

D00272

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

**DESCRIPTIVE REPORT**

Type of Survey: Navigable Area Natural Disaster  
Response

Registry Number: D00272

**LOCALITY**

State(s): Virginia

General Locality: Offshore Chesapeake Bay

Sub-locality: Thimble Shoal to SE Approach Channel

**2020**

CHIEF OF PARTY  
CDR Briana Hillstrom, NOAA

**LIBRARY & ARCHIVES**

Date:

**HYDROGRAPHIC TITLE SHEET**

**D00272**

**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 Chesapeake Bay**

Sub-Locality: **Thimble Shoal to SE Approach Channel**

Scale: **5000**

Dates of Survey: **08/05/2020 to 08/11/2020**

Instructions Dated: **08/04/2020**

Project Number: **OPR-D304-TJ-20**

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

Chief of Party: **CDR Briana Hillstrom, NOAA**

Soundings by: **Kongsberg Maritime EM 710 (MBES)**

Imagery by: **Klein Marine Systems System 5000 (SSS)**

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.*

## DESCRIPTIVE REPORT SUMMARY

### A. Area Surveyed

This hydrographic survey was acquired in accordance with the requirements defined in the Project Instruction OPR-D304-TJ-20. This hurricane response survey was an addendum to the original project as assigned in the Project Instructions. See Figure 1 and 2 for a coverage graphic that depicts the survey area.

Data were acquired within the following survey limits:

| Northwest Limit                    | Southeast Limit                     |
|------------------------------------|-------------------------------------|
| 37° 0' 42.67" N<br>76° 19' 18.2" W | 36° 47' 47.6" N<br>75° 44' 11.09" W |

