

H12773

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

**DESCRIPTIVE REPORT**

Type of Survey: Navigable Area

Registry Number: H12773

**LOCALITY**

State(s): South Carolina

General Locality: South East Atlantic Ocean

Sub-locality: 8 NM Southeast of Charleston Harbor Channel Buoy

**2015**

CHIEF OF PARTY  
Captain Shepard M. Smith, NOAA

LIBRARY & ARCHIVES

Date:

**HYDROGRAPHIC TITLE SHEET**

**H12773**

**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): **South Carolina**

General Locality: **South East Atlantic Ocean**

Sub-Locality: **8 NM Southeast of Charleston Harbor Channel Buoy**

Scale: **20000**

Dates of Survey: **10/22/2015 to 10/30/2015**

Instructions Dated: **04/09/2015**

Project Number: **OPR-G380-TJ-15**

Field Unit: **NOAA Ship Thomas Jefferson**

Chief of Party: **Captain Shepard M. Smith, NOAA**

Soundings by: **Multibeam Echo Sounder**

Imagery by: **Side Scan Sonar**

Verification by: **Atlantic Hydrographic Branch**

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

Remarks:

*The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via <https://www.ncei.noaa.gov/>.*

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## Descriptive Report to Accompany Survey H12773

Project: OPR-G380-TJ-15

Locality: South East Atlantic Ocean

Sublocality: 8 NM Southeast of Charleston Harbor Channel Buoy

Scale: 1:20000

October 2015 - October 2015

**NOAA Ship Thomas Jefferson**

Chief of Party: Captain Shepard M. Smith, NOAA

### A. Area Surveyed

H12773 is in the proximity of the approaches to Charleston harbor located approximately 12 NM Southeast of Charleston Harbor. Figure 1 shows the general locality of the survey data submitted in correlation with survey H12773.

#### A.1 Survey Limits

Data were acquired within the following survey limits:

<b>Northwest Limit</b>	<b>Southeast Limit</b>
32° 36' 37.58" N 79° 29' 40.14" W	32° 30' 29.79" N 79° 21' 43.5" W

*Table 1: Survey Limits*

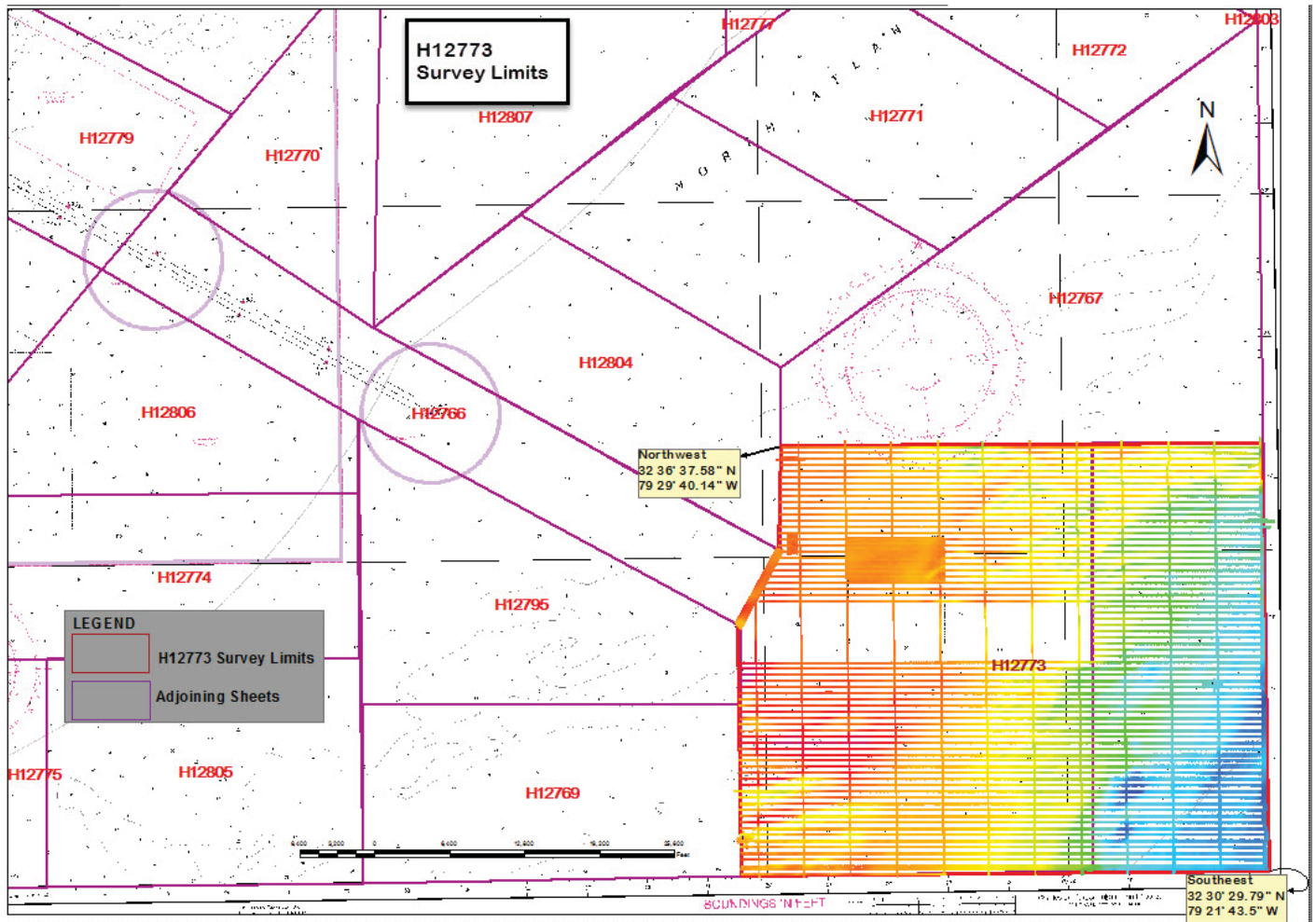


Figure 1: H12773 survey limits plotted over RNC 11528

Survey limits were acquired in accordance with the requirements in the Project Instructions and the HSSD.

## A.2 Survey Purpose

This project is being conducted in support of NOAA's Office of Coast Survey to provide contemporary hydrographic data in support of a new nautical chart in this area and in response to a harbor deepening project in the Port of Charleston which will better serve deeper draft ships transiting the area. This project was identified as priority 1 in the Project Instructions.

## A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Although no holidays exists within the survey data, small surface sound velocity busts occurred on several lines due to adverse environmental conditions during survey operations.



There was an ERS bust on line XL\_295\_907\_1601 which necessitated a re-run of the line resulting in line XL\_303\_647\_0548. A surface comparison using the two crosslines showed no significant improvement in the quality of the line.

Another anomaly was discovered in DN 297 on lines 297\_148\_1615 and 297\_148\_1635. It was discovered during processing that a vertical offsets of 50cm occurred at some points between these lines and crosslines and may probably be due to ERS busts. No significant features are associated with the ERS bust or in the SSS. Survey still meets specifications.

A scour area was discovered during processing. A least depth of 21.94 was determined and included as a designated sounding. No splits were run to develop the area further.

