducted from 2903 and 2904 at least every 4 hours using a Seabird SBE 19+ CTD. Variations in surface sound speed were monitored by the survey watch to assess appropriate cast frequency.

A total of 116 sound speed profiles were collected within the survey limits of H13417 and display good spatial diversity (Figure 20). An additional 18 measurements were collected outside the data extents and were included in the master file for processing. These 18 additional profiles provide data representative of the conditions found within the survey area and are appropriate for use. All sound speed profile data were concatenated into a master file for the sheet. MBES data were corrected by applying profiles nearest in distance in time (4 hours) using this master file.



*Figure 20: Overview of all SVP casts taken on H13417.*

## **B.2.8 Coverage Equipment and Methods**

S222 acquired 100% side scan sonar coverage with concurrent multibeam to meet complete coverage requirements on survey H13417, as specified in the project instructions, using a Klein 5000V1 towfish and a Kongsberg EM2040 multibeam system. Both launches 2903 and 2904 were used to acquire complete multibeam coverage using a Kongsberg EM2040 multibeam system.

## **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

All equipment and survey methods were used as detailed in the DAPR. Raw MBES backscatter was flagged as part of the .all file from the Kongsberg EM2040 systems. Backscatter was processed in QPS Fledermaus GeoCoder Toolbox (FMGT) software, and the exported geotiffs are include in the final processed data submission package (Figure 21).

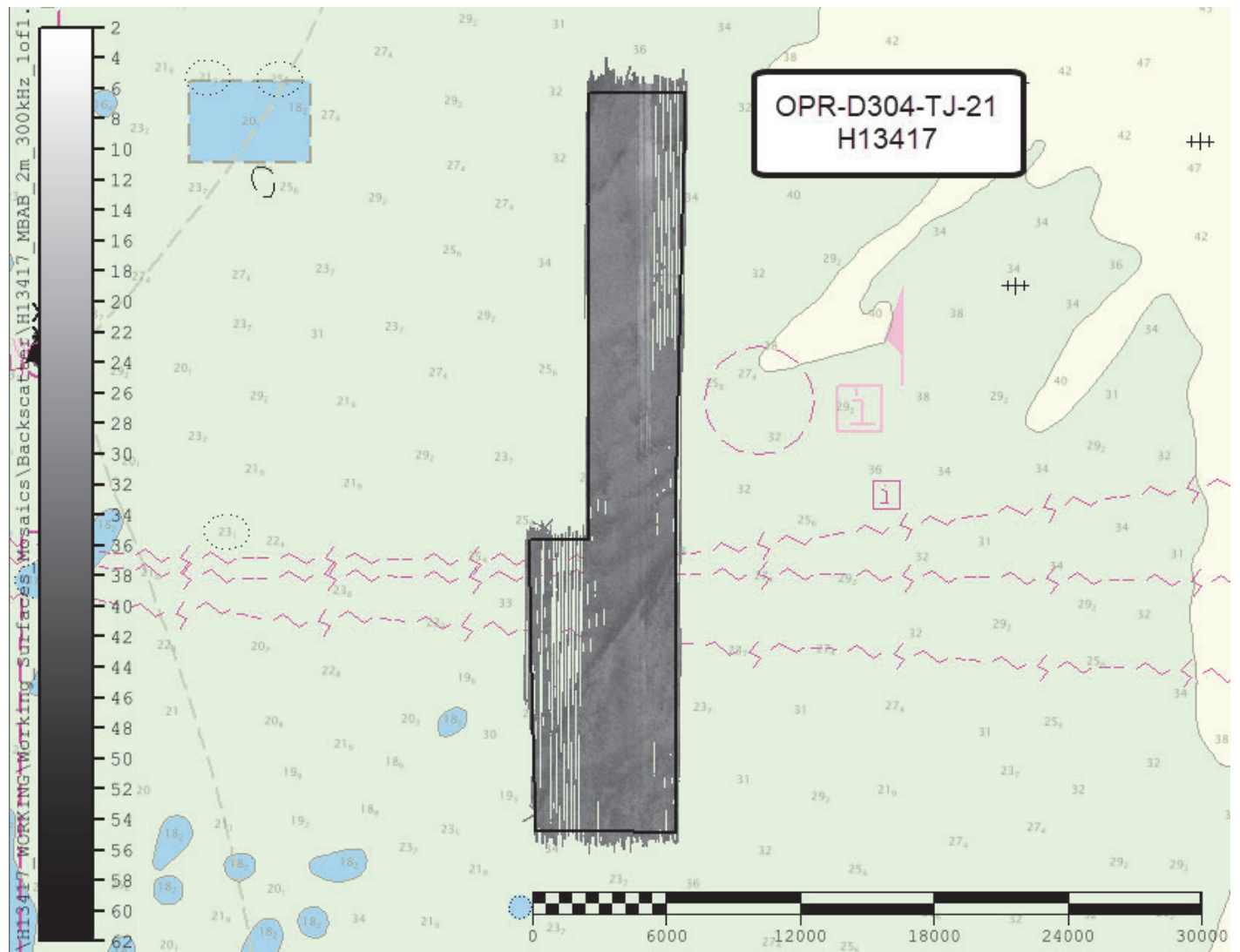


Figure 21: H13417 combined 300kHz backscatter mosaic from S222, 2903, and 2904.