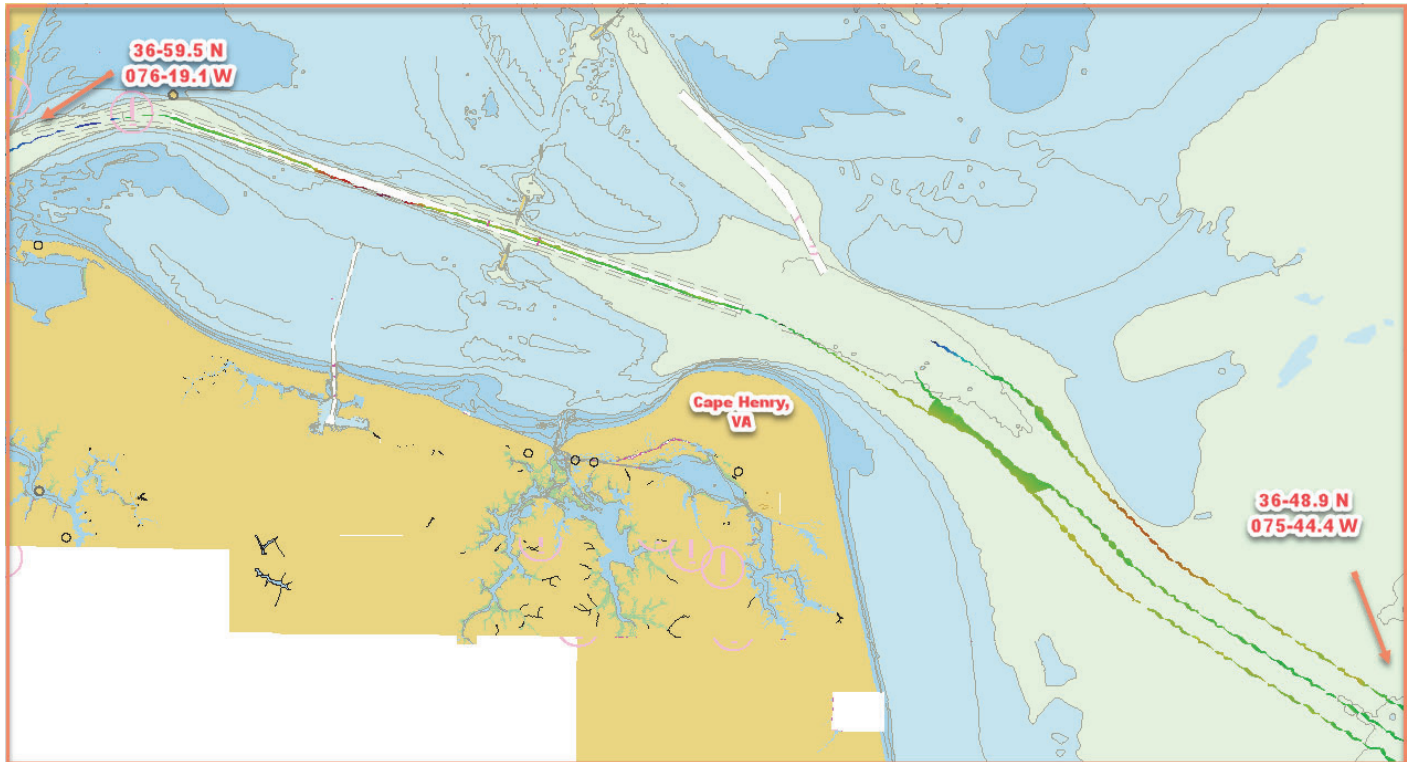


Figure 1: MBES Coverage graphic for D00272

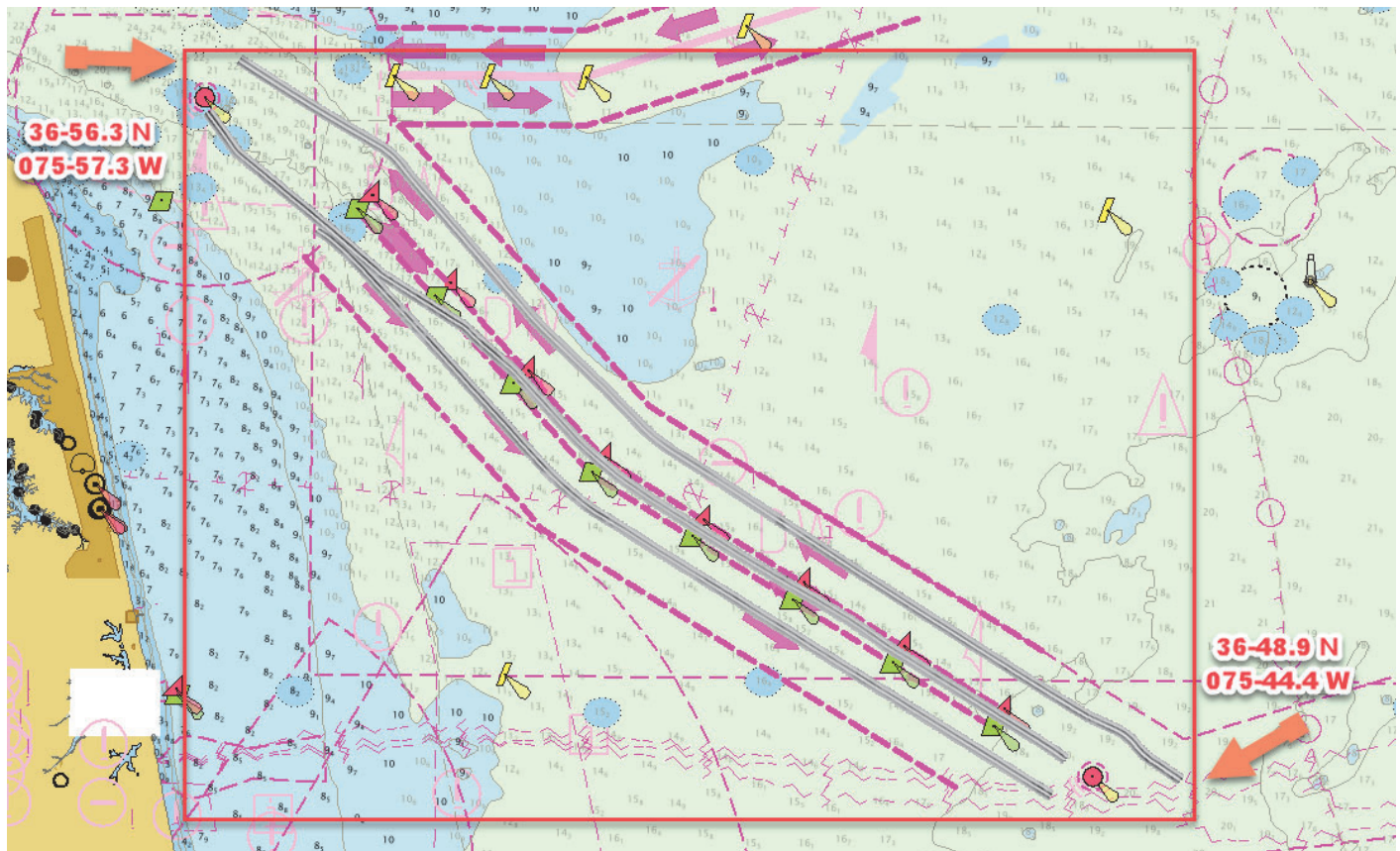


Figure 2: SSS Coverage graphic for D00272

## B. Survey Purpose

This project covers 280 SNM approaching Chesapeake Bay, home for two top 20 container ports in the USA: Baltimore, MD and Port of Virginia. Together they net over 116 million tons of imports and exports per year. (1)

The Port of Virginia, with four 50 foot deep water marine terminals located in Norfolk Harbor, 18 nautical miles from the Atlantic Ocean, regularly hosts the larger New Panamax vessels over 1,000 feet in length and the Ultra Large Container Vessels (ULCVs) over 1,200 feet. In 2018, the Port of Virginia received Congressional authorization to dredge 55 feet (16.75 meters) deep and 1,400 feet (426.72 meters) wide channels in Norfolk Harbor and plan to start in 2020. (2)

Norfolk is the home a Naval Station in the Sewell's Point area and is a major base for the US Atlantic Command, US Atlantic Fleet and other fleet forces operating internationally. The Port of Baltimore, 145 nautical miles from the Atlantic Ocean, also receives New Panamax and ULCV vessels and is competitively located close to USA Midwestern metropolitan areas with only a day truck drive. (3)

The most recent surveys in this approaches project are partial bottom coverage from the 1880s to 1940s. Chart depths currently indicate 66 to 110 feet. Historic storms and hurricanes have likely made substantial

changes to the seabed and therefore deprecated the nautical charts over the last century raising a concern for shoaling.