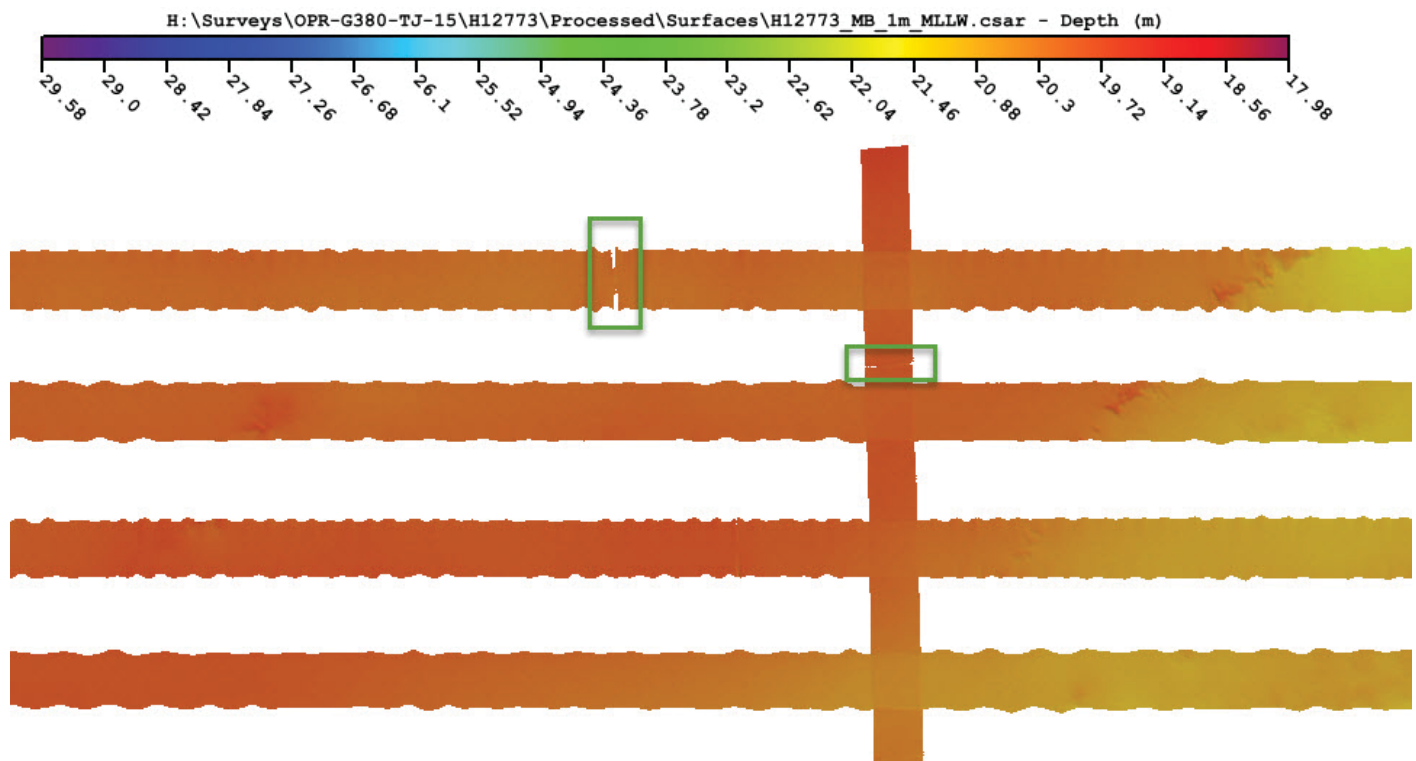


Figure 2: H12773 - SV Busts depicted in green box

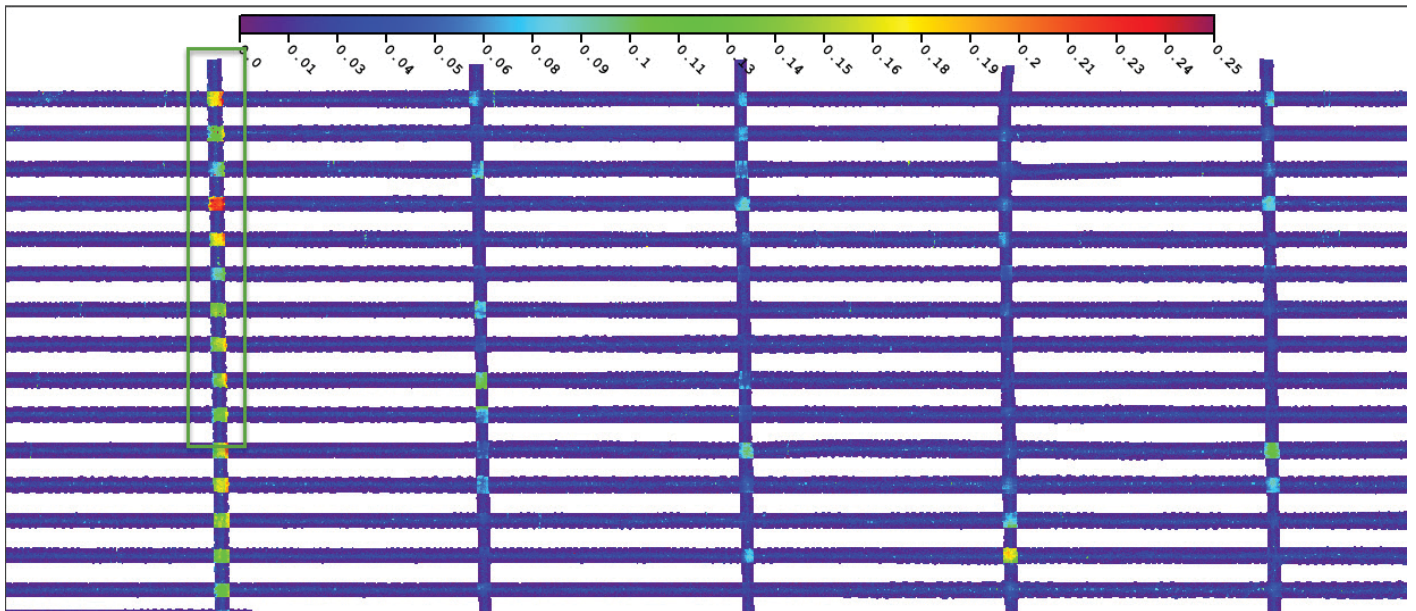


Figure 3: ERS Bust - XL\_295\_907\_1601 shown in Node Std Dev layer

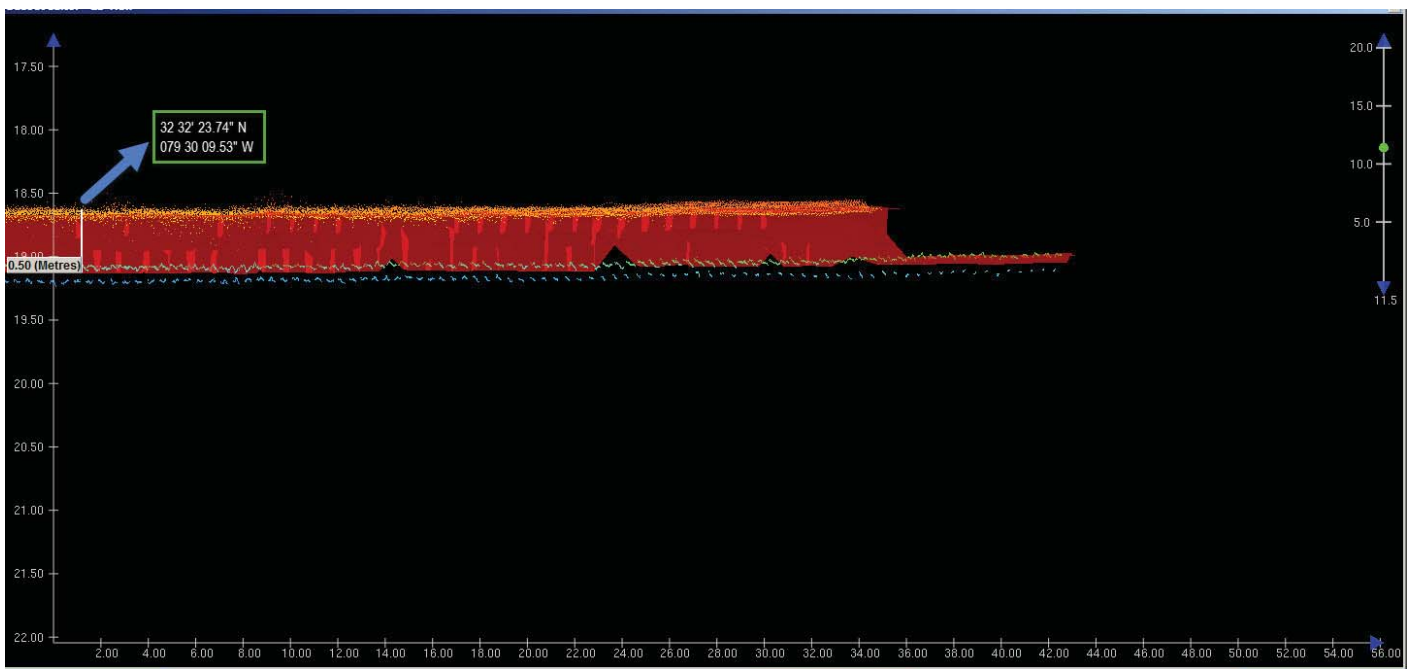
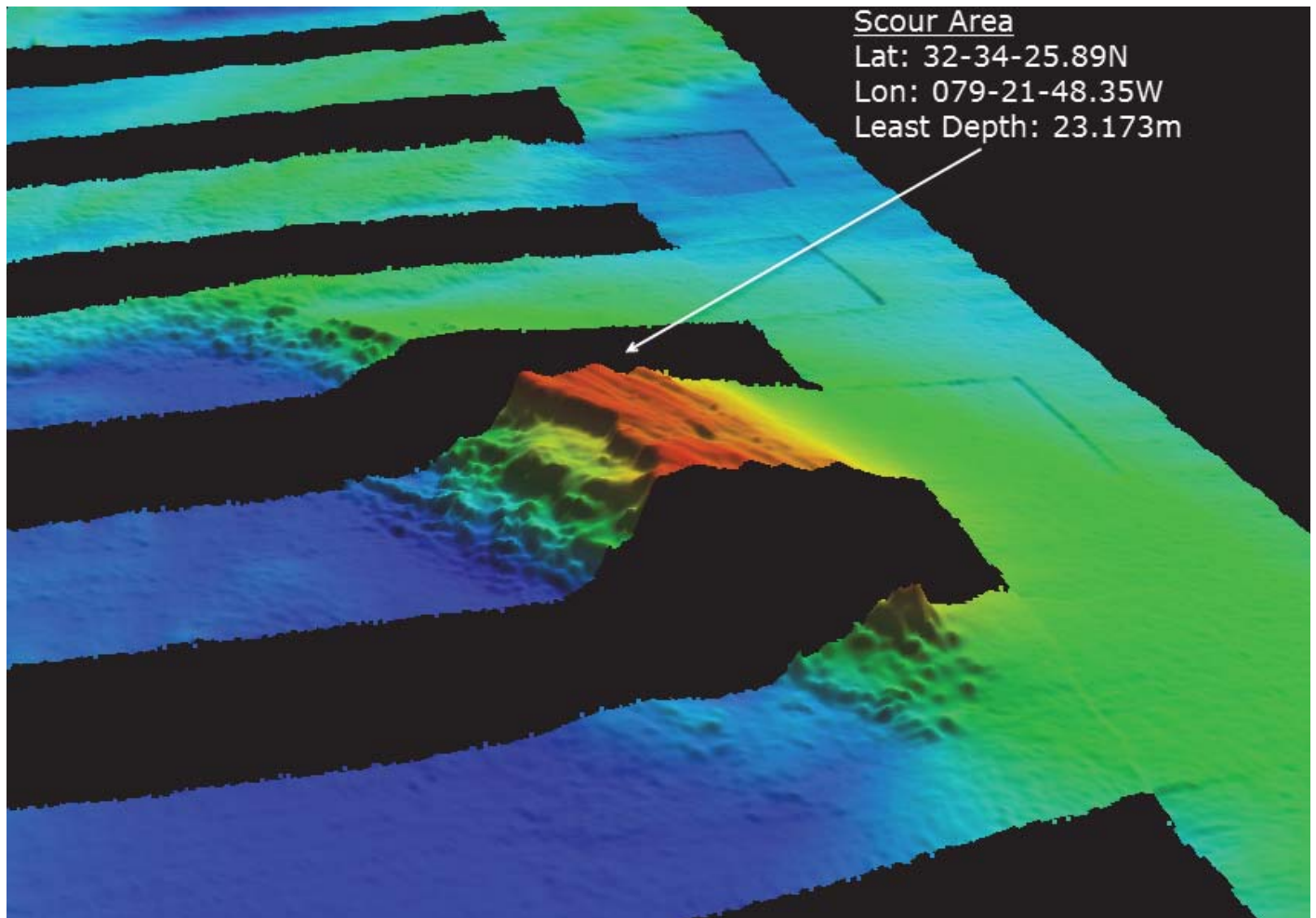
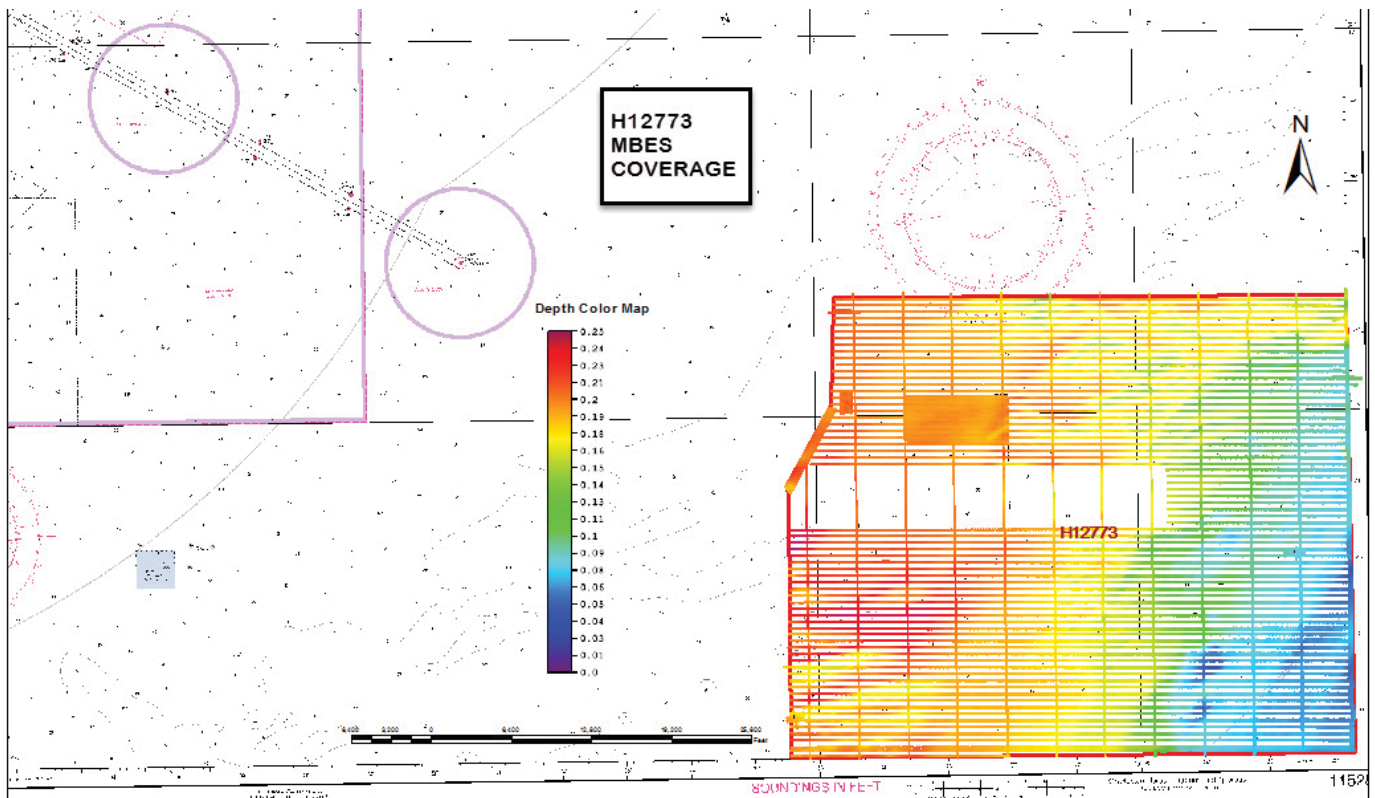


Figure 4: ERS Bust - 297\_148\_1615



*Figure 5: Scour Area - Line 296\_124\_2113*

## A.4 Survey Coverage



*Figure 6: H12773 MBES COVERAGE*

Survey coverage was in accordance with the requirements in the Project Instructions and the HSSD.

## A.5 Survey Statistics

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

	<b>HULL ID</b>	<i>S222</i>	<i>Total</i>
<b>LNM</b>	<b>SBES Mainscheme</b>	0	0
	<b>MBES Mainscheme</b>	15.3	15.3
	<b>Lidar Mainscheme</b>	0	0
	<b>SSS Mainscheme</b>	0	0
	<b>SBES/SSS Mainscheme</b>	0	0
	<b>MBES/SSS Mainscheme</b>	494.5	494.5
	<b>SBES/MBES Crosslines</b>	70.3	70.3
	<b>Lidar Crosslines</b>	0	0
<b>Number of Bottom Samples</b>			0
<b>Number of AWOIS Items Investigated</b>			0
<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>			52.59

*Table 2: 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>
10/22/2015	295
10/23/2015	296
10/24/2015	297
10/25/2015	298
10/29/2015	302
11/30/2015	334

*Table 3: 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>	<i>S222</i>
<b>LOA</b>	208 feet
<b>Draft</b>	15 feet

*Table 4: Vessels Used*

NOAA Ship Thomas Jefferson acquired multibeam soundings and backscatter data. The Ship also collected side scan sonar imagery, sound velocity profiles, surface sound velocity readings and attitude and position data.

## 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>
RESON	7125 SV2	MBES
RESON	SVP 70	SOUND SPEED
RESON	7125 ROV	MBES
KLEIN	5000 V2	SSS
APPLANIX	POS MV v 5	POSITIONING & ATTITUDE
TRIMBLE	SPS 351	POSITIONING
ROLLS ROYCE-BROOKE OCEAN TECHNOLOGIES	MOVING VESSEL PROFILER 100	SOUND SPEED
AML OCEANOGRAPHIC	AML SMART SV & P PROBE	SOUND SPEED

*Table 5: Major Systems Used*

## B.2 Quality Control

### B.2.1 Crosslines

Crosslines acquired for this survey totaled 14% of mainscheme acquisition.

Total Crosslines acquired during survey made up approximately 14.2% of total mainscheme lines. NOAA Ship Thomas Jefferson acquired 70.3 linear nautical miles of MBES crosslines which translated to 14.2% of mainscheme MBES data acquired. A statistical comparison analysis using Caris HIPS/SIPS was made using the difference between the 1m mainscheme and crossline grids. Out of 3,848,470 nodes, there was an observed mean of 0.034m and a standard deviation of 0.154m. Based on the percentage of crosslines and the statistical difference, H12773 is in compliance with section 5.2.4.3 of the HSSD (2015 ed).

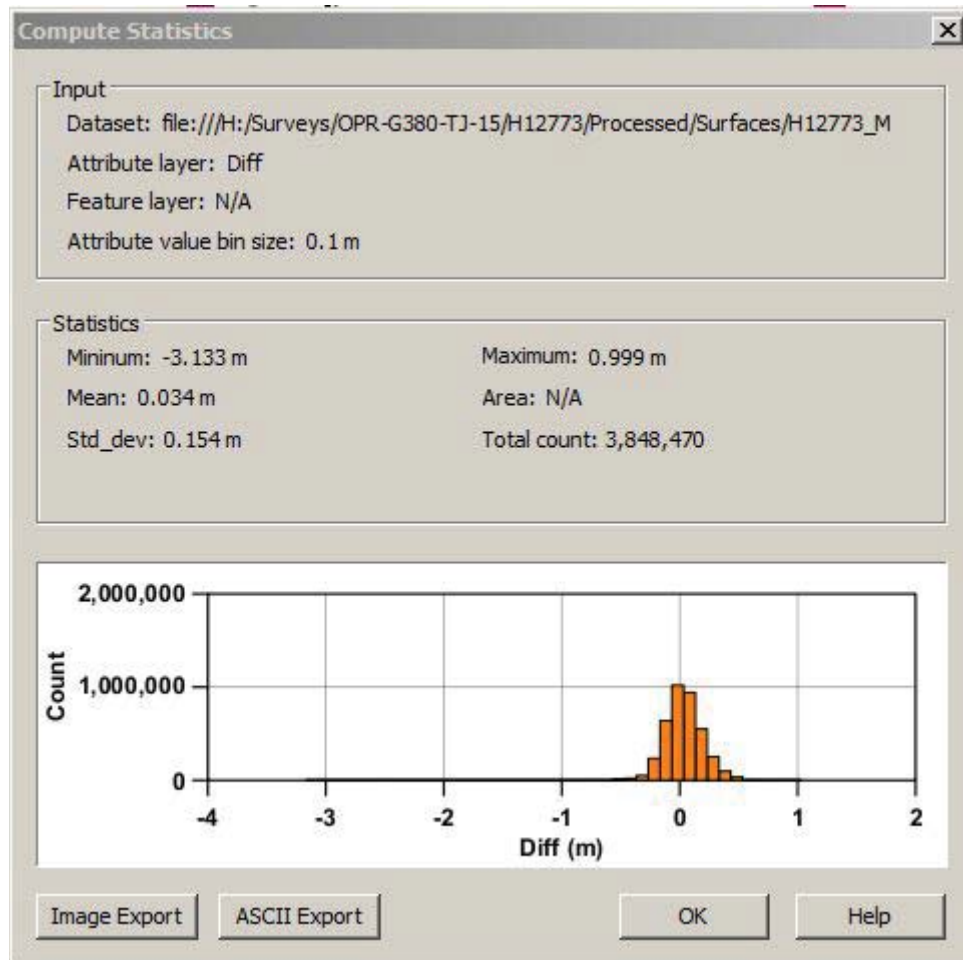


Figure 7: H12773\_XL\_MS\_Difference

### B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning
0.0 meters	0.125 meters

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
S222	4 meters/second	1 meters/second	0.2 meters/second

Table 7: Survey Specific Sound Speed TPU Values



Uncertainty Standards were calculated using the Pydro64 (v5092) Contribs "Finalized CSAR QA" script. Results are listed: H12773 has > 99.99% nodes with uncertainty less than IHO error. 72,694,311 nodes passed out of 72,694,557 total nodes.

Object Detection Coverage was calculated using the Pydro64 (v5092) Contribs "Finalized CSAR QA" script. Results are listed: H12773 has 99.40% nodes with uncertainty less than IHO error. 72,226,826 nodes passed out of 72,694,557 total nodes.

Total Propagated Uncertainty values for survey H12773 were derived using a combination of real time uncertainties for vessel motion, a priori of values for equipment and vessel characteristics, assigned values for tidal datum uncertainties, and field assigned values for sound speed uncertainties. The realtime uncertainties for vessel motion include roll, pitch, gyro, navigation, and elevation. The uncertainties in these measurements were recorded as part of the POSPac 5P ERS solution and were applied to the soundings via an SBET RMS file generated by Applanix POSPac per Chapter 3.4.2.1.1 of the NOAA Field Procedures Manual (2014 ed). The NOAA ship THOMAS JEFFERSON employed a subscription service, "Marinestar", to generate real-time correctors for position and vertical heights broadcast over the L-Band from a geosynchronous orbital satellite. Uncertainties for sonar mounting and vessel speed were assigned using the a priori values found in Chapter 4 of the NOAA Field Procedures Manual (2014 ed). These values were applied to the data via the CARIS HIPS Hydrographic Vessel File. The uncertainty associated with sound speed measurements were based on the frequency and location of CTD and MVP casts in accordance with Appendix 4 of the FPM (2014 ed).

## Uncertainty Standards

H12773\_MB\_1m\_MMLW\_FINAL.csar: >99.9% nodes pass (72694311/72694557)

min=0.44, 5%=0.55, mode=0.56, 25%=0.57, median=0.58, 75%=0.59, 95%=0.61, max=2.44