## 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 |
|--------------|------|---------|
|              |      |         |

*Table 10: Primary bathymetric data processing software*

The following Feature Object Catalog was used: NOAA Profile Version 2021.

Information on the Bathymetry Data Processing Software is included in the DAPR. Table 10 was unable to be removed from the exported PDF. The XML DR team has been contacted.

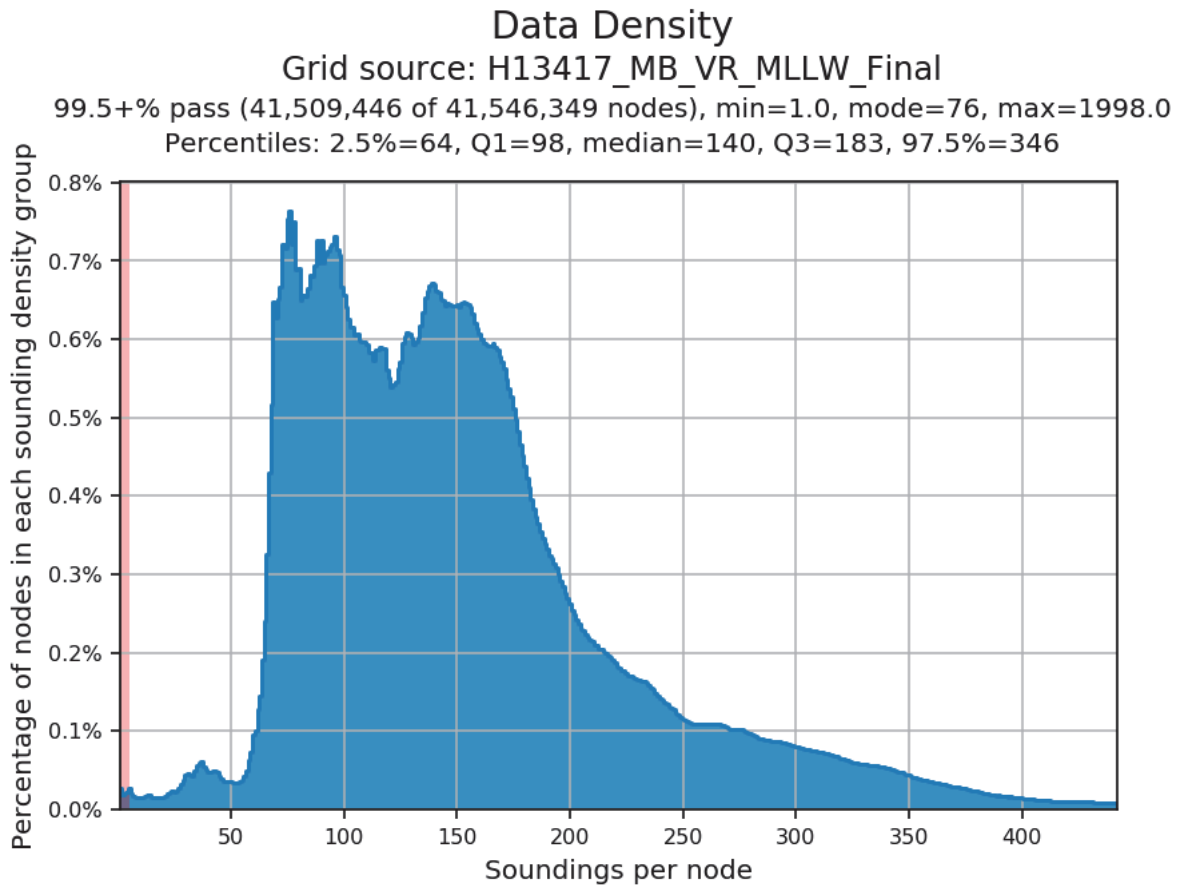
### B.5.2 Surfaces

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

| Surface Name                | Surface Type            | Resolution          | Depth Range               | Surface Parameter | Purpose       |
|-----------------------------|-------------------------|---------------------|---------------------------|-------------------|---------------|
| H13417_MB_VR_MLLW           | CARIS VR Surface (CUBE) | Variable Resolution | 19.2 meters - 41.7 meters | NOAA_VR           | Complete MBES |
| H13417_MB_VR_MLLW_Final     | CARIS VR Surface (CUBE) | Variable Resolution | 19.2 meters - 41.7 meters | NOAA_VR           | Complete MBES |
| H13417_SSSAB_1m_455kHz_1of1 | SSS Mosaic              | 1 meters            | -                         | N/A               | 100% SSS      |
| H13417_MBAB_2m_300kHz_1of1  | MB Backscatter Mosaic   | 2 meters            | -                         | NOAA_2m           | Complete MBES |

*Table 11: Submitted Surfaces*

Complete coverage requirements were met by 100% side scan sonar coverage with concurrent multibeam and complete coverage multibeam as specified under section 5.2.2.3 of the 2021 HSSD. All bathymetric grids for H13417 meet density requirements per the HSSD 2021 (Figure 22). See section A.4 Survey Coverage for a complete discussion on side scan coverage.