This survey is a critical part of an ongoing, multi-year hydrographic survey covering the Approaches to Chesapeake Bay to support the safety of waterborne commerce to these vital ports and monitor the habitat and the environmental health of the region. Survey data from this project is not adequate to supersede prior survey data in the common area.

1. U.S. Army Corps of Engineers, "Waterborne Commerce Statistics Center: Tonnage for selected U.S. ports in 2018." Institute for Water Resources. Submitted to USACE Digital Library 2019-12-12. <https://usace.contentdm.oclc.org/>. Accessed May 21, 2020.

2. The Port of Virginia, "Virginia Directories: Virginia Advantages." 600 World Trade Center, Norfolk, VA 23510. PORTOFVIRGINIA.COM. [http://aapa.files.cms-plus.com/AwardsCompetitionMaterials/2019CommunicationsAward/DirectoriesHandbooks/Virginia\\_Directories\\_Virginia-Advantages.pdf](http://aapa.files.cms-plus.com/AwardsCompetitionMaterials/2019CommunicationsAward/DirectoriesHandbooks/Virginia_Directories_Virginia-Advantages.pdf). Accessed May 21, 2020.

3. Ronan, Dan, "Port of Baltimore Welcomes Its Largest Cargo Ship" Transport Topics, May 29, 2019. <https://www.ttnews.com/articles/port-baltimore-welcomes-its-largest-cargo-ship>. Accessed May 21, 2020.

### **C. Intended Use of Survey**

The survey is NOT adequate to supersede previous data.

This survey is intended as a response to Hurricane Isaias that hit the Hampton Roads area on 04 August 2020 and was surveyed on 05 August 2020. The survey was added to the existing project OPR-D304-TJ-20.

This survey is intended for informational purposes only and is not adequate to supersede previous data. Due to operational time constraints, no crosslines were collected, meaning the specifications set out in 5.2.2 of the 2020 HSSD were not met. The hydrographer recommends that these data and the accompanying documentation be archived without further action.