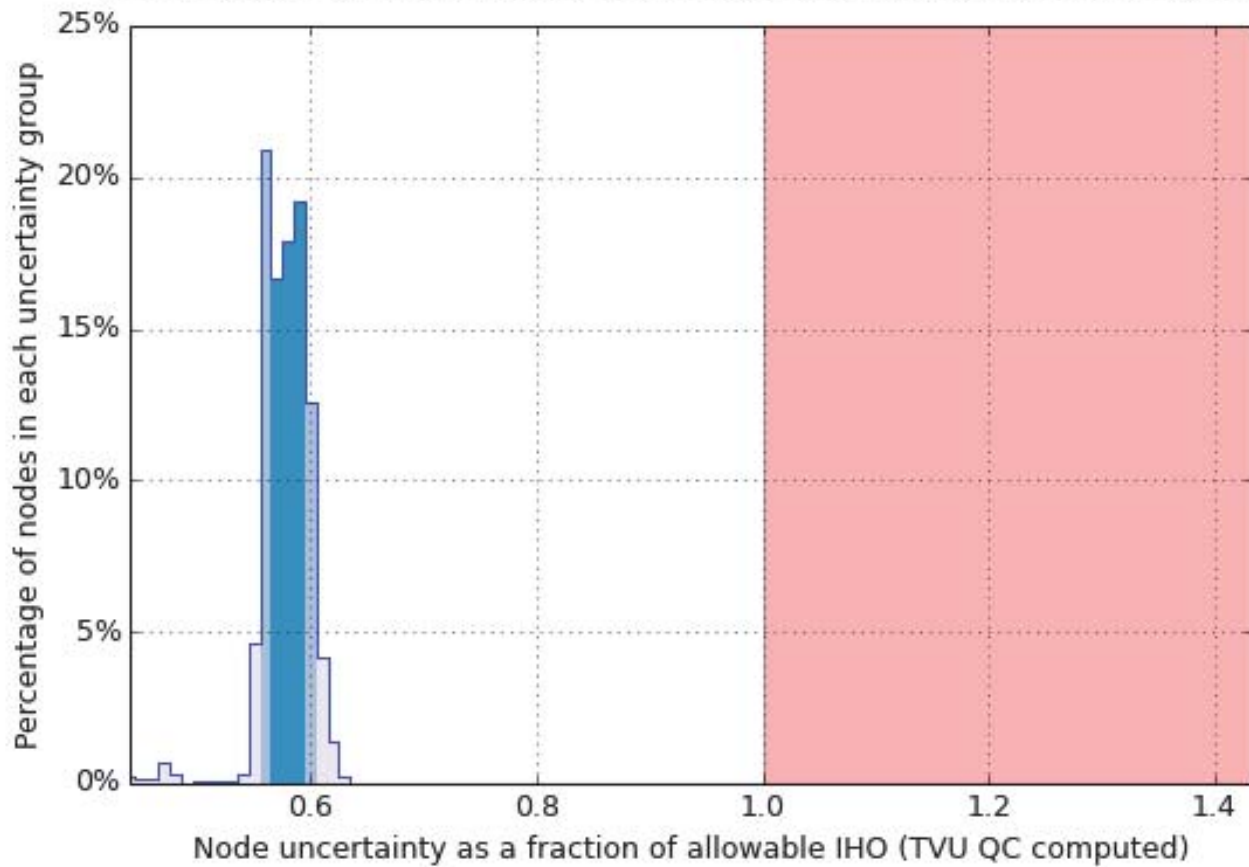


Figure 8: Plot showing Uncertainty Standards

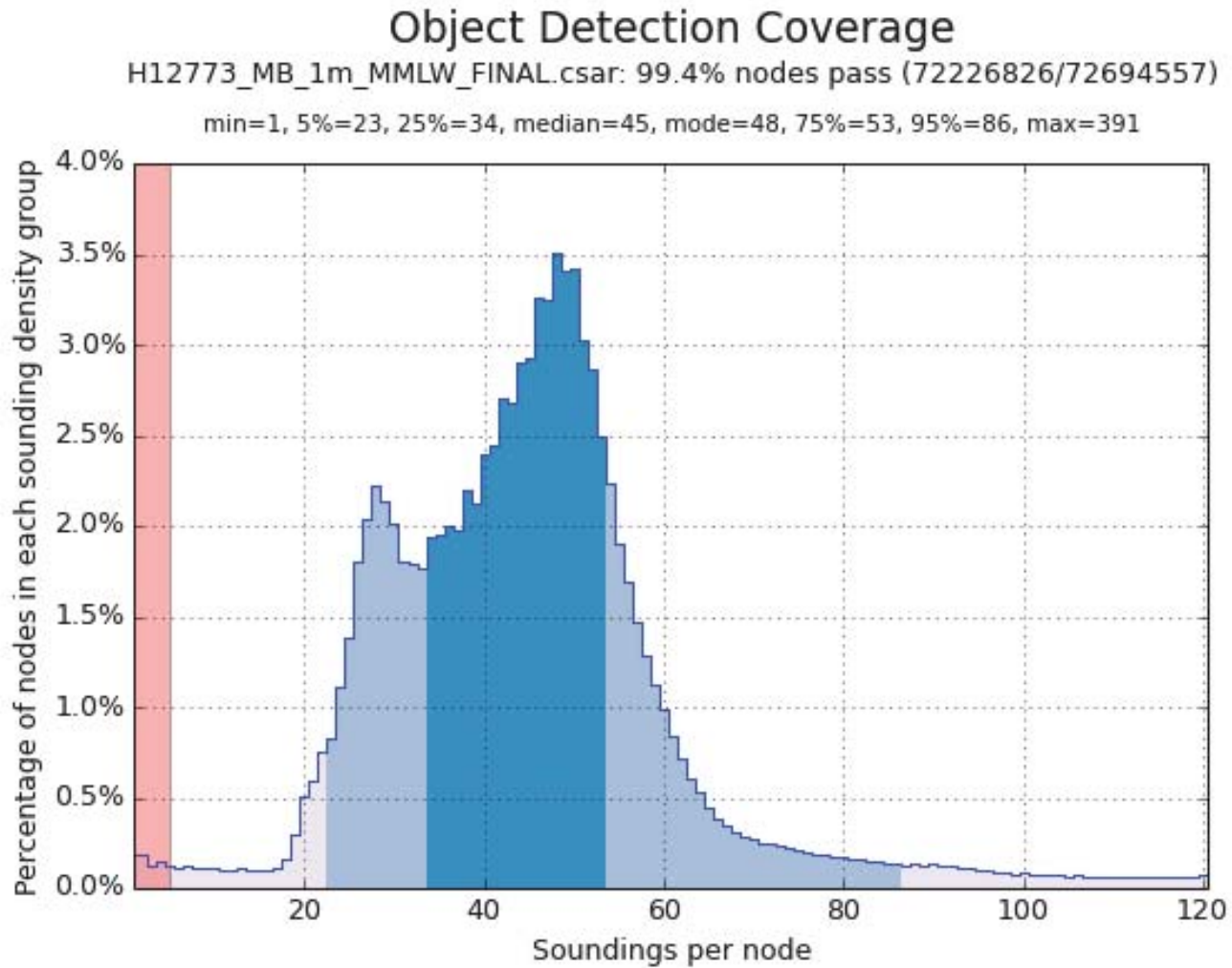


Figure 9: Plot showing Object Deterction Coverage

### B.2.3 Junctions

Five concurrent surveys were acquired during the same relative time frame of acquisition of H12773. H12767; H12804; H12766; H12795; H12769 Depth comparisons were made using a CARIS HIPS generated difference surface as a check that the sonar systems and application of correctors were in agreement.

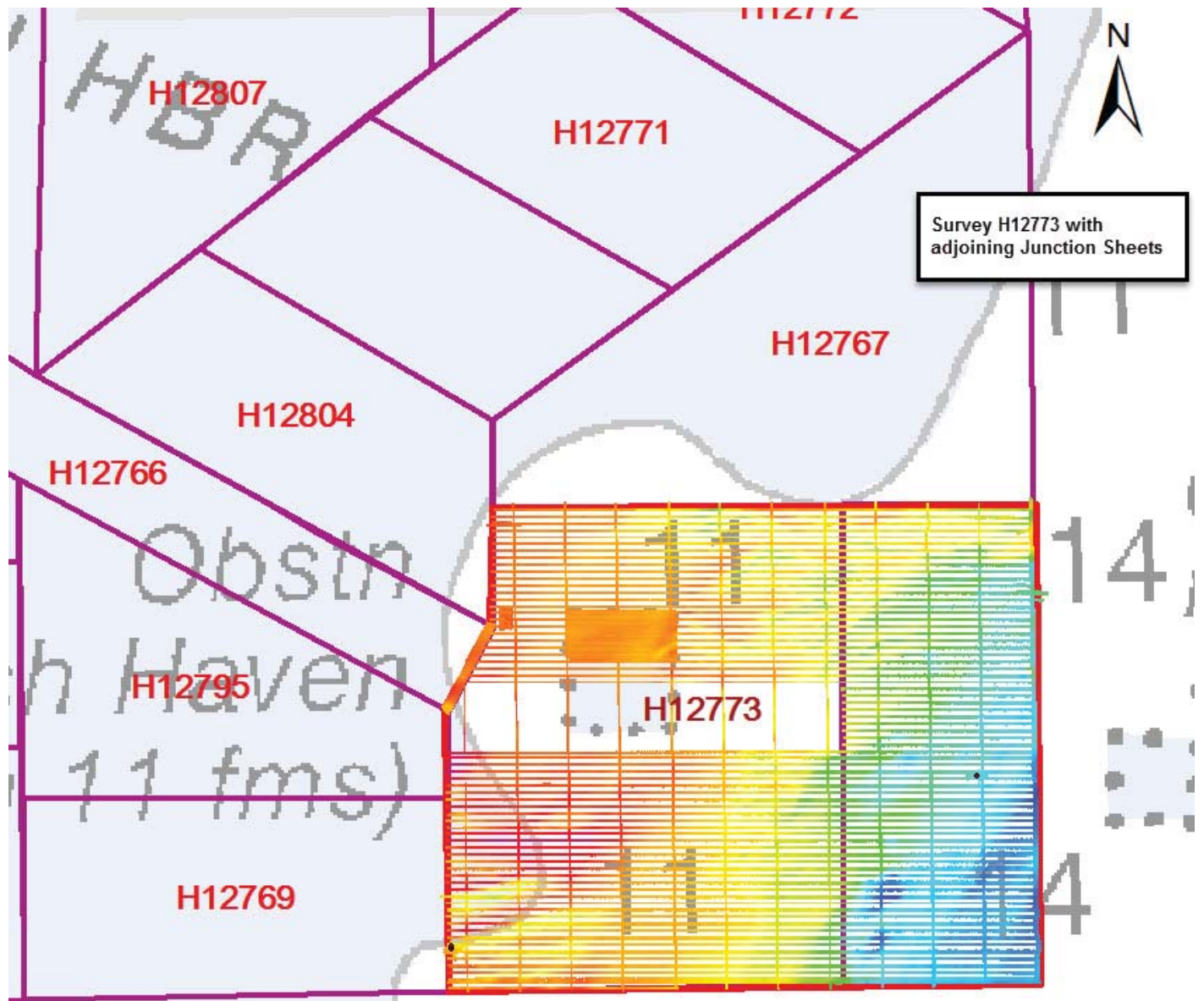


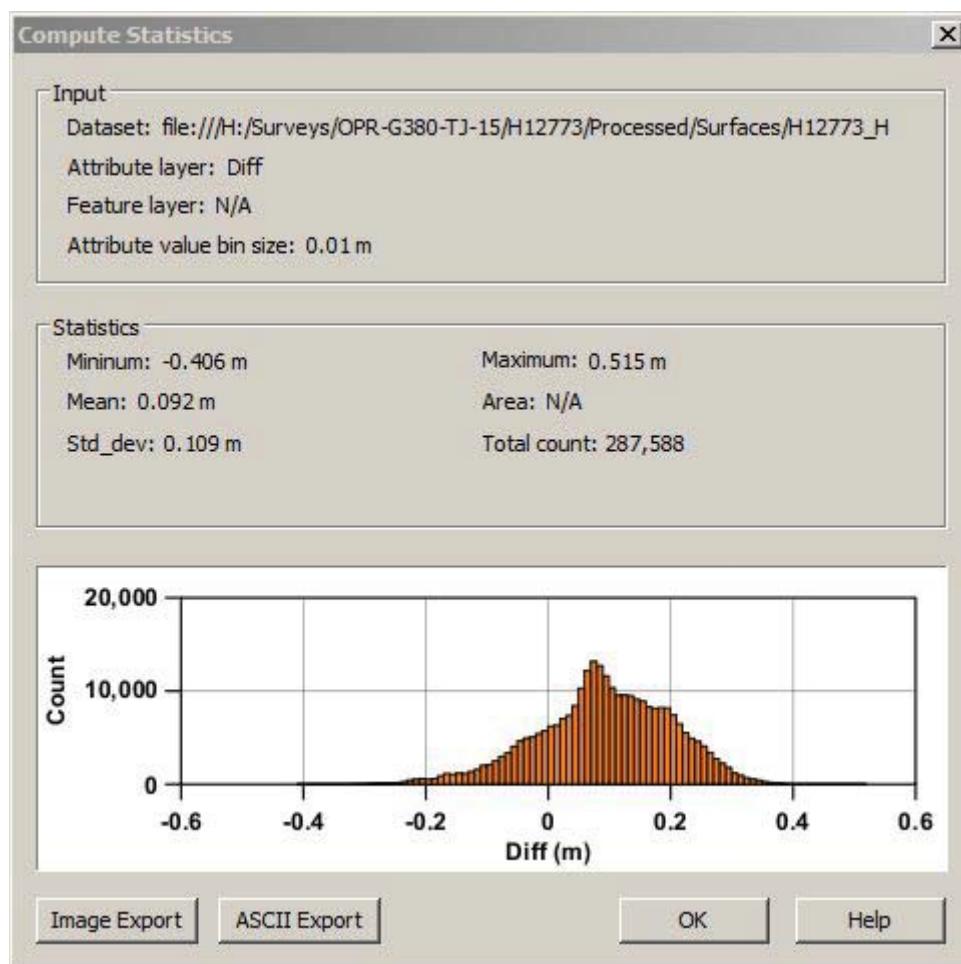
Figure 10: H12773 Survey junction comparison with adjoining sheets

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12767	1:20000	2015	NOAA Ship Thomas Jefferson	N
H12766	1:20000	2015	NOAA Ship Thomas Jefferson	W
H12769	1:20000	2015	NOAA Ship Thomas Jefferson	SW
H12804	1:20000	2015	NOAA Ship Thomas Jefferson	NW
H12795	1:20000	2015	NOAA Ship Thomas Jefferson	NW

*Table 8: Junctioning Surveys*H12767

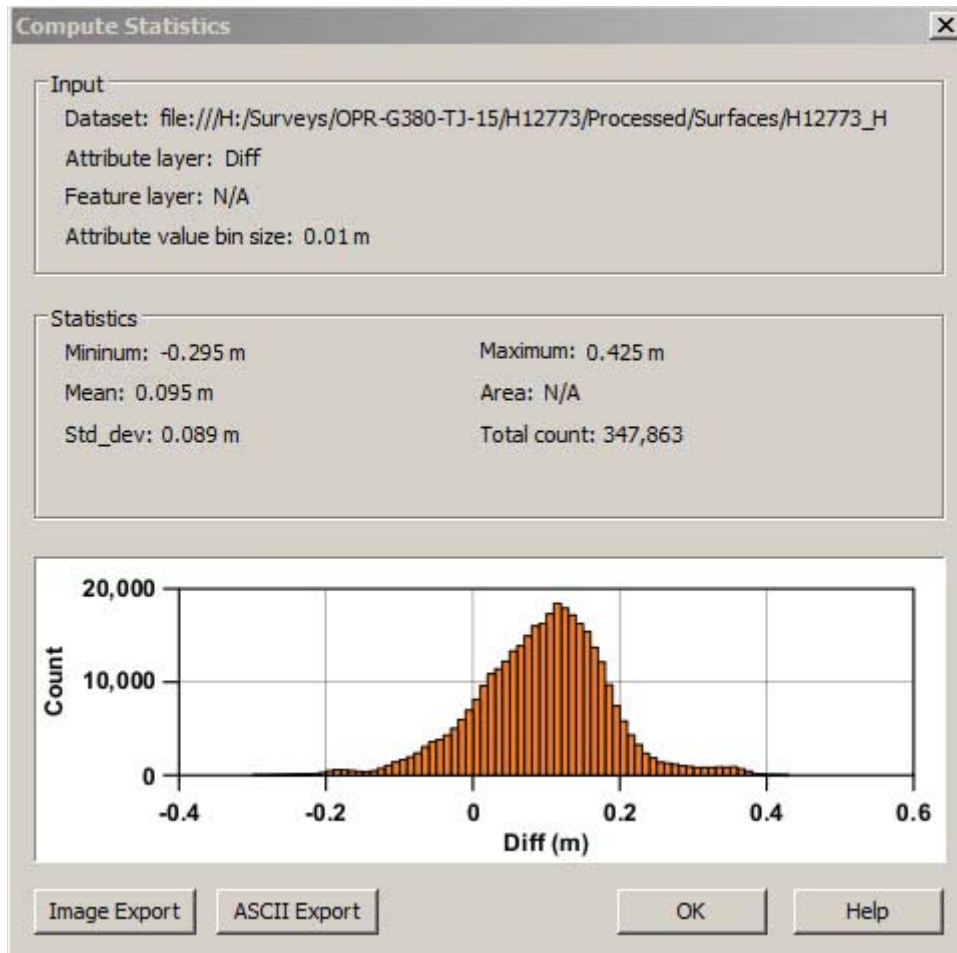
The difference between survey H12773 and the junction survey H12767 ranged from -0.406m to 0.515m. The mean was 0.092m and the standard deviation was 0.109m. Out of a total of 287588 nodes, 283080 fell within 0.3m of the surface, which is 98%.



*Figure 11: H12773 & H12767 Junction Statistics*

H12766

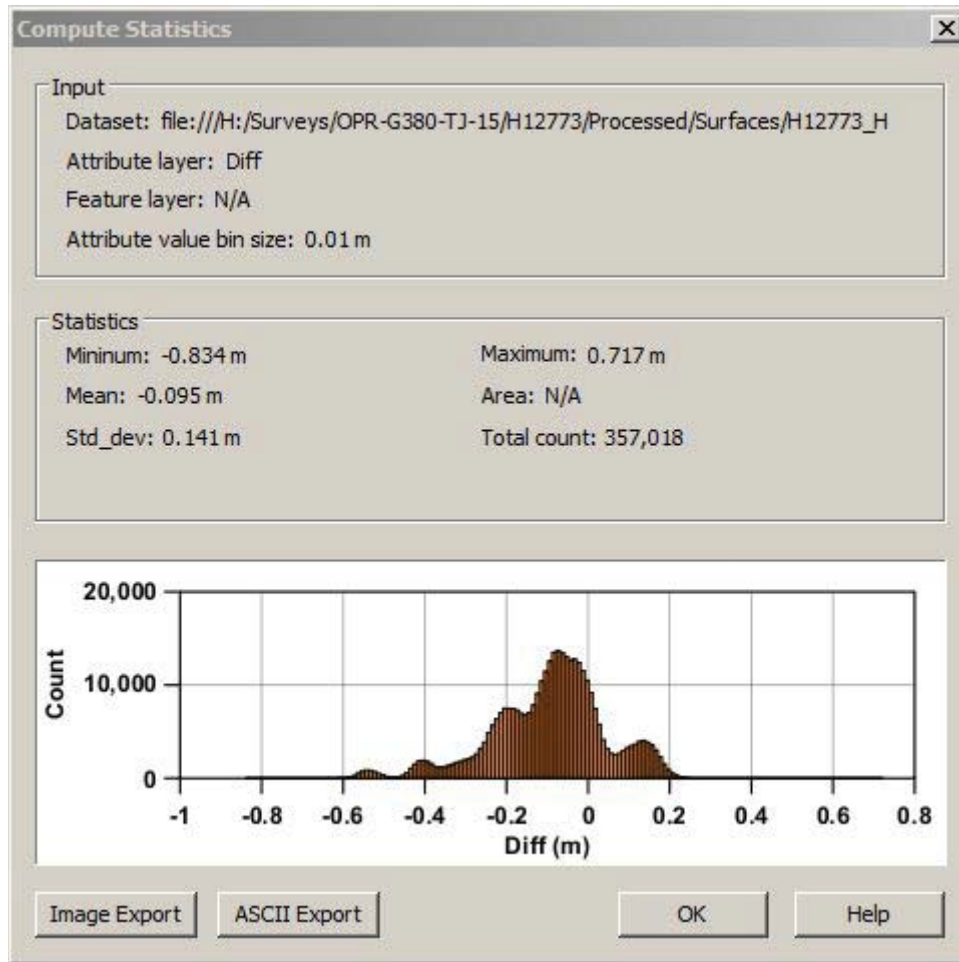
The difference between survey H12773 and the junction survey H12766 ranged from -0.295m to 0.425m. The mean was 0.095 and the standard deviation was 0.089m. Out of a total of 347863 nodes, 342258 agreed within 0.3m of the surface, which is approximately 98%