*Figure 22: H13417 density statistics*

## C. Vertical and Horizontal Control

Field installed tide and GPS stations were not utilized for this survey. There is no HVCR report included with the submission of H13417.

## 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 | VDatum Area_100m_NAD83-MLLW_geoid12b     |

*Table 12: ERS method and SEP file*

All soundings submitted for H13417 are reduced to MLLW using VDatum techniques as outlined in the DAPR.

## C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD 83).

The projection used for this project is Universal Transverse Mercator (UTM) Zone 18.

The following PPK methods were used for horizontal control:

- RTX

Trimble-RTX service was used with an Applanix POS MVv5 GNSS\_INS system to obtain highly accurate ellipsoidally referenced position data to meet ERS specifications for H13417 MBES data from vessels HSL 2903, HSL 2904, and S222.

### WAAS

The Wide Area Augmentation System (WAAS) was used for real-time horizontal control during data acquisition on vessels S222, HSL 2903, and HSL 2904

## D. Results and Recommendations

### D.1 Chart Comparison

All data from H13417 should supersede charted data. A chart comparison was conducted between survey H13417 and previously charted ENC US3DE01M in accordance with methods outlined in the DAPR.

### 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 |
|----------|----------|---------|-------------------------|------------|
| US3DE01M | 1:419706 | 23      | 06/01/2021              | 06/01/2021 |

*Table 13: Largest Scale ENC's*

### D.1.2 Shoal and Hazardous Features

A chart comparison was conducted between survey H13417 and electronic navigational chart (ENC) US3DE01M in accordance with methods outlined in the DAPR. There were no DTONs to report and all data from H13417 are recommended to supersede charted data.

### D.1.3 Charted Features

One charted obstruction was assigned, investigated, disproved, and is included in the Final Feature File. This obstruction was disproved by complete coverage multibeam with a 200m search radius extending from the center of it's charted location (Figure 23). Nothing significant was located while conducting the search. The hydrographer recommends deleting the obstruction from ENC US3DE01M.