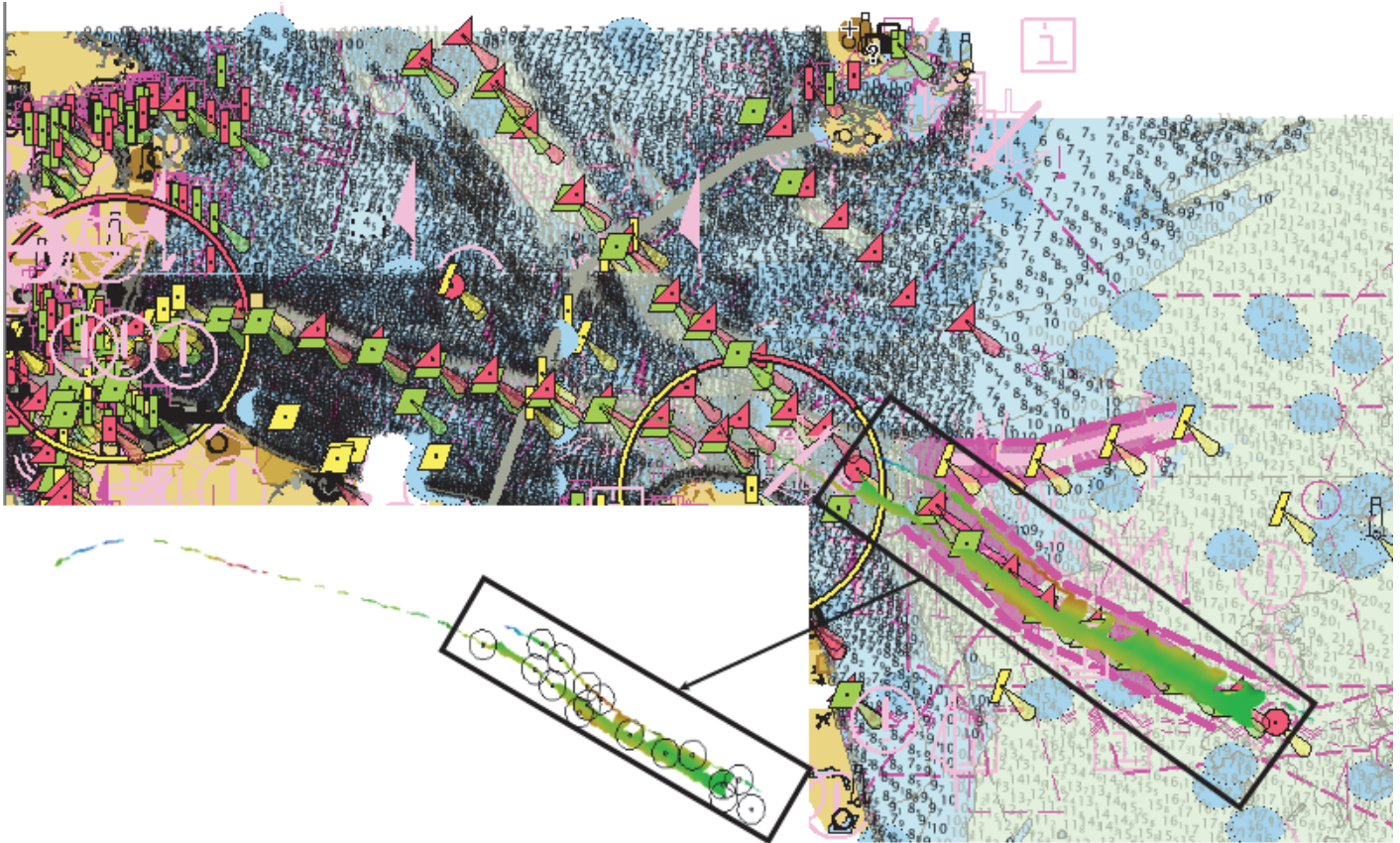
The survey was conducted in response to Hurricane Isaias to identify hazards and shoaling, as requested by stakeholders. The survey area lies within a dredged channel.

### **D. Data Acquisition and Processing**

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.

Due to traffic, sound speed casts were collected only within the south eastern Deep-water Traffic Separation Scheme (Figure 3). A total of 16 casts were taken.

No crosslines for D00272 were collected due to traffic and operational time constraints.



*Figure 3: SVP casts collected in the Deep-water Traffic Separation Scheme. Locations of casts are shown as circles.*

## E. Uncertainty

The bathymetric surface's uncertainty layer is compliant with HSSD 2020 uncertainty standards. Over 99.5% of all nodes pass uncertainty standards (Figure 4).

The following survey specific parameters were used for this survey:

Method: ERS via VDatum.

Measured: 0.0 meters.

Zoning: 0.09 meters.

Hull ID: S-222.

Measured MVP: 4 meters/second.

Surface: 0.2 meters/second.