*Figure 12: H12773 & H12766 Junction Statistics.*

### H12769

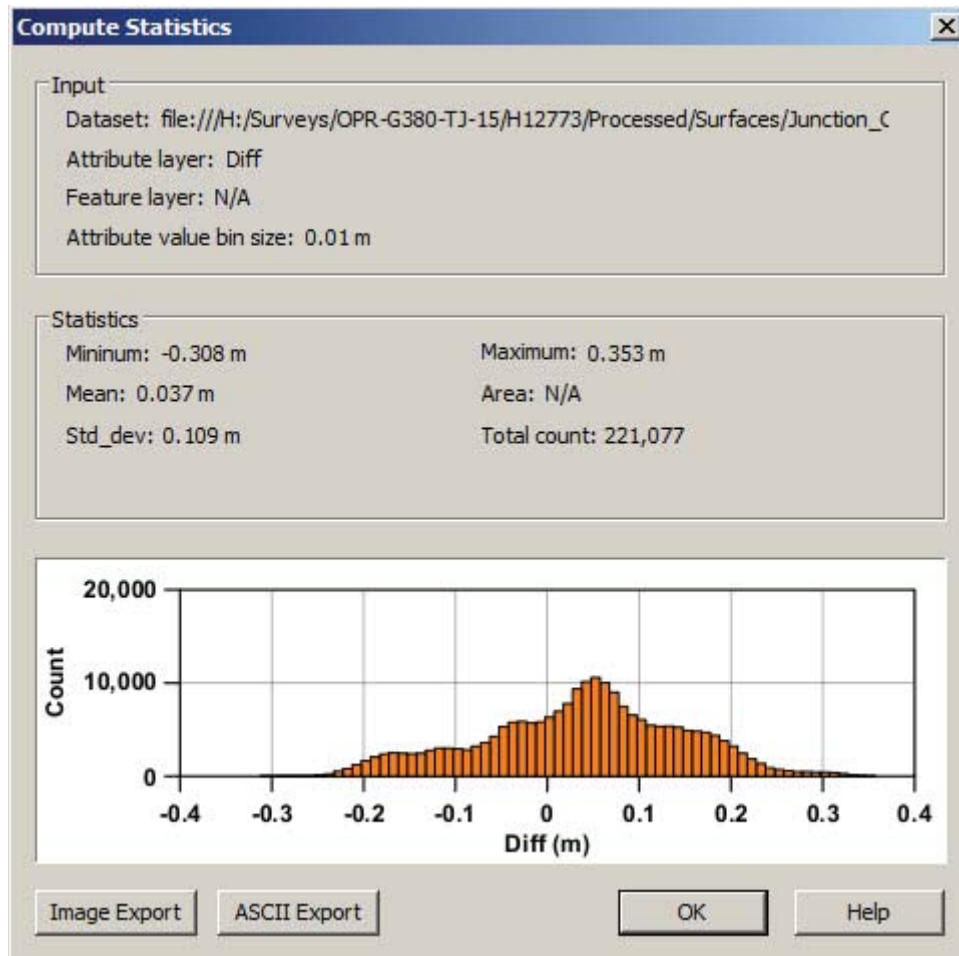
The difference between survey H12773 and the junction survey H12769 ranged from -0.834m to 0.717m. . The mean was 0.095 and the standard deviation was 0.141m. Out of a total of 357018 nodes , 328901 fell within 0.3m of the surface which is 92%



*Figure 13: H12773 & H12769 Junction Statistics.*

### H12804

The difference between survey H12773 and the junction survey H12804 ranged from -0.308m to 0.353m. . The mean was 0.037 and the standard deviation was 0.109m. Out of a total of 221077 nodes , 219798 fell within 0.3m of the surface which is 99.4%



*Figure 14: H12773 & H12804 Junction Statistics.*

### H12795

The difference between survey H12773 and the junction survey H128795 ranged from -0.341m to 0.345m. . The mean was -0.006 and the standard deviation was 0.131m. Out of a total of 83855 nodes , 83662 fell within 0.3m of the surface which is 99.8%



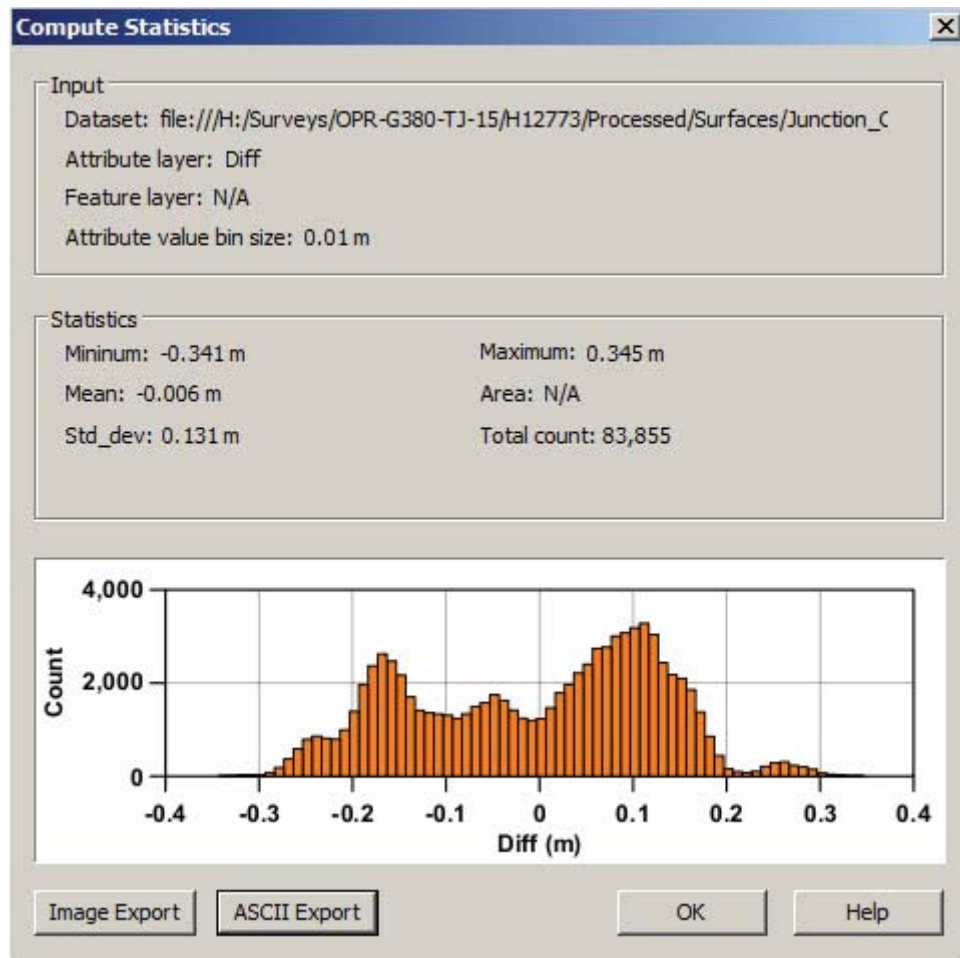


Figure 15: H12773 & H12795 Junction Statistics.

#### 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

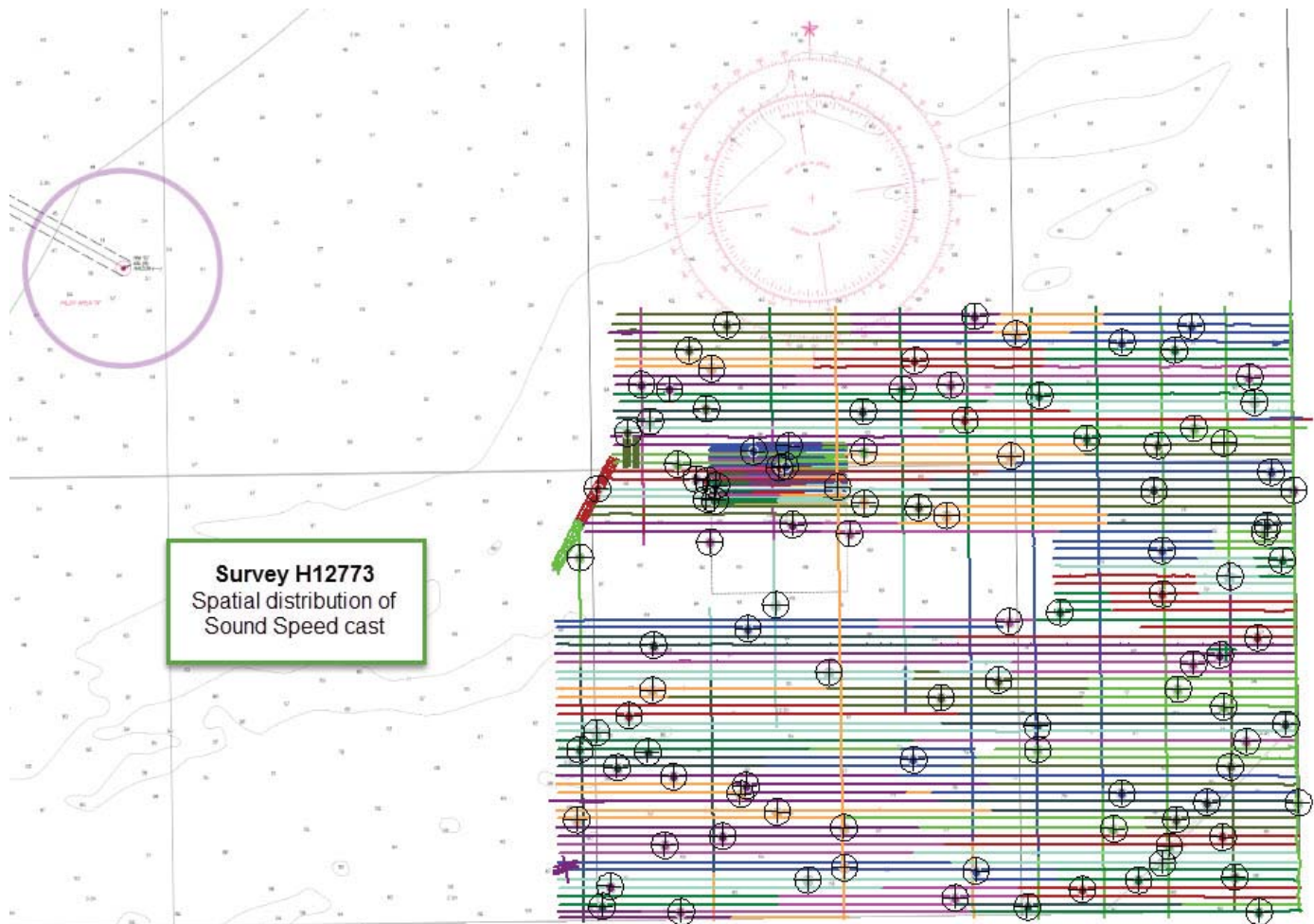
There were no conditions or deficiencies that affected equipment operational effectiveness.

#### 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: Sound speed profiles were measured in accordance with the HSSD (2015 ed.) on Thomas Jefferson (S222) using the Rolls Royce-Brooke-Ocean MVP 100 approximately every 30 minutes to one hour and were evenly distributed spatially throughout the survey area. All MVP casts were concatenated into one sheet wide sound velocity file and applied to multibeam data in CARIS using nearest in distance within a time of 1 hour. The results showed the water column to be well mixed with minimal variance over space and time.



*Figure 16: H12773 Spatial distribution of Sound Speed Casts*

### B.2.8 Coverage Equipment and Methods

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

## B.2.9 H12773 Density Compliance

Density requirements for H12773 were analyzed using the finalized CSAR QA tool in the Pydro Contributions program. The Chief Hydrographer chose to exceed the specifications for complete coverage with set line spacing because density requirements were met and bathymetry was better represented using a 1m resolution. The 1 meter surface meets density 99.4% of the time.

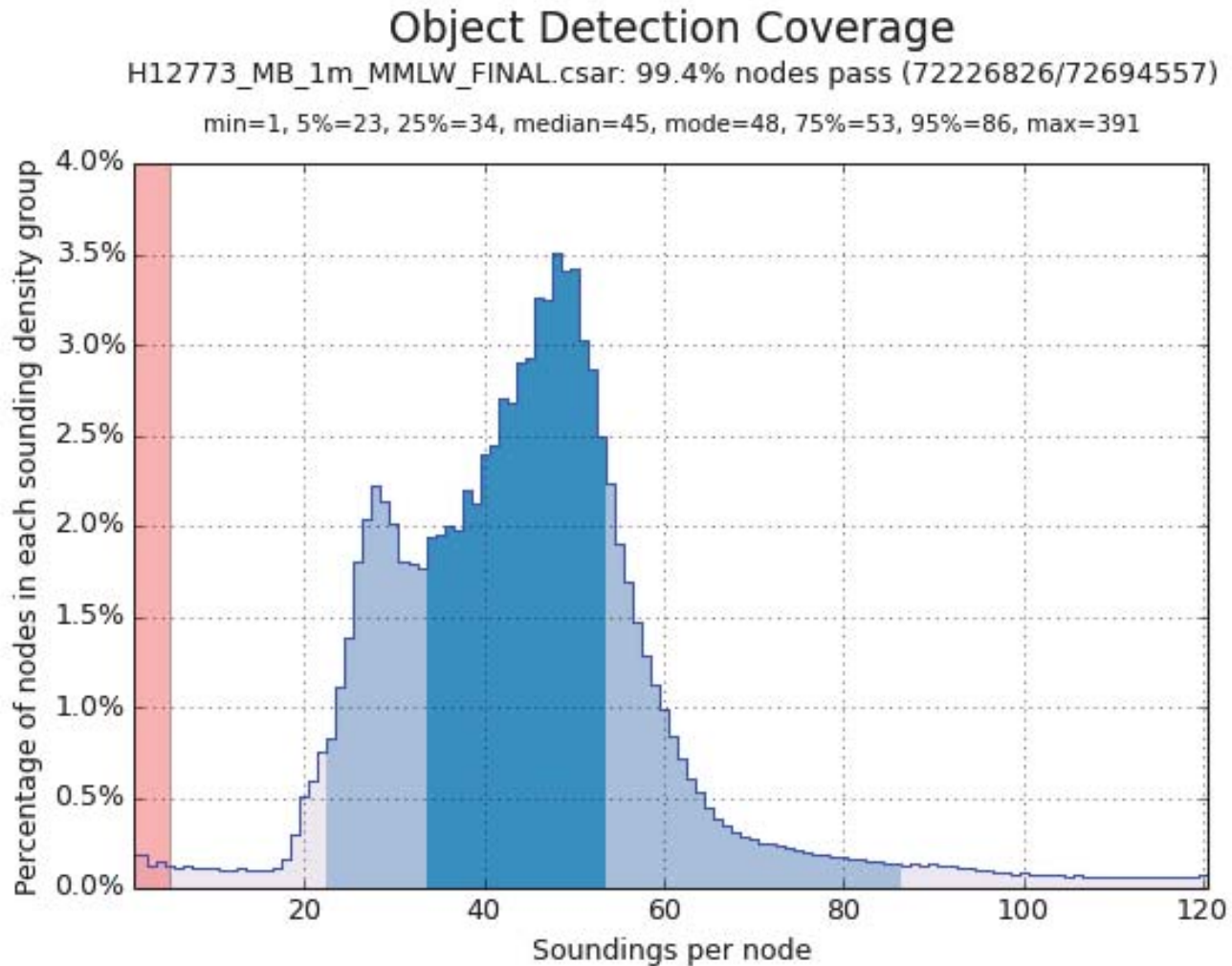


Figure 17: Object Detecton Coverage

## 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.3.3 Merge and Tide

The entire survey has both Discrete Zoning Observed tides and ERS Post Processed Precise Point Positioning (5P) with separation model (GPS Tide) loaded to the data. GPS tide was chosen as the merge option and was the datum of choice for this survey.

### B.4 Backscatter

Backscatter was logged as a 7k file and submitted to the Atlantic Hydrographic Branch for processing. One line per vessel, per day was processed aboard the Thomas Jefferson in order to assess and ensure quality. No deficiencies were noted.

## B.5 Data Processing

### B.5.1 Software Updates

The following software updates occurred after the submission of the DAPR:

Manufacturer	Name	Version	Service Pack	Hotfix	Installation Date	Use
Caris	HIPS/SIPS	9.0.19			09/03/2015	Processing
Caris	Bathy DataBASE	4.1.3			10/15/2015	Processing
NOAA	Pydro	14.6	R5358		11/09/2015	Processing
Applanix	PosPAC	7.0.5637.21708	2		06/05/2015	Processing

*Table 9: Software Updates*

The following Feature Object Catalog was used: NOAA Profile V 5.3.3

### 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
H12773_SSS_100	SSS Mosaic	1 meters	0 meters - 0 meters	N/A	100% SSS
H12773_MB_1m_MLLW	CUBE	1 meters	17.98 meters - 29.54 meters	NOAA_1m	MBES TracklineSBES Set Line Spacing
H12773_MB_1m_MLLW_Final	CUBE	1 meters	17.88 meters - 29.54 meters	NOAA_1m	MBES TracklineSBES Set Line Spacing

*Table 10: Submitted Surfaces*

### B.5.3 Data Fliers in MB Data

A swath filter was applied to the data to remove sonar side lobe anomalies in the RESON SV2 system. The filter used logic that rejected bathymetric data points beyond 60 degrees on either side of nadir. The filter was only applied to cross lines. All other erroneous data was manually rejected by the hydrographer during normal data processing and editing.