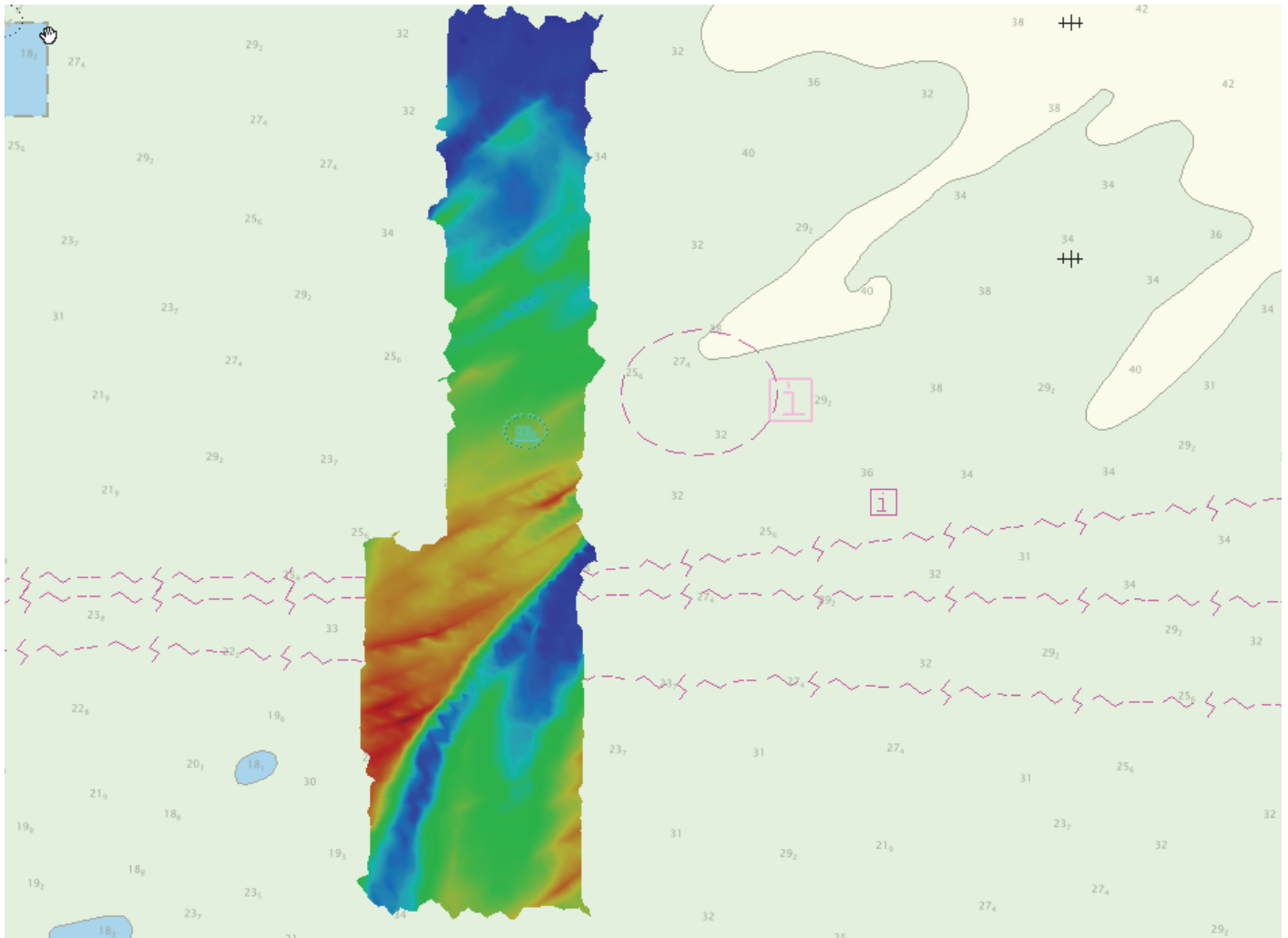


Figure 23: View of assigned obstruction within H13417 sheet limits recommended to be deleted.

#### D.1.4 Uncharted Features

One uncharted feature was identified and investigated (Figures 24 and 25). This feature is located at  $36^{\circ} 51.259641' \text{ N}$ ,  $075^{\circ} 11.513979' \text{ W}$ . Reference the Final Feature File for further information.

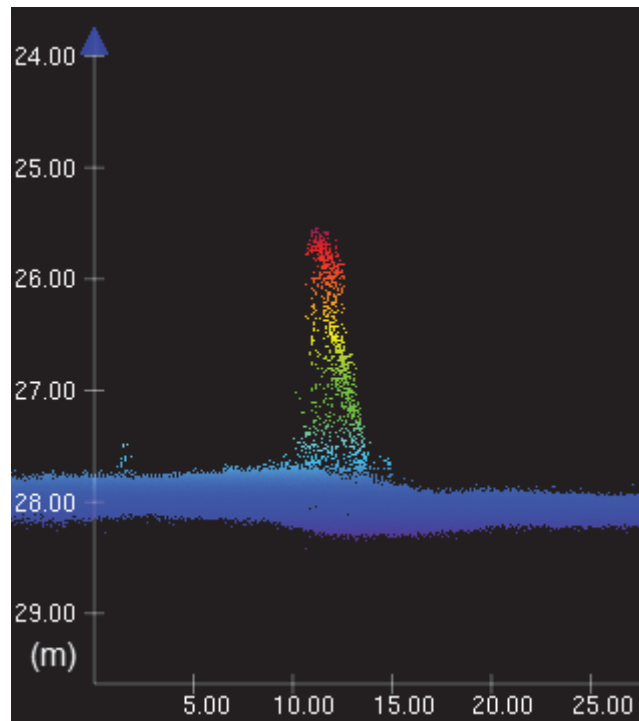


Figure 24: Uncharted Feature in 2D view showing approximately 2m in height.

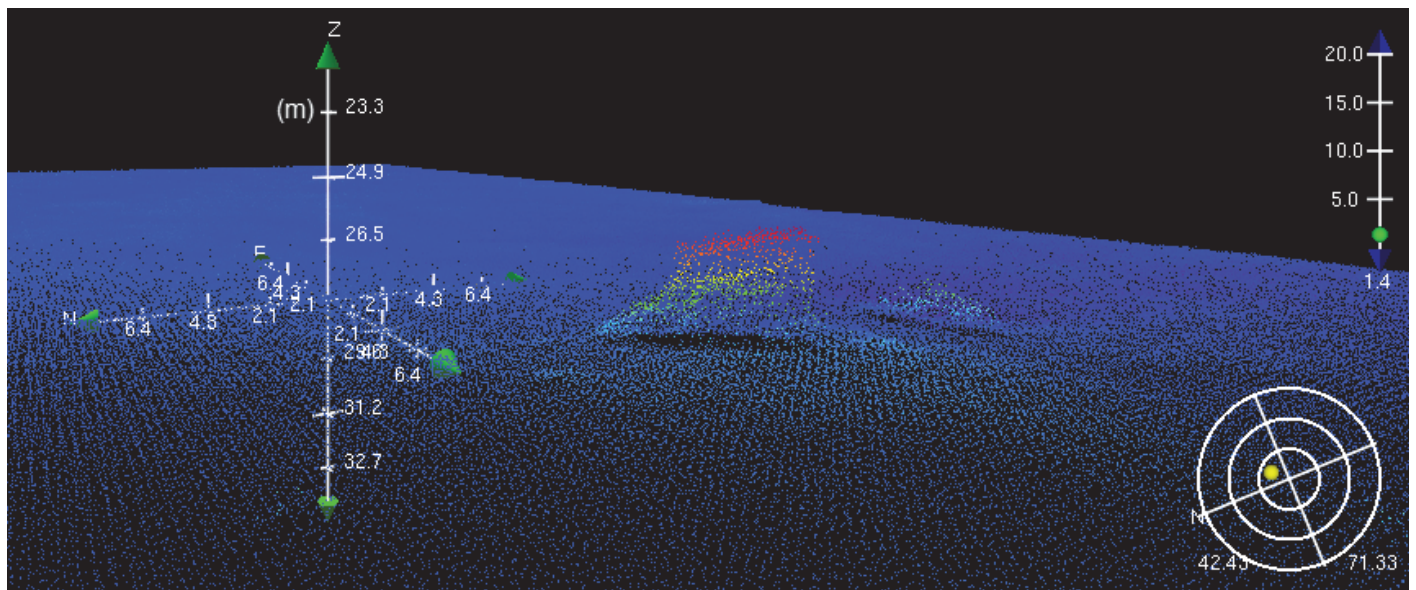


Figure 25: 3D view of uncharted feature.