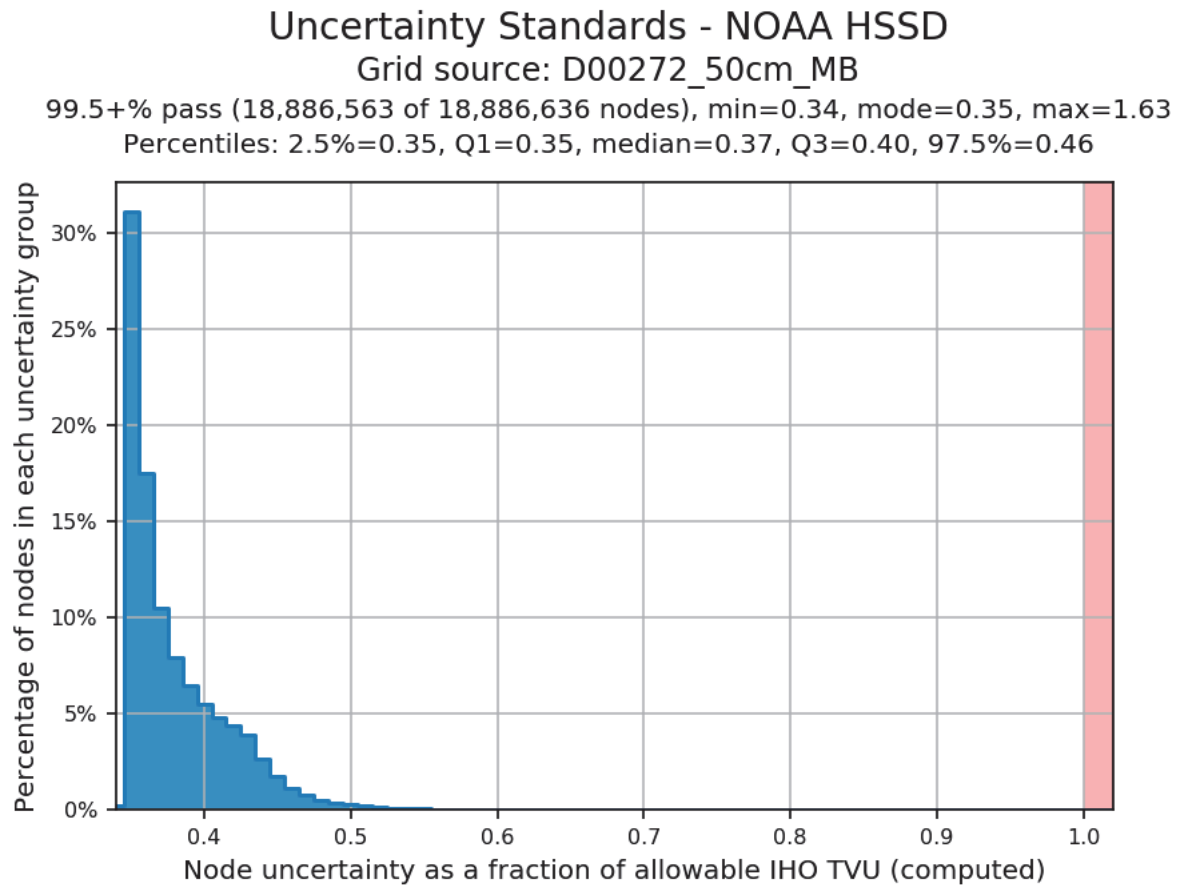


Figure 4: Plot of the Grid QA assessment of TVU values against IHO and NOAA HSSD specifications

## F. Results and Recommendations

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

| ENC      | Scale   | Edition | Update Application Date | Issue Date |
|----------|---------|---------|-------------------------|------------|
| US5VA11M | 1:50000 | 24      | 01/16/2020              | 08/12/2020 |
| US5VA13M | 1:40000 | 41      | 10/24/2019              | 08/21/2020 |
| US5VA15M | 1:20000 | 54      | 01/28/2020              | 10/19/2020 |
| US5VA19M | 1:20000 | 37      | 07/24/2020              | 07/24/2020 |
| US5VA20M | 1:20000 | 19      | 07/27/2018              | 02/24/2020 |