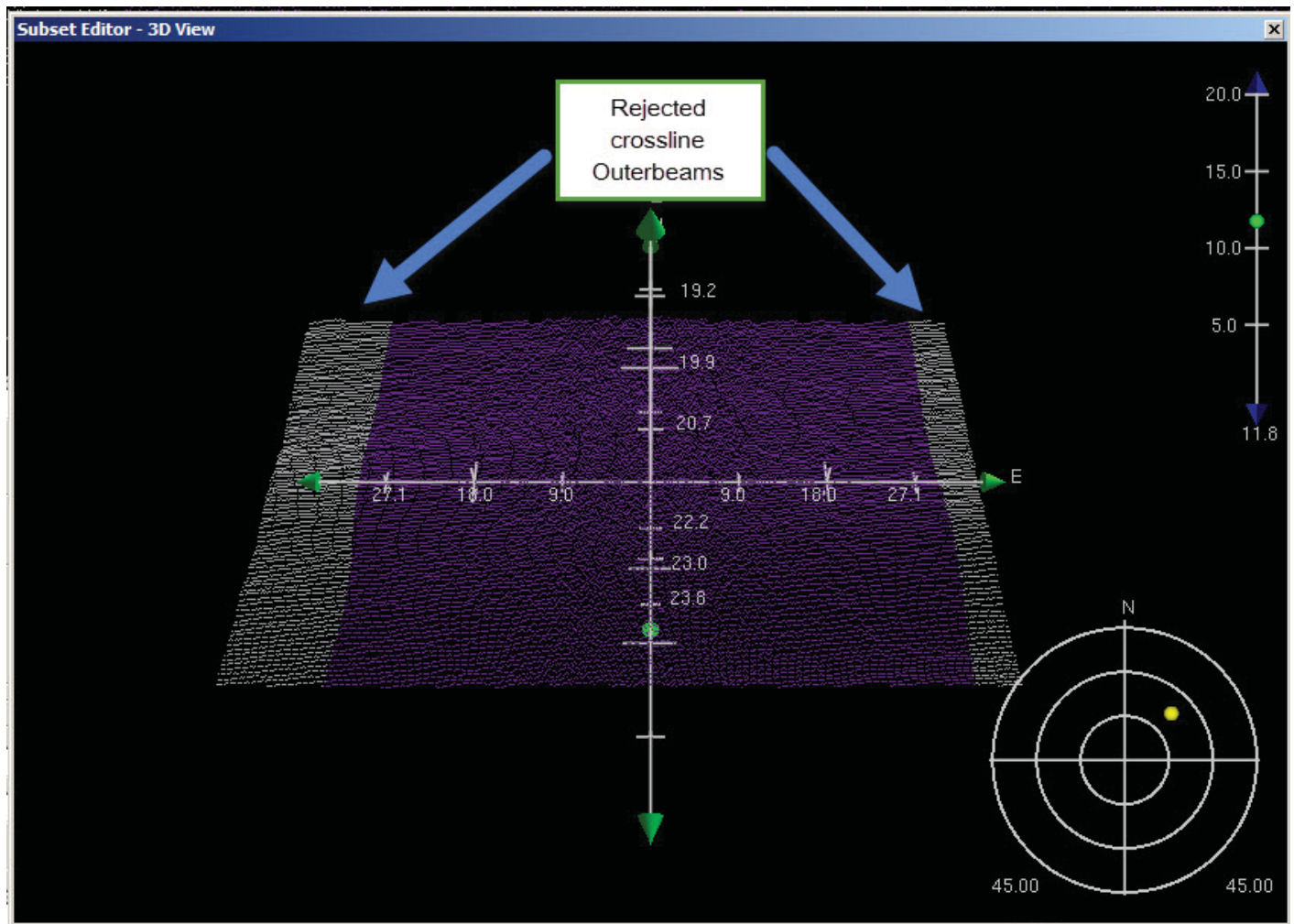


Figure 18: Rejected Outer beams on crosslines

#### B.5.4 Total Vertical Uncertainty Analysis

A custom layer was created for the finalized surface submitted in correlation with survey H12773. The layer was derived from the difference between the calculated uncertainties of individual nodes and the allowable uncertainty at the coupled node. This layer was examined using the CARIS QC report tool. The resulting statistical analysis identified greater than 99.9% of nodes within H12773 met the vertical uncertainty standards of Section 5.1.3 of the 2015 HSSD.

No SBET data was interpolated.

## C. Vertical and Horizontal Control

All vertical and horizontal control activities conducted during the course of this survey are fully addressed in the following sections. Per section 5.1.2.3 of the FPM (2014 ed), no Horizontal and Vertical Control Report has been generated for survey H12773.

## C.1 Vertical Control

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

### Non-Standard Vertical Control Methods Used:

VDatum

### Ellipsoid to Chart Datum Separation File:

2015\_G380\_VDatum\_NAD83\_MLLW\_rev2.csar

All soundings submitted as H12773 are reduced to MLLW using documented VDatum techniques. If it is deemed necessary to change the water level reduction method to discrete zoning the following additional information will be useful:

- 1) The National Water Level Observation Network (NWLON) stations serving as datum control for this survey is Charleston, SC (8665530).
- 2) The submitted water level files (8665530\_Verified.tid) are the final approved water levels for the period of hydrography. These files have been loaded to all CARIS lines submitted as H12773.
- 3) The submitted tide corrector (G380TJ2015CORP.zdf) is the preliminary zoning file that was accepted as final per final tide note, submitted in Appendix I. This file has been loaded to all CARIS lines submitted as H12773.
- 4) A request for final approved tides was sent to COOPS on 07 Nov 2015.

## C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD83).

The projection used for this project is 17 North.

The projection used for this project is UTM zone 17 north. Additional information discussing the use of 5P for this survey can be found in the accompanying DAPR.

## D. Results and Recommendations

### D.1 Chart Comparison

Chart comparison procedures were followed as outlined in section 4.5 of the FPM (2014 ed) and section 8.1.4 sub section D.1 of the HSSD (2015 ed). The ENC and RNC versions of the relevant charts were reviewed to ensure that the latest USCG Local Notice to Mariners (LNM) has been applied.

Chart comparisons for survey H12773 were conducted using a selected sounding set over plot removed to a map scale of 1:40000. In CARIS BDB, the soundings were then converted into a point cloud, from which a 1m interpolated surface was generated. Contouring was run on the interpolated surface and the results are listed below.

### D.1.1 Raster Charts

The following are the largest scale raster charts, which cover the survey area:

<b>Chart</b>	<b>Scale</b>	<b>Edition</b>	<b>Edition Date</b>	<b>LNМ Date</b>	<b>NM Date</b>
11528	1:40000	1	07/2014	09/24/2015	07/25/2015

*Table 11: Largest Scale Raster Charts*

#### 11528

Survey H12773 generally aligned well with existing depth soundings on the 11528 RNC to within 2 feet. H12773 contours generated show a shift from those on the 11528 RNC.

Sounding comparison of the Fish Haven showed depths shoaler than the charted minimum of 67 ft and should be updated to reflect the new controlling depth of at least 63ft. The Hydrographer recommends updating all contours and soundings with the digital data from survey H12773.