### D.1.5 Channels

No channels exist for this survey. There are no designated anchorages, precautionary areas, safety fairways, traffic separation schemes, pilot boarding areas, or channel and range lines within the survey limits.



## 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

Bottom Samples were assigned, investigated, and are included in the Final Feature File. One additional bottom sample location was added after backscatter analysis indicated a dynamic bottom type in need of investigation (Figure 26).

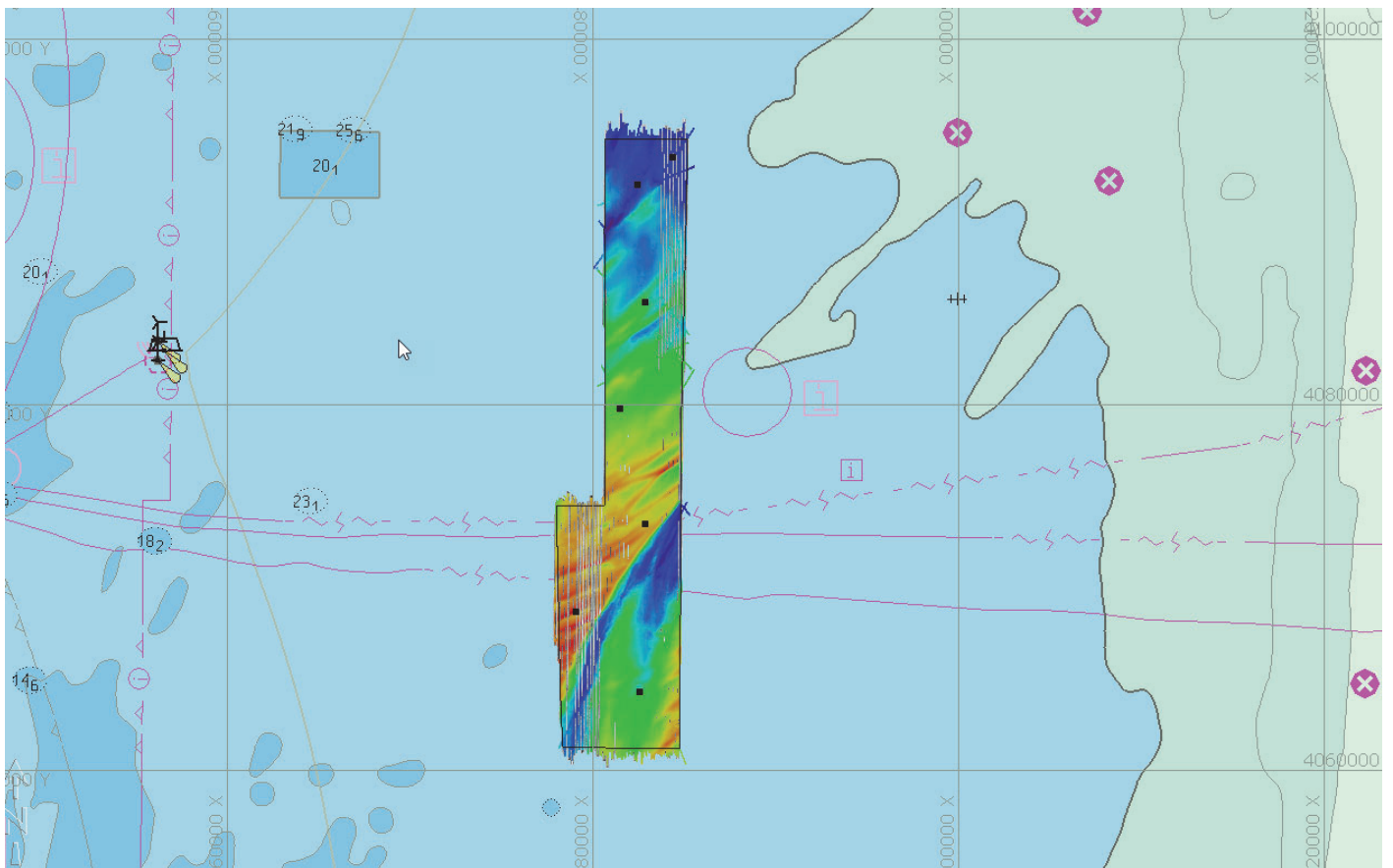


Figure 26: H13417 revised bottom sample plan plotted over H13417 1m surface.



**D.2.4 Overhead Features**

No overhead features exist for this survey.

**D.2.5 Submarine Features**

No submarine features exist for this survey.

**D.2.6 Platforms**

No platforms exist for this survey.

**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**

No present or planned construction or dredging exist within the survey limits.