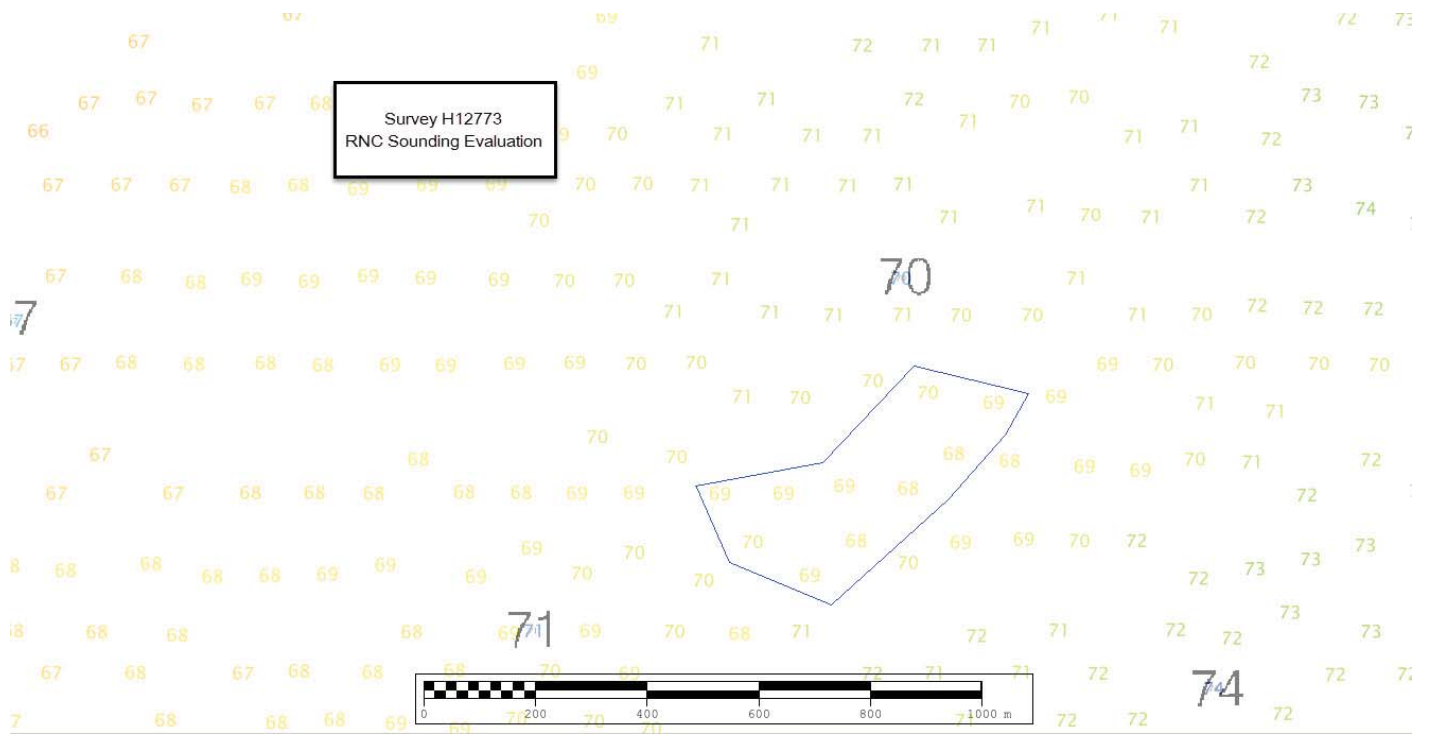


Figure 19: H12773 RNC Comparison

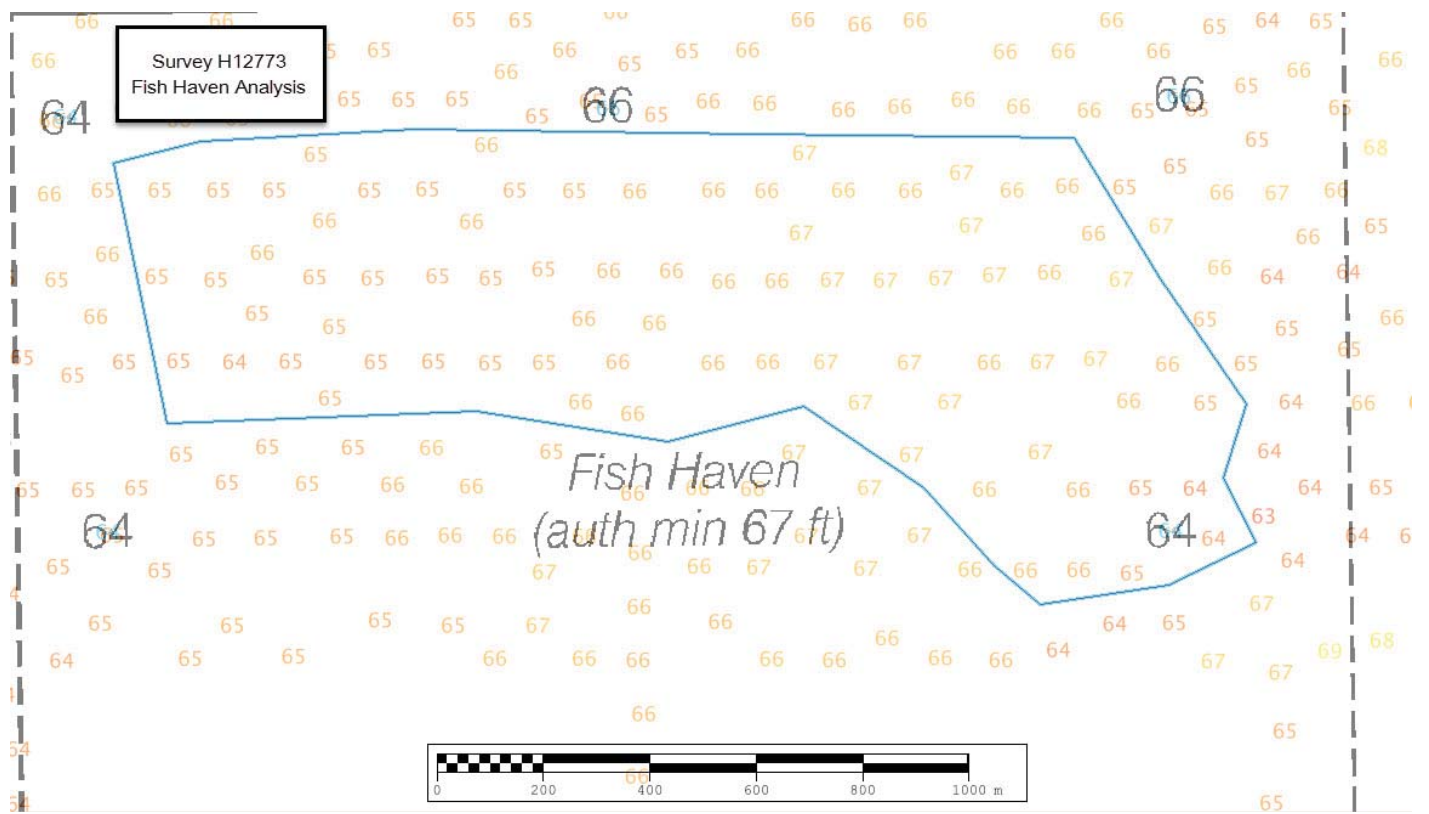


Figure 20: H12773 Fish Haven Analysis

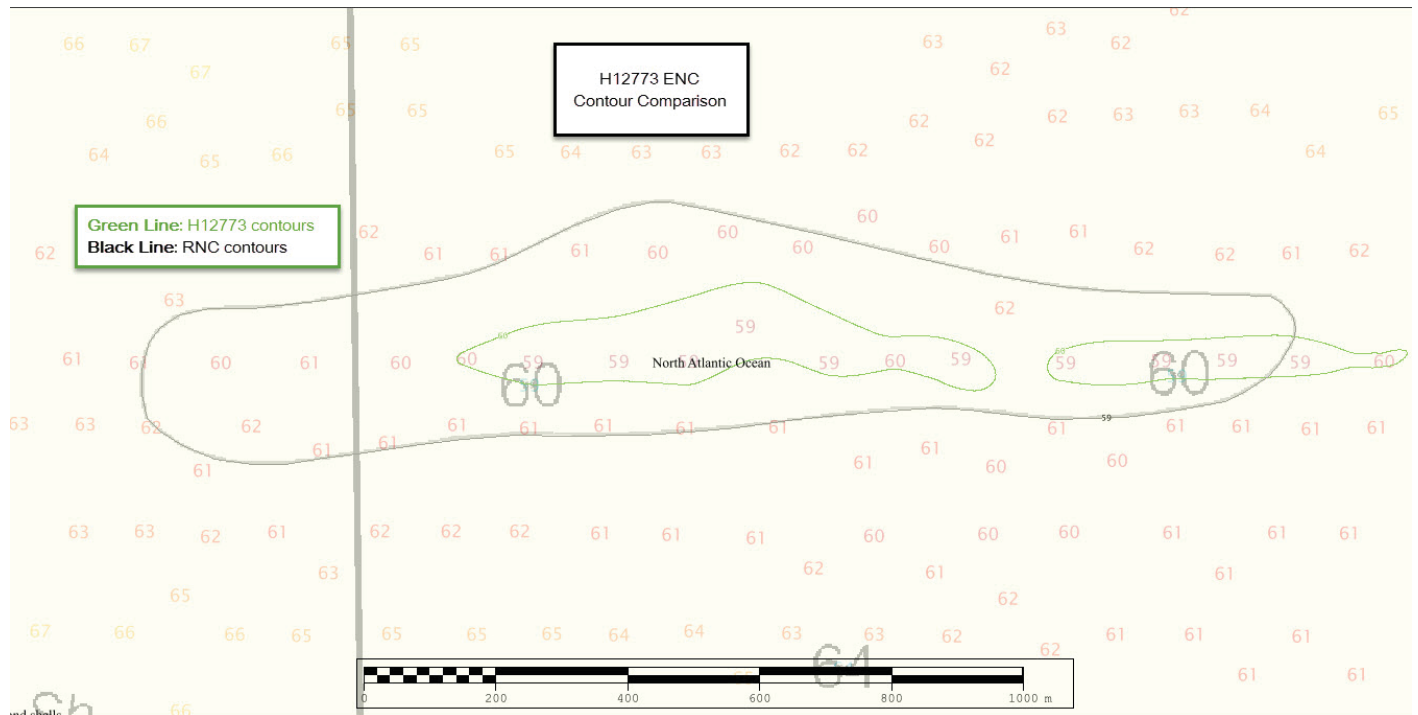


Figure 21: H12773 ENC Contour Comparison

### D.1.2 Electronic Navigational Charts

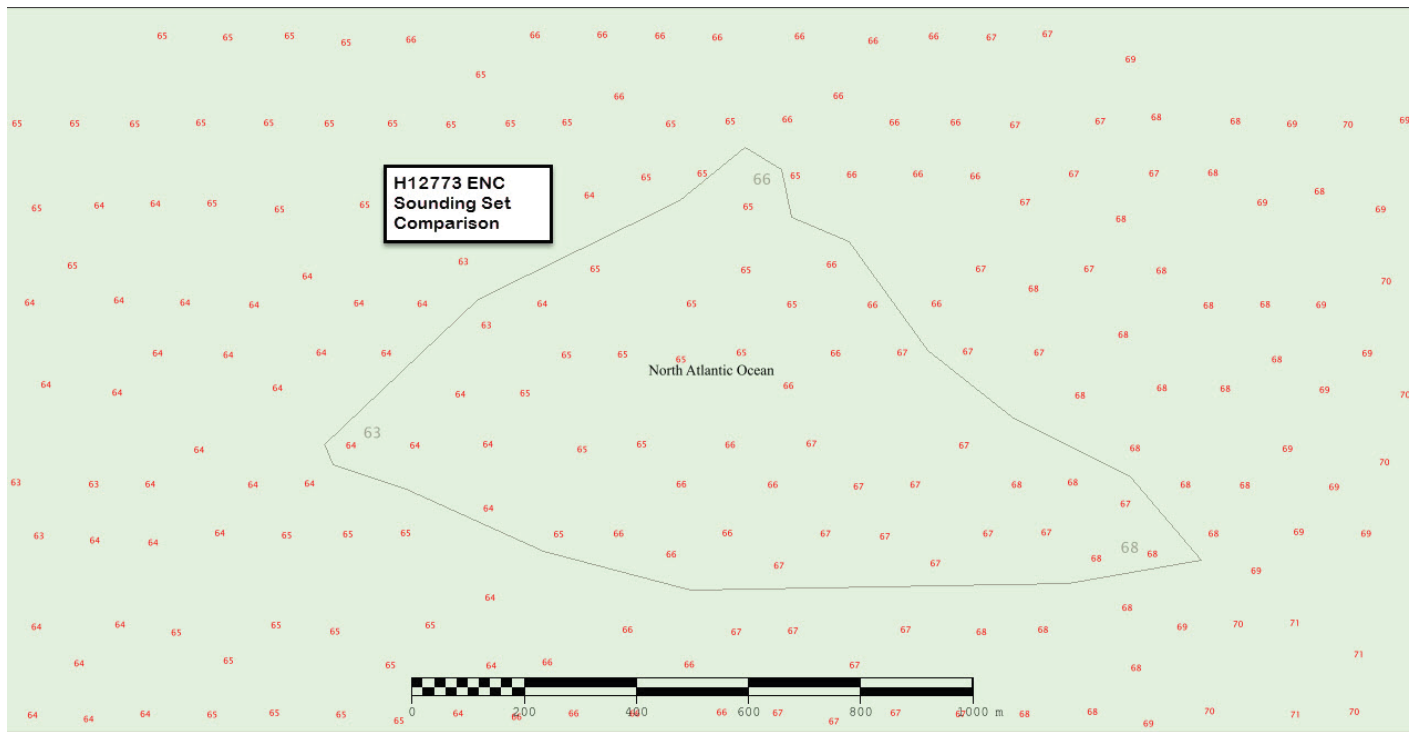
The following are the largest scale ENC, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US5SC25M	1:40000	1	10/06/2014	10/06/2015	NO

Table 12: Largest Scale ENCs

#### US5SC25M

ENC US5SC25M coincides with 11528 RNC, with the depths and contours matching up closely. The comparison between survey H12773 and the ENC is therefore equivalent to the preceding comparison with Chart 11528. The Hydrographer recommends updating all contours and soundings with the digital data from survey H12773.



*Figure 22: H12773 ENC Sounding Comparison*

### **D.1.3 AWOIS Items**

No AWOIS items were assigned for this survey.

### **D.1.4 Maritime Boundary Points**

No Maritime Boundary Points were assigned for this survey.

### **D.1.5 Charted Features**

No charted features exist for this survey.

### **D.1.6 Uncharted Features**

No uncharted features exist for this survey.

### **D.1.7 Dangers to Navigation**

No Danger to Navigation Reports were submitted for this survey.

**D.1.8 Shoal and Hazardous Features**

No shoals or potentially hazardous features exist for this survey.

**D.1.9 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.1.10 Bottom Samples**

No bottom samples were required for this survey.

**D.2 Additional Results****D.2.1 Shoreline**

Shoreline was not assigned in the Hydrographic Survey Project Instructions or Statement of Work.

**D.2.2 Prior Surveys**

Prior survey comparisons exist for this survey, but were not investigated.

**D.2.3 Aids to Navigation**

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

**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 Ferry Routes and Terminals**

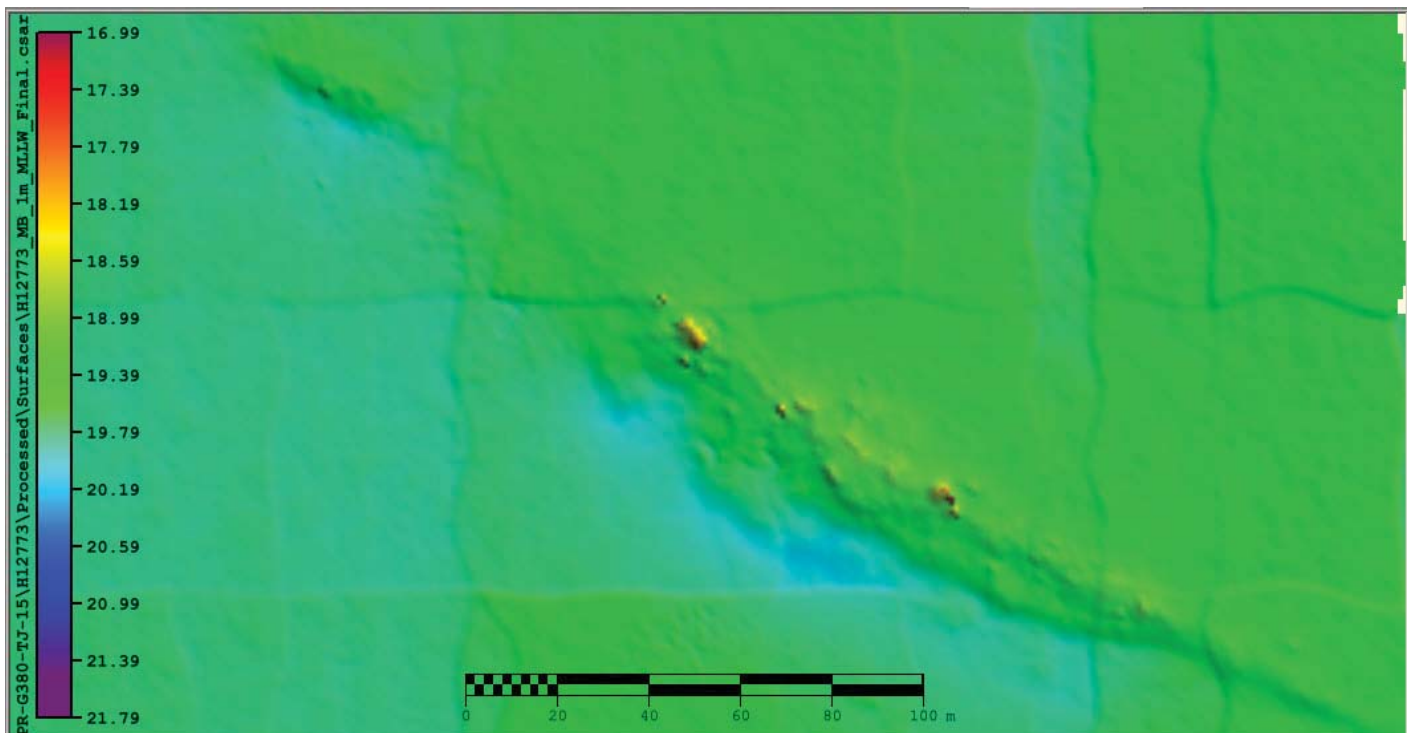
No ferry routes or terminals exist for this survey.

## D.2.7 Platforms

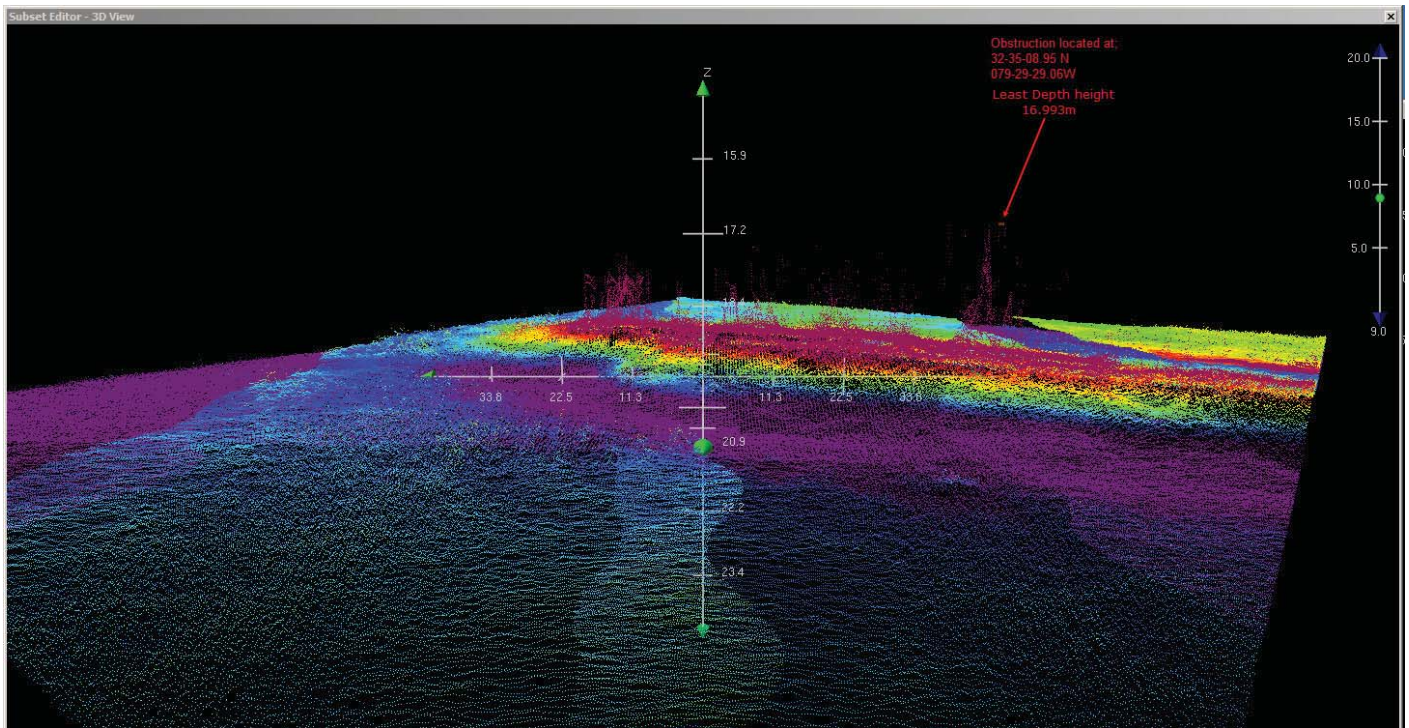
No platforms exist for this survey.

## D.2.8 Significant Features

A feature of significance was located at coordinates; 32-35-08.95N, 079-29-29.06W. Feature was determined to have a least depth of 16.993m above the seabed. Due to the buried nature of the feature, it is estimated to have been underwater for a long time.



*Figure 23: H12773 Underwater Feature*



*Figure 24: H12773 Underwater Feature Least Depth*

### **D.2.9 Construction and Dredging**

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

### **D.2.10 New Survey Recommendation**

No new surveys or further investigations are recommended for this area.

### **D.2.11 Inset Recommendation**


No new insets 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 and Specifications Deliverables Manual, 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
Shepard M. Smith, CAPT/NOAA	Chief of Party	11/12/2015	 c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=NOAA, cn=SMITH.SHEPARD.M.100677 8930 2015.11.19 17:49:21 -05'00'
Joseph K. Carrier, LT/NOAA	Field Operations Officer	11/12/2015	 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=NOAA, cn=CARRIERJOSEPH.KELSO.III. 1155373152 Date: 2015.11.20 14:10:24 Z
Uchechukwu K. Erege, Sub-Lt/Nigeria Navy	Sheet Manager	11/12/2015	Uchechukwu K. Erege  Digitally signed by Uchechukwu K. Erege DN: cn=Uchechukwu K. Erege, o=Nigerian Navy, ou=Nigerian Navy Hydrographic Office, email=erege_x@yahoo.com, c=NG Date: 2015.11.20 15:43:16 Z

## 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>	Continually 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>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>HSSD</b>	Hydrographic Survey Specifications and Deliverables



<b>Acronym</b>	<b>Definition</b>
<b>HSTP</b>	Hydrographic Systems Technology Programs
<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>	Local Notice to Mariners
<b>LNM</b>	Linear Nautical Miles
<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>NAIP</b>	National Agriculture and Imagery Program
<b>NALL</b>	Navigable Area Limit Line
<b>NM</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>PST</b>	Physical Science Technician
<b>RNC</b>	Raster Navigational Chart
<b>RTK</b>	Real Time Kinematic
<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>ST</b>	Survey Technician
<b>SVP</b>	Sound Velocity Profiler
<b>TCARI</b>	Tidal Constituent And Residual Interpolation
<b>TPE</b>	Total Propagated Error
<b>TPU</b>	Topside Processing Unit
<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>ZDA</b>	Global Positioning System timing message
<b>ZDF</b>	Zone Definition File

APPENDIX I  
TIDE NOTE AND GRAPHICS



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
National Ocean Service  
Silver Spring, Maryland 20910

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** November 18, 2015

**HYDROGRAPHIC BRANCH:** Atlantic  
**HYDROGRAPHIC PROJECT:** OPR-G380-TJ-2015  
**HYDROGRAPHIC SHEET:** H12773

**LOCALITY:** 12 NM Southeast of Charleston Harbor Channel Buoy, SC  
**TIME PERIOD:** October 22 - 30, 2015

**TIDE STATION USED:** 8665530 Charleston, SC  
Lat. 32° 46.9'N Long. 79° 55.4' W

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 1.648 meters

**REMARKS: RECOMMENDED ZONING**

Preliminary zoning is accepted as the final zoning for project OPR-G380-TJ-2015, H12773, during the time period between October 22 - 30, 2015.

Please use the zoning file G380TJ2015CORP submitted with the project instructions for OPR-G380-TJ-2015. Zones SA138 and SA139 are the applicable zones for H12773.

**Refer to attachments for zoning information.**

**Note 1:** Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

**HOVIS.GERALD.THOMAS.JR.1365860250**

Digitally signed by  
HOVIS.GERALD.THOMAS.JR.1365860250  
DN: c=US, o=U.S. Government, ou=DoD,  
ou=PKI, ou=OTHER,  
cn=HOVIS.GERALD.THOMAS.JR.1365860250  
Date: 2015.11.19 15:36:54 -05'00'

CHIEF, PRODUCTS AND SERVICES BRANCH



**Preliminary as Final Tidal Zoning for**

**OPR-G380-TJ-2015, H12773**

**12 NM Southeast of Charleston Harbor Channel Buoy, SC**

**8665530 CHARLESTON, SC**

**SA139  
Reference 8665530**

**SA138  
Reference 8665530**



APPENDIX II

SUPPLEMENTAL SURVEY RECORDS  
AND CORRESPONDENCE



Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

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## VDatum SEP Uncertainty

2 messages

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**Kathryn Pridgen - NOAA Federal** <kathryn.pridgen@noaa.gov>

Tue, Apr 14, 2015 at 1:04 PM

To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>, Shep Smith - NOAA Federal <shep.smith@noaa.gov>

We failed to include the uncertainty for the VDatum SEP. The uncertainty for the provided model is 0.125m two sigma.

—

Kathryn Pridgen  
Physical Scientist  
NOAA-HSD OPS  
301-713-2722 ext 145  
[kathryn.pridgen@noaa.gov](mailto:kathryn.pridgen@noaa.gov)

---

**Joseph Carrier - NOAA Federal** <joseph.carrier@noaa.gov>

Mon, Apr 20, 2015 at 12:24 PM

To: \_OMAO MOA XO Thomas Jefferson <xo.thomas.jefferson@noaa.gov>, Alex Ligon - NOAA Federal <alex.c.ligon@noaa.gov>, Allison Stone - NOAA Federal <allison.c.stone@noaa.gov>, Brittany Anderson - NOAA Federal <brittany.l.anderson@noaa.gov>, Diane Perry - NOAA Federal <diane.m.perry@noaa.gov>, Eileen Pye - NOAA Federal <eileen.o.pye@noaa.gov>, Kimberly Glomb - NOAA Federal <kimberly.glomb@noaa.gov>, Peter Lewit - NOAA Federal <peter.lewit@noaa.gov>, Rita Bowker - NOAA Federal <rita.s.bowker@noaa.gov>, Stephen Moulton <stephen.f.moulton@noaa.gov>, Todd Walsh - NOAA Federal <todd.walsh@noaa.gov>, Abigail Winz - NOAA Federal <abigail.higgins@noaa.gov>, Daniel Hodge - NOAA Federal <daniel.w.hodge@noaa.gov>, Marybeth Head <Marybeth.Head@noaa.gov>, Megan Guberski <Megan.Guberski@noaa.gov>, Shepard Smith <shep.smith@noaa.gov>, Tyanne Faulkes - NOAA Federal <tyanne.faulkes@noaa.gov>

FYI, on the Charleston project planning.

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
(301) 713-7782  
(757) 483-8755  
<http://www.moc.noaa.gov/tj/>

[Quoted text hidden]



Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

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## Re: TJ DAPR Questions

2 messages

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**Russell Quintero - NOAA Federal** <russell.quintero@noaa.gov>

Tue, Jun 2, 2015 at 2:37 AM

To: matthew.jaskoski@noaa.gov

Cc: \_OMAO MOA OPS Thomas Jefferson <OPS.Thomas.Jefferson@noaa.gov>, "LTJG Matthew Forrest, NOAA" <Matthew.R.Forrest@noaa.gov>

Pulling Joe and Matt into the conversation.

On 5/30/15, Russell Quintero - NOAA Federal <[russell.quintero@noaa.gov](mailto:russell.quintero@noaa.gov)> wrote:

> Jasko,

>

> I'm helping TJ with their DAPR for this year while I'm out here  
> augmenting. We wanted to get AHB's feedback on a few things we are  
> doing a little differently.

>

> The xmlDAPR is certainly helpful, but there are parts of the  
> implementation that create far more work than is necessary, and even  
> deviate from the HSSD.

>

> The TJ DAPR is undergoing final review, but is essentially done  
> already. To facilitate the speed of composition, we have deviated from  
> the xmlDAPR while continuing to adhere to the HSSD. The specific  
> changes are:

>

> 1) We are not tracking interchangeable hardware. We obviously track  
> the serial numbers of all components of the sensor (Tpu and fish for a  
> SSS for instance), but anything that can be swapped out at will is not  
> tracked. Processing computers that are freely interchangeable with no  
> effect on the data are not tracked in the DAPR. Already hardware like  
> monitors and external hard drives that are deemed to have no effect  
> are not tracked, we are just shifting that line slightly further.

>

> 2) The xmlDAPR requires that you transcribe out of the HVF all of the  
> values used in the survey, for every sensor and vessel. It also  
> requires transcribing the output of things like the dynamic draft and  
> patch test. In contrast, the HSSD actually specify that these should  
> be in a separate appendix.

>

> Doing these as a separate appendix is actually far, far faster on the  
> ship, far easier, and less prone to error. The Vessel Editor in Caris  
> can generate a report that contains all of the relevant info with only  
> a few button clicks instead of manually transferring every single  
> value.

>

> As such, we complied with the HSSD instead of the xmlDAPR schema. To  
> make that work, we occasionally had to mark "Not Applied" to some  
> correctors, and then add an "Additional Discussion" block immediately  
> following that explained how we did those correctors and referenced  
> the appropriate appendix.

>

>

> While we are confident that we are in compliance with the HSSD, we  
> wanted to make sure the Branch wouldn't have any opposition to this



> approach.  
>  
> V/r,  
> Russ  
>  
> --  
> Lieutenant Russell Quintero, NOAA  
> DoD Liaison, Office of Coast Survey  
> 1315 East-West Highway  
> SSMC3 - 6110  
> Silver Spring, MD 20910  
>  
> 301-713-2780x152 Office  
> 970-481-2030 Mobile  
>

--  
Lieutenant Russell Quintero, NOAA  
DoD Liaison, Office of Coast Survey  
1315 East-West Highway  
SSMC3 - 6110  
Silver Spring, MD 20910

301-713-2780x152 Office  
970-481-2030 Mobile

---

**Matthew Jaskoski - NOAA Federal** <matthew.jaskoski@noaa.gov>

Tue, Jun 2, 2015 at 11:53 AM

To: Russell Quintero - NOAA Federal <russell.quintero@noaa.gov>

Cc: \_OMAO MOA OPS Thomas Jefferson <OPS.Thomas.Jefferson@noaa.gov>, "LTJG Matthew Forrest, NOAA" <Matthew.R.Forrest@noaa.gov>

Hey Russ,

I don't have a problem if you all want to generate a \*.pdf DAPR in the traditional manner as opposed to using the xml (as long as it meets the requirements of HSSD, of course).

I believe the xmlDAPR is in a phase of substantial re-write and I would highly recommend you email the current deficiencies to the xmlDR/DAPR folks for inclusion in the re-scheming discussion. My understanding is that in the new version the vessel offsets and inventory items will be automatically populate from the HVF and Hybase respectively, so that may be part of the different schema/stylesheet architecture.

thanks for the heads-up,  
Jasko

Lieutenant Commander Matthew Jaskoski, NOAA  
Chief, Atlantic Hydrographic Branch  
439 W. York St.  
Norfolk, VA 23510  
Office: 757-441-6746 x200  
Cell: 757-647-3356

[Quoted text hidden]



Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

---

## OPR-G380: Soundings and Set line spacing

5 messages

---

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

Sat, May 30, 2015 at 11:43 PM

To: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>

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

Jasko,

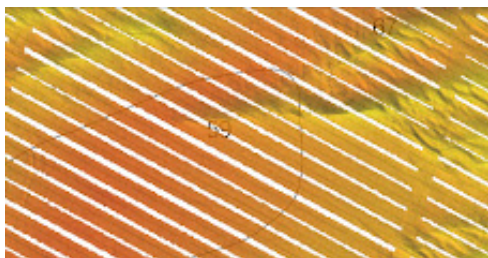
When sorting through some of the Charleston surveys where TJ is using set line spacing with concurrent 200% MB to achieve object detection. We noticed that there were a few soundings per sheet that land between the MB lines.

Section 5.2.2.3 of the 2014 HSSD says "All charted depths falling between sounding lines and shallower than adjacent surveyed soundings shall be verified or disproved."

In TJ's case, most of these soundings fall within very flat bottom areas and are 1-2 ft different on either side of the soundings (see attached). At such slight differences, it would be hard to say if it were within our estimated uncertainty or just a shoal sounding. Interested to hear what AHB's thoughts are and please don't hesitate to ask if you would like to discuss further.

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
cell: (757) 647-0187  
voip: (301) 713-7782  
fax: (757) 512-8295  
<http://www.moc.noaa.gov/tj/>



59foot\_32\_33\_48n\_79\_32\_00W\_sounding.jpg  
470K

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Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>

Mon, Jun 1, 2015 at 6:30 PM

To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>, Edward Owens - NOAA Federal <edward.owens@noaa.gov>

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

Hey Joe (I'm looping in Ed here for carto-perspective),

I think by the letter of the law the centroid should be ensonified to remove the charted shoal sounding with a deeper one. However, as you point out 1-2 ft is right about the TVU as well as right around the charted depth vertical uncertainty for a CATZOC A1 area as depicted on the final product.

Considering their has been little change to the seafloor, and the new depths are w/in 1-2ft of the charted depths it does seem like a waste of resources to slit these lines simply to "paint the number" I don't think we will have a

problem superseding soundings in the type of situation you described - Ed what do you think?

Jasko

Lieutenant Commander Matthew Jaskoski, NOAA  
Chief, Atlantic Hydrographic Branch  
439 W. York St.  
Norfolk, VA 23510  
Office: 757-441-6746 x200  
Cell: 757-647-3356

[Quoted text hidden]

---

**CAPT Shepard Smith** <shep.smith@noaa.gov>

Mon, Jun 1, 2015 at 7:04 PM

To: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>

Cc: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>, Edward Owens - NOAA Federal <edward.owens@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Also, there is no indication of anything unusual in the sidescan, and no indication of unresolved shoaling (gradient of seafloor is level on both sides of the gap).

CAPT Shepard M. Smith, NOAA

[Quoted text hidden]

---

**Edward Owens - NOAA Federal** <edward.owens@noaa.gov>

Tue, Jun 2, 2015 at 3:46 PM

To: CAPT Shepard Smith <shep.smith@noaa.gov>

Cc: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>, Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

CAPT, et al,

Didn't seem to get any of the graphics described in the thread...? No matter, think I get the gist. Based on Shep's last statement, that recount is the best practice we apply for shoal disprovals in set line spacing datasets. If there is an indication of shoaling or indication thereof in the SS we would question the ability to disprove that shoal sounding and apply logic of the magnitude of depth variance and nav. signif. between the surveyed and charted depths to decide the charting action. If no shoaling is indicated by those same means the shoaler charted sounding is superseded by the survey data. If this occurs on the edge of the survey (outermost line) we would typically resort to retaining the shoaler charted value. Does that hit all the notes?

Regards, Edward

[Quoted text hidden]

---

**Shep Smith - NOAA Federal** <shep.smith@noaa.gov>

Tue, Jun 2, 2015 at 4:29 PM

To: Edward Owens - NOAA Federal <edward.owens@noaa.gov>

Cc: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>, Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Ed,

Thanks, I think that answers the question, and I think is a reasonable approach. We will use this guidance in choosing when to split.

Best Regards,

Shep

-----  
**CAPT Shepard M. Smith, NOAA**  
Commanding Officer, NOAA Ship Thomas Jefferson  
National Oceanic and Atmospheric Administration

[Quoted text hidden]



Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

---

## OPR-G380-TJ-15Combined sheets

3 messages

---

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

Sun, Jun 7, 2015 at 10:34 PM

To: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>

Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Katy,

TJ would like to modify the sheet layout to match available resources and keep the momentum we have with the early sheets. Essentially, we need to combine H12771 and H12803 because we don't have an available sheet manager. It's been great to give everyone the experience with at least one sheet but TJ feels these two sheets can be combined and managed with much less overhead; one package from TJ, one DR, one SAR, one H-cell, etc... If the weather holds and equipment stays operational, we should be able to close it out by the time we leave Charleston.

Please let us know if you have any concerns. Attached is a screen grab of the proposed sheet limits.

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
cell: (757) 647-0187  
voip: (301) 713-7782  
fax: (757) 512-8295  
<http://www.moc.noaa.gov/tj/>



Combined sheets.jpg  
373K

---

Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>

Mon, Jun 8, 2015 at 1:47 PM

To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Joe,

I dont think that will be a problem, especially if you are confident that the combined sheet will be completely surveyed by the end of the survey. I dont want to leave a sheet partially surveyed. I will work on combining those two sheets into one sheet H12771, I will cancel the other sheet H12803. Will that work?

Katy

On Sun, Jun 7, 2015 at 6:34 PM, Joseph Carrier - NOAA Federal <[joseph.carrier@noaa.gov](mailto:joseph.carrier@noaa.gov)> wrote:

Katy,

TJ would like to modify the sheet layout to match available resources and keep the momentum we have with the early sheets. Essentially, we need to combine H12771 and H12803 because we don't have an available sheet manager. It's been great to give everyone the experience with at least one sheet but TJ feels these two sheets can be combined and managed with much less overhead; one package from TJ, one DR, one SAR, one H-cell, etc... If the weather holds and equipment stays operational, we should be able to close it out by the time we leave Charleston.

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Joe Carrier, LT/NOAA

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<http://www.moc.noaa.gov/tj/>

—

Kathryn Pridgen  
Physical Scientist  
NOAA-HSD OPS  
301-713-2722 ext 145  
[kathryn.pridgen@noaa.gov](mailto:kathryn.pridgen@noaa.gov)

---

**Joseph Carrier - NOAA Federal** <[joseph.carrier@noaa.gov](mailto:joseph.carrier@noaa.gov)>

Mon, Jun 8, 2015 at 1:50 PM

To: Kathryn Pridgen - NOAA Federal <[kathryn.pridgen@noaa.gov](mailto:kathryn.pridgen@noaa.gov)>

Cc: "CO.Thomas Jefferson - NOAA Service Account" <[co.thomas.jefferson@noaa.gov](mailto:co.thomas.jefferson@noaa.gov)>, "OPS.Thomas Jefferson - NOAA Service Account" <[ops.thomas.jefferson@noaa.gov](mailto:ops.thomas.jefferson@noaa.gov)>

Katy,

Thank you for working with us on this one and for the quick reply. Please cancel H12803 and add the coverage area to H12771.

Joe

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
cell: (757) 647-0187  
voip: (301) 713-7782  
fax: (757) 512-8295  
<http://www.moc.noaa.gov/tj/>

On Mon, Jun 8, 2015 at 1:47 PM, Kathryn Pridgen - NOAA Federal <[kathryn.pridgen@noaa.gov](mailto:kathryn.pridgen@noaa.gov)> wrote:

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surveyed by the end of the survey. I dont want to leave a sheet partially surveyed. I will work on combining those two sheets into one sheet H12771, I will cancel the other sheet H12803. Will that work?

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—

Kathryn Pridgen  
Physical Scientist  
NOAA-HSD OPS  
301-713-2722 ext 145  
[kathryn.pridgen@noaa.gov](mailto:kathryn.pridgen@noaa.gov)



Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

---

## OPR-G380-TJ-15

2 messages

---

**Joseph Carrier - NOAA Federal** <joseph.carrier@noaa.gov> Sun, Jun 7, 2015 at 11:06 PM  
To: Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>  
Cc: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

LCDR Gonsalves,

The project instructions require TJ to use HSSD 2014. TJ is requesting to use the 2015 HSSD for OPR-G380-TJ-15.

Please advise if HSD has any concerns.

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
cell: (757) 647-0187  
voip: (301) 713-7782  
fax: (757) 512-8295  
<http://www.moc.noaa.gov/tj/>

---

**Kathryn Pridgen - NOAA Federal** <kathryn.pridgen@noaa.gov> Mon, Jun 8, 2015 at 2:00 PM  
To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

Joe,  
HSD has no issues with using HSSD 2015 instead of HSSD 2014.

Katy Pridgen  
[Quoted text hidden]  
—  
Kathryn Pridgen  
Physical Scientist  
NOAA-HSD OPS  
301-713-2722 ext 145  
[kathryn.pridgen@noaa.gov](mailto:kathryn.pridgen@noaa.gov)





Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

---

## OPR-G380-TJ-15Combined sheets

6 messages

---

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

Sun, Jun 7, 2015 at 10:34 PM

To: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>

Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Katy,

TJ would like to modify the sheet layout to match available resources and keep the momentum we have with the early sheets. Essentially, we need to combine H12771 and H12803 because we don't have an available sheet manager. It's been great to give everyone the experience with at least one sheet but TJ feels these two sheets can be combined and managed with much less overhead; one package from TJ, one DR, one SAR, one H-cell, etc... If the weather holds and equipment stays operational, we should be able to close it out by the time we leave Charleston.

Please let us know if you have any concerns. Attached is a screen grab of the proposed sheet limits.

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
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<http://www.moc.noaa.gov/tj/>



Combined sheets.jpg  
373K

---

Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>

Mon, Jun 8, 2015 at 1:47 PM

To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

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Katy

[Quoted text hidden]

—

Kathryn Pridgen  
Physical Scientist  
NOAA-HSD OPS  
301-713-2722 ext 145  
[kathryn.pridgen@noaa.gov](mailto:kathryn.pridgen@noaa.gov)

---

**Joseph Carrier - NOAA Federal** <joseph.carrier@noaa.gov>  
To: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>  
Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Mon, Jun 8, 2015 at 1:50 PM

Katy,

Thank you for working with us on this one and for the quick reply. Please cancel H12803 and add the coverage area to H12771.

Joe

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
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---

**Kathryn Pridgen - NOAA Federal** <kathryn.pridgen@noaa.gov>  
To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>  
Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Mon, Jun 8, 2015 at 1:57 PM

Alright, its all fixed, my sheet are now identical to your graphic.  
Katy

[Quoted text hidden]

---

**Joseph Carrier - NOAA Federal** <joseph.carrier@noaa.gov>  
To: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>  
Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Mon, Jun 8, 2015 at 3:16 PM

Thanks Katy

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
cell: (757) 647-0187  
voip: (301) 713-7782  
fax: (757) 512-8295

<http://www.moc.noaa.gov/tj/>

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**Kathryn Pridgen - NOAA Federal** <kathryn.pridgen@noaa.gov>

Mon, Jun 8, 2015 at 3:42 PM

To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>, Jacklyn James - NOAA Federal <jacklyn.c.james@noaa.gov>

Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Joe and the rest of the TJ,

I am getting ready to go to sea on the Rainier (I leave on Wednesday) for the remainder of the Charleston project. While I am at sea, Jacklyn James, will be the HSD contact for the rest of the Charleston Survey. For any further questions, comments, or issues please contact Jackie at HSD, [jacklyn.c.james@noaa.gov](mailto:jacklyn.c.james@noaa.gov).

Thanks!