**D.2.10 New Survey Recommendations**

No new surveys or further investigations are recommended for this 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  |
|-------------------------------|--------------------------|---------------|--|
| Matthew Jaskoski,<br>CDR/NOAA | Commanding Officer       | 08/27/2021    | <br>JASKOSKI.MATTHEW.J<br>ACOB.1275636262<br>2021.08.30 08:44:44<br>-04'00'                               |
| Michelle Levano,<br>LT/NOAA   | Field Operations Officer | 08/27/2021    | <br>Digitally signed by<br>LEVANO.MICHELLE.MARIE.<br>1516645888<br>Date: 2021.08.30 11:03:19<br>-04'00' |
| Douglass Wood                 | Chief Survey Technician  | 08/27/2021    | WOOD.DOUGLA<br>S.ALAN.1282580<br>698<br>Digitally signed by<br>WOOD.DOUGLAS.ALAN.128<br>2580698<br>Date: 2021.08.31 13:28:01<br>-04'00'  |
| Mark Meadows,<br>ENS/NOAA     | Sheet Manager            | 08/27/2021    | MEADOWS.MA<br>RK.1571877895<br>Digitally signed by<br>MEADOWS.MARK.157187<br>7895<br>Date: 2021.08.29 10:05:01<br>-04'00'  |

## F. Table of Acronyms

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

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

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



OPS.Thomas Jefferson - NOAA Service Account <ops.thomas.jefferson@noaa.gov>

---

## For Submission: OPR-D304-TJ-H1316 Survey Outline

4 messages

---

**OPS.Thomas Jefferson - NOAA Service Account** <ops.thomas.jefferson@noaa.gov> Fri, May 28, 2021 at 10:51 AM

To: \_NOS OCS Survey Outlines <survey.outlines@noaa.gov>

Cc: "ChiefST.Thomas Jefferson - NOAA Service Account" <chiefst.thomas.jefferson@noaa.gov>, Surafel Abebe - NOAA Federal <surafel.abebe@noaa.gov>, Mark Meadows - NOAA Federal <mark.meadows@noaa.gov>

Good Afternoon,

Attached is the survey outline for OPR-D304-TJ-21, registry number H14317.

Please do not hesitate to contact me if you have any questions, comments, or concerns.

Very Respectfully,  
LTJG Michelle Levano

--

Operations Officer, NOAA Ship *Thomas Jefferson*

Ship Land Line: 757-441-6322

Ship Cell: 757-647-0187

Ship Iridium: 808-434-2706

---

 **H13417\_SurveyOutline.000**  
15K

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**Brian Mohr - NOAA Federal** <brian.mohr@noaa.gov> Fri, May 28, 2021 at 11:46 AM

To: "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Cc: \_NOS OCS Survey Outlines <survey.outlines@noaa.gov>, "ChiefST.Thomas Jefferson - NOAA Service Account" <chiefst.thomas.jefferson@noaa.gov>, Surafel Abebe - NOAA Federal <surafel.abebe@noaa.gov>, Mark Meadows - NOAA Federal <mark.meadows@noaa.gov>

can I get confirmation on this survey number outline?

b

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---

**ChiefST.Thomas Jefferson - NOAA Service Account** <chiefst.thomas.jefferson@noaa.gov> Tue, Jun 1, 2021 at 7:30 AM

To: Brian Mohr - NOAA Federal <brian.mohr@noaa.gov>

Cc: "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>, \_NOS OCS Survey Outlines <survey.outlines@noaa.gov>, Surafel Abebe - NOAA Federal <surafel.abebe@noaa.gov>, Mark Meadows - NOAA Federal <mark.meadows@noaa.gov>

Good morning,

The survey number is H13417. Sorry for the confusion!

Best,  
Erin

[Quoted text hidden]

--

CHST Erin Cziraki, NOAA

NOAA Ship *Thomas Jefferson*

757-647-0187 ship cell

541-867-8927 voip

808-434-2706 iridium



---

**OPS.Thomas Jefferson - NOAA Service Account** <ops.thomas.jefferson@noaa.gov>  
To: "CO.Thomas Jefferson - NOAA Service Account" <CO.thomas.jefferson@noaa.gov>

Fri, Jun 4, 2021 at 9:10 AM

[Quoted text hidden]

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 **H13417\_SurveyOutline.000**  
15K



OPS.Thomas Jefferson - NOAA Service Account <ops.thomas.jefferson@noaa.gov>

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## OPR-D304-TJ-21 Wavier Request

4 messages

---

**OPS.Thomas Jefferson - NOAA Service Account** <ops.thomas.jefferson@noaa.gov> Sat, Jun 26, 2021 at 5:57 AM  
To: Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>, Surafel Abebe - NOAA Federal <surafel.abebe@noaa.gov>  
Cc: "CO.Thomas Jefferson - NOAA Service Account" <CO.thomas.jefferson@noaa.gov>, "ChiefST.Thomas Jefferson - NOAA Service Account" <chiefst.thomas.jefferson@noaa.gov>, Matthew Chonka - NOAA Federal <matthew.chonka@noaa.gov>, Chloe Arboleda - NOAA Federal <chloe.arboleda@noaa.gov>, Mark Meadows - NOAA Federal <mark.meadows@noaa.gov>, Audrey Jerauld - NOAA Federal <audrey.jerauld@noaa.gov>

Good Morning Martha and Surafel,


Attached is a waiver for OPR-D304-TJ-21 for the project to be acquired and submitted under the 2021 HSSD.

Please do not hesitate to contact me if you have any questions, comments, or concerns.

Very Respectfully,  
LTJG Michelle Levano

--  
LTJG Michelle Levano, NOAA  
Operations Officer, NOAA Ship *Thomas Jefferson*  
Ship Land Line: 757-441-6322  
Ship Cell: 757-647-0187  
Ship Iridium: 808-434-2706

---

 **OPR-D304-TJ-21\_HSSD2021 Wavier.pdf**  
149K

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**Surafel Abebe - NOAA Federal** <surafel.abebe@noaa.gov> Fri, Jul 2, 2021 at 11:01 AM  
To: "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <CO.thomas.jefferson@noaa.gov>, "ChiefST.Thomas Jefferson - NOAA Service Account" <chiefst.thomas.jefferson@noaa.gov>  
Cc: Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>, Matthew Chonka - NOAA Federal <matthew.chonka@noaa.gov>, Chloe Arboleda - NOAA Federal <chloe.arboleda@noaa.gov>, Mark Meadows - NOAA Federal <mark.meadows@noaa.gov>, Audrey Jerauld - NOAA Federal <audrey.jerauld@noaa.gov>, HSD Chief Ops - NOAA Service Account <hsd.chief.ops@noaa.gov>

Good morning TJ,

I want to let you know that I attached signed waiver letter.

Sincerely,

Surafel  
[Quoted text hidden]

--

**Surafel Abebe**, (He/His) Physical Scientist.

NOAA/NOS/Office of Coastal Survey (OCS)

Hydrographic Surveys Division (HSD)

Operation Branch

Current work hours: **6AM - 3PM EDT**


1315 East West Highway

Silver Spring, MD 20910

SSMC3, Station 6205

[surafel.abebe@noaa.gov](mailto:surafel.abebe@noaa.gov)

---

 **OPR-D304-TJ-21\_HSSD2021 Wavier Signed.pdf**  
184K

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**OPS.Thomas Jefferson - NOAA Service Account** <ops.thomas.jefferson@noaa.gov> Mon, Jul 5, 2021 at 9:14 AM

To: Surafel Abebe - NOAA Federal <surafel.abebe@noaa.gov>

Cc: "CO.Thomas Jefferson - NOAA Service Account" <CO.thomas.jefferson@noaa.gov>, "ChiefST.Thomas Jefferson - NOAA Service Account" <chiefst.thomas.jefferson@noaa.gov>, Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>, Matthew Chonka - NOAA Federal <matthew.chonka@noaa.gov>, Chloe Arboleda - NOAA Federal <chloe.arboleda@noaa.gov>, Mark Meadows - NOAA Federal <mark.meadows@noaa.gov>, Audrey Jerauld - NOAA Federal <audrey.jerauld@noaa.gov>, HSD Chief Ops - NOAA Service Account <hsd.chief.ops@noaa.gov>

Good Morning Surafel,

Received, thank you!

Very Respectfully,  
Michelle

[Quoted text hidden]

---

**OPS.Thomas Jefferson - NOAA Service Account** <ops.thomas.jefferson@noaa.gov> Mon, Jul 5, 2021 at 9:16 AM

To: Mark Meadows - NOAA Federal <mark.meadows@noaa.gov>, Matthew Chonka - NOAA Federal <matthew.chonka@noaa.gov>, "Cook, Natalie A" <nac1050@wildcats.unh.edu>

Cc: "ChiefST.Thomas Jefferson - NOAA Service Account" <chiefst.thomas.jefferson@noaa.gov>

Mark, Matt, and Natalie,

Please download this email thread, and save the attached memo in the following location for your surveys:

[G:\OPR-D304-TJ-21\HXXXXX\Processed\Reports\Project\Project\\_Correspondence](G:\OPR-D304-TJ-21\HXXXXX\Processed\Reports\Project\Project_Correspondence)

Please do not hesitate to contact me if you have any questions, comments, or concerns.

Very Respectfully,  
Michelle

[Quoted text hidden]

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 **OPR-D304-TJ-21\_HSSD2021 Wavier Signed.pdf**  
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**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
 Office of Marine and Aviation Operations  
 NOAA Ship *Thomas Jefferson* (S222)  
 439 West York Street Norfolk, VA 23510

Date: 6/26/2021

MEMORANDUM FOR: Surafel Abebe  
 Project Manager, OPR-D304-TJ-21  
 Hydrographic Surveys Division Operations Branch

FROM: Commander Briana W. Hillstrom, NOAA  
 Commanding Officer, NOAA Ship *Thomas Jefferson*

*Briana Welton Hillstrom*

Digitally signed by  
 HILLSTROM.BRIANA.WELTON.  
 1267667531  
 Date: 2021.06.26 05:44:58 -04'00'

SUBJECT: Waiver request – 2021 Hydrographic Survey Specifications and Deliverables

*Thomas Jefferson* requests a waiver from the project instructions for OPR-D304-TJ-21 to acquire and submit these surveys under the 2021 Hydrographic Survey Specifications and Deliverables (HSSD).