Katy

[Quoted text hidden]



Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

---

## OPR-G380-TJ-15: Horcon Report

5 messages

---

**Joseph Carrier - NOAA Federal** <joseph.carrier@noaa.gov> Sun, Jun 7, 2015 at 8:55 PM  
To: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>  
Cc: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

LCDR Jaskoski,

Historically, TJ hasn't managed tide or base stations during survey operations and therefore didn't submit a Horcon report with surveys. Using Fugro's MarineStar we have been able to stay out of the tide gauge and base station installation business. Do you foresee a need for TJ to submit a Horcon report with these Charleston surveys using MarineStar?

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
cell: (757) 647-0187  
voip: (301) 713-7782  
fax: (757) 512-8295  
<http://www.moc.noaa.gov/tj/>

---

**Matthew Jaskoski - NOAA Federal** <matthew.jaskoski@noaa.gov> Mon, Jun 8, 2015 at 1:09 PM  
To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>  
Cc: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Hey Joe,  
Assuming the ship isn't generating another report about the MarineStar integration and ERS on the project (that will accompany the data to NGDC) - I think it would be a good idea to submit an HVCR since it is a project-wide element that represents a significant departure from our past-practices. I think you could use Tyanne's report on MarineStar as the bulk of your text for your HVCR. All you really need is some background information on how the MarineStar Systems works, and a brief description of the methods, adequacy of positioning, and any confidence checks that were done - to meet the intent of the HVCR. The intent is to document the positioning activities that took place as part of the project.

hope this helps,  
regards,  
Jasko

Lieutenant Commander Matthew Jaskoski, NOAA  
Chief, Atlantic Hydrographic Branch  
439 W. York St.  
Norfolk, VA 23510  
Office: 757-441-6746 x200  
Cell: 757-647-3356

[Quoted text hidden]

---

**Joseph Carrier - NOAA Federal** <joseph.carrier@noaa.gov> Mon, Jun 8, 2015 at 1:48 PM  
To: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>  
Cc: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Jasko,

Thanks for the quick reply. Since TJ has never installed tide gauges or base stations for projects in the past and I don't have any examples on our network to work from. If you have one you can share like the ERS survey from the Hassler I'd really like to take a look and see how they did their report.

Since I'm going to be using Tyanne's report as a reference, do you mind if I ask for her help on revising the HVCR to make sure it's accurate?

Regards,  
Joe

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
cell: (757) 647-0187  
voip: (301) 713-7782  
fax: (757) 512-8295  
<http://www.moc.noaa.gov/tj/>

[Quoted text hidden]

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**Matthew Jaskoski - NOAA Federal** <matthew.jaskoski@noaa.gov> Mon, Jun 8, 2015 at 3:40 PM  
To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>  
Cc: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

hey Joe,

I think this got kicked back to me because of the attached DAPR pdf file sizes. did you get the earlier email? note there is a change in my recommendation regarding the HVCR

Jasko

Lieutenant Commander Matthew Jaskoski, NOAA  
Chief, Atlantic Hydrographic Branch  
439 W. York St.  
Norfolk, VA 23510  
Office: 757-441-6746 x200  
Cell: 757-647-3356

On Mon, Jun 8, 2015 at 11:35 AM, Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov> wrote:

Hey Joe,

I'm going to reverse course on my earlier recommendation that you include an HVCR. It looks like FH did not do an HVCR for the survey that they completed to the elipse, I believe they detailed everything in the DR/DAPR. This seems like a legitimate way to proceed, and considering you all did not establish any actual HorVerCon equipment the generation of a HVCR might be an unnecessary encumbrance on the ship. You could/should detail the MarineStar info in the DAPR - particularly sections A.4, B.1.4, and probably C.4-5.

from AHB's view we are content if you want to skip the HVCR and add the information about MarineStar in the DAPR (with any project specific deviations from the DAPR outlined in the appropriate DR).

Jasko

Lieutenant Commander Matthew Jaskoski, NOAA  
Chief, Atlantic Hydrographic Branch  
439 W. York St.  
Norfolk, VA 23510  
Office: 757-441-6746 x200  
Cell: 757-647-3356

[Quoted text hidden]

---

**Joseph Carrier - NOAA Federal** <joseph.carrier@noaa.gov> Mon, Jun 8, 2015 at 4:49 PM  
To: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>  
Cc: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Jasko,

Thanks for the update and thanks for reconsidering the HVCR!

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
cell: (757) 647-0187  
voip: (301) 713-7782  
fax: (757) 512-8295  
<http://www.moc.noaa.gov/tj/>

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Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

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## Final Tides Request?

3 messages

---

**Joseph Carrier - NOAA Federal** <joseph.carrier@noaa.gov>  
To: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>

Mon, Jun 8, 2015 at 6:43 PM

Katy,

We found two lines on a sheet we closed last week that we should rerun however the tides request has already been submitted. Since these surveys are to the Ellipse and we have only been using tides as a reference check against ERS, do you need us to resubmit a final tides note on the sheet in question?

Thanks in advance for your help.

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
cell: (757) 647-0187  
voip: (301) 713-7782  
fax: (757) 512-8295  
<http://www.moc.noaa.gov/tj/>

---

**Kathryn Pridgen - NOAA Federal** <kathryn.pridgen@noaa.gov>  
To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>

Mon, Jun 8, 2015 at 7:07 PM

You do not need to resubmit a final tides note on that sheet, just re-run the lines.

Katy

[Quoted text hidden]

—

Kathryn Pridgen  
Physical Scientist  
NOAA-HSD OPS  
301-713-2722 ext 145  
[kathryn.pridgen@noaa.gov](mailto:kathryn.pridgen@noaa.gov)

---

**Joseph Carrier - NOAA Federal** <joseph.carrier@noaa.gov>  
To: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>  
Cc: Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>

Tue, Jun 9, 2015 at 3:58 AM

Thanks Katy

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
cell: (757) 647-0187

6/9/2015

National Oceanic and Atmospheric Administration Mail - Final Tides Request?

voip: (301) 713-7782

fax: (757) 512-8295

<http://www.moc.noaa.gov/tj/>

[Quoted text hidden]





Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

---

## Re: Project update

2 messages

---

**Corey Allen - NOAA Federal** <corey.allen@noaa.gov>

Mon, Jun 22, 2015 at 5:55 PM

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

Cc: Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Jacklyn James - NOAA Federal <jacklyn.c.james@noaa.gov>, Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>

Joe,

After consultation with CAPT Berkowitz, we would request that the TJ go ahead and submit the data you have as H12794. In the event you return to Charleston this fall, Ops will provide a new H# for the uncompleted section. Please let Katy or I know if you have any questions regarding this submittal.

Cheers, Corey

On Sat, Jun 20, 2015 at 1:36 PM, Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov> wrote:

I am not sure how to answer this email. Any guidance? Jackie probably should take this one, she is the backup and is in the office so it might be easier for her to talk to them since we are in and out of internet coverage. I am not sure why they didnt cc anyone on this email.

Katy

----- Forwarded message -----

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

Date: Sat, Jun 20, 2015 at 5:27 AM

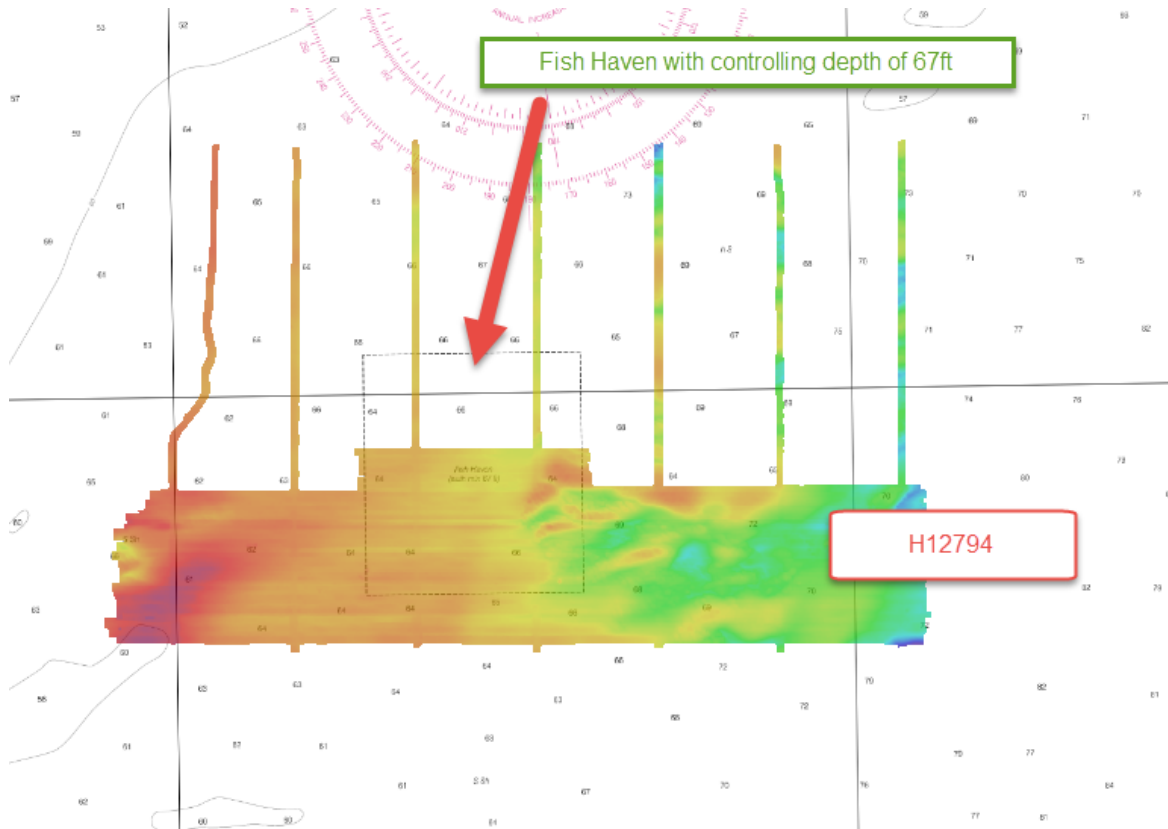
Subject: Project update

To: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>

Katy,

Just wanted to give you a heads up that TJ is pulling into Norfolk a day early because we are having problems with our AC. We completed Sheet H12771 with the extension. While we were working on compiling the data for H12771 and closing out H12779 we opened H12794. Due to the early departure from the working grounds, we were not able to close out H12794 but we were able to get coverage over most of the fish haven in the middle of the sheet. Coverage/density was solid and we don't have any holidays in the area we have completed.

Please advise on how you would like us to proceed with submitting the partially complete survey.



I look forward to hearing from you and hope that you are enjoying your time out on the West Coast.

V/R,  
Joe Carrier

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
 439 West York Street  
 Norfolk, VA 23510  
 cell: (757) 647-0187  
 voip: (301) 713-7782  
 fax: (757) 512-8295  
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Kathryn Pridgen  
 Physical Scientist  
 NOAA-HSD OPS  
 301-713-2722 ext 145  
[kathryn.pridgen@noaa.gov](mailto:kathryn.pridgen@noaa.gov)

J. Corey Allen  
 Team Lead, Operations Branch  
 Hydrographic Surveys Division  
 Office of Coast Survey, NOAA  
[Corey.Allen@noaa.gov](mailto:Corey.Allen@noaa.gov)  
 301.713.2777 x119 (Office)  
 301.717.7271 (Cell)

---

**Joseph Carrier - NOAA Federal** <joseph.carrier@noaa.gov>

Mon, Jun 22, 2015 at 8:34 PM

To: Corey Allen - NOAA Federal &lt;corey.allen@noaa.gov&gt;

Cc: "OPS.Thomas Jefferson - NOAA Service Account" &lt;ops.thomas.jefferson@noaa.gov&gt;, Michael Gonsalves - NOAA Federal &lt;michael.gonsalves@noaa.gov&gt;, Jacklyn James - NOAA Federal &lt;jacklyn.c.james@noaa.gov&gt;, Kathryn Pridgen - NOAA Federal &lt;kathryn.pridgen@noaa.gov&gt;

Corey,

Thanks for the reply. Understood on the new shape file for the fall. We were so close and then we had some mechanical issues. Overall, pretty productive so far. Hope things are going well at HSD.

V/R,  
Joe

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
cell: (757) 647-0187  
voip: (301) 713-7782  
fax: (757) 512-8295  
<http://www.moc.noaa.gov/tj/>

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Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

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## Charleston Channel: Sunken Buoy

2 messages

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**Joseph Carrier - NOAA Federal** <joseph.carrier@noaa.gov>

Fri, Jun 26, 2015 at 11:17 PM

To: Kyle Ward - NOAA Federal <kyle.ward@noaa.gov>

Cc: ops.thomas.jefferson@noaa.gov, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Kyle,

Attached is an image and brief description of the sunken buoy TJ found near the approaches to Charleston. If you share this with the CG, please make sure to follow up with OCS if and when they decide to salvage the buoy so it gets charted properly.

Thanks for your continued support and we look forward to working with you again this fall.

Very respectfully,  
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*  
439 West York Street  
Norfolk, VA 23510  
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**Sunken Charleston Entrance Channel Buoy.docx**

1444K

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**Kyle Ward - NOAA Federal** <kyle.ward@noaa.gov>

Mon, Jun 29, 2015 at 2:39 PM

To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

Cc: \_NMAO MOA OPS Thomas Jefferson <ops.thomas.jefferson@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Joe,

Thanks for this report. I have passed it on to the local USCG office and Pilots with instruction to provide updates if they are planning on removing this item.

Best Regards,  
Kyle

Kyle R. Ward, Navigation Manager Southeast  
NOAA Office of Coast Survey  
843.740.1153  
301.651.4852 cell



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**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
Office of Marine and Aviation Operations,  
Marine Operation Center-Atlantic, NOAA Ship Thomas Jefferson  
Norfolk, Virginia 23510

August 11, 2015

MEMORANDUM FOR: Captain Eric W. Berkowitz  
Chief, Hydrographic Surveys Division

FROM: Captain Shepard M. Smith, NOAA  
Commanding Officer, NOAA Ship Thomas Jefferson

SUBJECT: NOAA Ship *Thomas Jefferson* ERS Capability

Under the project instructions OPR-G380-TJ-15, the NOAA Ship *Thomas Jefferson* (TJ) was tasked with surveying the approaches to Charleston, SC by referencing the vertical datum to the ellipse.

The crew of the *Thomas Jefferson* with support from the Atlantic Hydrographic Branch, Hydrographic Systems Technical Programs and Hydrographic Surveys Division collaborated to evaluate different methods of surveying to the ellipse. The ship and launches were integrated with Fugro's Marinestar-XP service, which provides a 1 sigma accuracy of approximately +/-10cm in the horizontal and +/-15cm in the vertical planes using a combination of GPS satellites and geostationary communications satellites.

The majority of the project area was beyond 30km from the nearest CORS base station, SCHA. When TJ arrived at the project area, station SCHA was offline for multiple days making initial comparisons impossible. Both the proximity and availability of the CORS station data made further attempts to test and compare the single base IAPPK and Real-time PPP challenging. Once the CORS station was available and ephemeris could be downloaded, multiple days were processed using IAPPK on the inshore sheet H12779. The availability of IAPPK to validate and or resolve vertical issues with 5P proved valuable in determining whether the the hydrographer chose to interpolate or to plan and execute ERS holidays.

Testing and subsequent integration of the Post Processed Precise Point Positioning (5P) method has proven efficient, accurate and reliable. Compared to traditional methods using discrete zoned/TCARI based tides, the *Thomas Jefferson* found Fugro's commercial service, MarineStar during data acquisition and post processing to consistently provide results within acceptable tolerances outlined in the Hydrographic Survey Specifications and Deliverables HSSD. Further, the system generally provided output within the stated 15cm of vertical uncertainty documented in it's technical capabilities.

A comparison between crosslines and mainscheme at 1m resolution demonstrated the internal consistency of the VDatum method was more accurate than traditional zoned tides (internal document: Faulkes, et al., 2015). Using an Ellipsoid Referenced Zone Tide comparison with Survey H12766, the observed vertical solution demonstrated parity with the regional separation model provided by HSD Operations, giving confidence that the SBET solutions created from 5P were satisfactory. Further, the reduced processing times associated with 5P allowed TJ survey personnel to more quickly identify problematic lines within the survey, thereby reducing bottlenecks and increasing efficiency. Throughout the project, the TJ worked with HSTP to develop new tools and procedures necessary to analyze and identify issues with the Smoothed Best Estimate of Trajectory (SBET). These tools provided the hydrographer with the ability to identify



suspected problem areas between ERS and the resultant grids through interpolation using the Pydro Pospac auto QC tool (v5092). In areas of extensive communication loss of MarineStar data(>8min), the ship found it more efficient to resurvey lines or utilize IAPPK. Since there currently are no specifications in regards to interpolating ERS data, the TJ incorporated a higher percentage of crosslines than required by the Hydrographic Specifications and Deliverables (2015 ed.) to better constrain areas of data dropouts, and ensure any systematic errors were promptly discovered and resolved in a timely manner.

The *Thomas Jefferson* expects to submit all of the surveys under Project OPR-G380-TJ-15 as full Ellipsoidally Referenced Surveys.

APPROVAL PAGE

H12773

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NCEI for archive

- H12773\_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12767\_H12773\_GeoImage.pdf

The survey evaluation and verification has been conducted according to current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Approved: \_\_\_\_\_  
**Lieutenant Commander Briana Welton, NOAA**  
Chief, Atlantic Hydrographic Branch