Justification

OPR-D304-TJ-21 lists the 2020 HSSD as supporting documentation, and was assigned prior to the release of the 2021 HSSD. Acquiring and submitting OPR-D304-TJ-21 survey data would streamline procedures onboard.

Decision

ABEBE.SURAFEL.  
 ASEFA.1516610634

Digitally signed by  
 ABEBE.SURAFEL.ASEFA.15166  
 10634  
 Date: 2021.06.28 06:16:20 -04'00'

Waiver is: Granted

Denied

cc: Chief, HSD OPS  
 OPS, *Thomas Jefferson*  
 HCST, *Thomas Jefferson*





OPS.Thomas Jefferson - NOAA Service Account <ops.thomas.jefferson@noaa.gov>

---

## For Submission: THOMAS JEFFERSON Marine Mammal Trained Observers

1 message

---

**OPS.Thomas Jefferson - NOAA Service Account** <ops.thomas.jefferson@noaa.gov> Sat, Jul 24, 2021 at 10:14 AM

To: \_NOS OCS ECC <ocs.ecc@noaa.gov>

Cc: Allegra Menniti - NOAA Federal <allegra.menniti@noaa.gov>, "ChiefST.Thomas Jefferson - NOAA Service Account" <chiefst.thomas.jefferson@noaa.gov>

Good Morning,

Attached is the list of trained Marine mammal observers onboard *Thomas Jefferson*.

Please do not hesitate to contact me if you have any questions, comments, or concerns.

Very Respectfully,  
Michelle

--

LT Michelle Levano, NOAA  
Operations Officer, NOAA Ship *Thomas Jefferson*  
439 W. York Street Norfolk, VA 23510  
Ship Land Line: 757-441-6322  
Ship Cell: 757-647-0187  
Ship Iridium: 808-434-2706

Follow NOAA Ship Thomas Jefferson on Facebook  
<https://www.facebook.com/NOAAShipThomasJefferson>

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 **Marine Mammals Training 2021.pdf**  
34K

# Marine Mammals Sign-up Sheet

When: 0833 March 3rd 2021

Where: MESS

Instructor: Julia Waldsmith

Pre-Reqs/Notes:

Questions:

Topics Covered:

- |                              |                     |
|------------------------------|---------------------|
| 1. <u>Chloe Arboleda</u>     | 21. Joshua Thompson |
| 2. <u>Mark Meadows</u>       | 22. Briana Hullston |
| 3. <u>Erin Cziraki</u>       | 23. MIKEL MENDON    |
| 4. <u>BRETT TOWNSEND</u>     | 24. ALLEGRA MENNUTI |
| 5. <u>OTIS TATE</u>          | 25. JUSTIN WITMER   |
| 6. <u>THOMAS BASCOM</u>      |                     |
| 7. <u>Bernard Poeser</u>     |                     |
| 8. <u>Matthow CHONKA</u>     |                     |
| 9. <u>CALANDRIA DECASTRO</u> |                     |
| 10. <u>JULIA WALDSMITH</u>   |                     |
| 11. <u>Patrick Faha</u>      |                     |
| 12. <u>AIZLIE PICKET</u>     |                     |
| 13. <u>JUSTIN BLANCHER</u>   |                     |
| 14. <u>Michael L. Isai</u>   |                     |
| 15. <u>Francine Grains</u>   |                     |
| 16. <u>Aceton Barko</u>      |                     |
| 17. <u>Patrick O'Brien</u>   |                     |
| 18. <u>Kevin Branch</u>      |                     |
| 19. Adam Martinez            |                     |
| 20. Seth George              |                     |





ChiefST.Thomas Jefferson - NOAA Service Account <chiefst.thomas.jefferson@noaa.gov>

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## OPR-D304-TJ-21 NCEI Data Submission

1 message

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**ChiefST.Thomas Jefferson - NOAA Service Account** <chiefst.thomas.jefferson@noaa.gov> Sat, Jul 24, 2021 at 10:29 AM

To: NODC.submissions@noaa.gov

Cc: Surafel Abebe - NOAA Federal <surafel.abebe@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>, "ChiefST.Thomas Jefferson - NOAA Service Account"

<chiefst.thomas.jefferson@noaa.gov>, Mark Meadows - NOAA Federal <mark.meadows@noaa.gov>, Matthew Chonka - NOAA Federal <matthew.chonka@noaa.gov>

Good morning,

Attached are the NCEI files for submission for OPR-D304-TJ-21 sheets H13416, H13417, and H13423. We will submit additional files for the sheet that is still open at the end of the project. Please let me know if you have any questions.

V/r,  
Erin

--

CHST Erin Cziraki, NOAA

NOAA Ship *Thomas Jefferson*

757-647-0187 ship cell

541-867-8927 voip

808-434-2706 iridium



**OPR-D304-TJ-21\_20210724.zip**  
2285K

APPROVAL PAGE

H13417

The survey data meet or exceed the current requirements of the Office of Coast Survey hydrographic data review process and may be used to update NOAA products. The following survey products will be archived at the National Centers for Environmental Information:

- Descriptive Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Collection of acoustic backscatter mosaics
- Bottom samples
- Geospatial PDF of survey products

Approved: \_\_\_\_\_

**Commander Meghan McGovern, NOAA**  
Chief, Atlantic Hydrographic Branch