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

| Surface Name                    | Surface Type            | Resolution            | Depth Range    | Surface Parameter | Purpose                   |
|---------------------------------|-------------------------|-----------------------|----------------|-------------------|---------------------------|
| D00272_SSSAB_1m_455kHz_1of1     | SSS Mosaic              | 1 m                   | N/A            | N/A               | 100% SSS                  |
| D00272_MB_VR_MLLW               | CARIS VR Surface (CUBE) | Variable Resolution m | 9.8 m - 27.7 m | NOAA_VR           | Object Detection          |
| D00272_MB_VR_MLLW_Final         | CARIS VR Surface (CUBE) | Variable Resolution m | 9.8 m - 27.7 m | NOAA_VR           | Object Detection          |
| D00272_MBAB_6m_S222_100kHz_1of1 | MB Backscatter Mosaic   | 6 m                   | N/A            | N/A               | MBES Acoustic Backscatter |

A chart comparison was conducted between survey D00272 soundings and previously charted ENC soundings and tabulated channel depths using procedures outlined in the DAPR. Good agreement was found between survey soundings and chart information.

### G. Vertical and Horizontal Control

The vertical datum for this project is Mean Lower Low Water. The vertical control method used was VDatum.

All data have been reduced from the ellipsoid to MLLW using the VDatum Separation Model provided in the files associated with the Project Instructions.

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.

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 D00272 MBES data from vessel S222. The Wide Area Augmentation System (WAAS) was used for real-time horizontal control during data acquisition. NOAA Ship Thomas Jefferson is equipped with Applanix POS/MV position and orientation systems on the hull. Correctors are derived using a Precise Point Positioning (PPP) approach. The POS/MV data was post-processed in Applanix POSpac MMS using the Applanix RTX service to produce Smoothed Best Estimates of Trajectory (SBETs) and RMS uncertainty files using the method of Post Processed Precise Point Positioning (5P).



No DGPS stations were used for this survey.

Additional information discussing the vertical and horizontal control for this survey can be found in the DAPR for the 2020 field season.

## **H. Additional Results**

### Entire Survey Area not Covered

Due to the survey being a response to the impacts from Hurricane Isaias, the entire survey area was not covered. The survey was conducted to provide a quick general overview of how the hurricane may have impacted the dredged Thimble Shoal Channel and Southeastern deep-water Traffic Separation Scheme in the Chesapeake Bay entrance. THOMAS JEFFERSON ran one survey line through the deep draft Thimble Shoal Channel and one line in each lane of the SE safety fairway.

For this survey, THOMAS JEFFERSON looked for noticeable shifting shoals, offstation ATON's, new DTON's, and other new obstructions caused by Hurricane Isaias.

### Off-station Buoys

It was determined that the effects of the hurricane moved the following buoys offstation: Chesapeake Bay Entrance Lighted Whistle Buoy CH, Chesapeake Bay Southern Approach Lighted Buoy 15, Chesapeake Bay Southern Approach Lighted Buoy 16. The offstation buoys were immediately reported to the USCG Sector Virginia and have since been moved back to their appropriate locations. Reference the FFF for more information.

### Backscatter

Raw MBES backscatter was logged as part of the .all files of the Kongsberg EM710 system. Backscatter was processed in QPS Fledermaus GeoCoder Toolbox (FMGT) software, and the exported geotiffs are included in the final processed data package. Holidays in backscatter imagery were present.

### Fliers present in final MBES surface

A number of iterations of surface cleaning and QC were undertaken in an effort to eliminate all fliers from the final surface. However, the Flier Finder tool in Pydro has identified 9 fliers that still remain. The fliers are found on the surfaces edges in dynamic areas and over the sunken gravel barge. The points of the surface flagged as fliers are considered by the hydrographer to be accurate representations of dynamic seafloor conditions.

## I. Approval

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 Survey Summary 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, Standing and 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 Survey Summary Report.

| Approver Name               | Title                   | Date       | Signature   |
|-----------------------------|-------------------------|------------|---|
| CDR Briana Hillstrom, NOAA  | Commanding Officer      | 11/06/2020 | HILLSTROM.BRIANA.WELTON.1267667531<br>Digitally signed by HILLSTROM.BRIANA.WELTON.1267667531<br>Date: 2020.11.29 14:53:00 -05'00' |
| LT Calandria DeCastro, NOAA | Operations Officer      | 11/06/2020 | <i>Calandria De Castro</i><br>Digitally signed by DECASTRO.CALANDRIA.MALVIN A.1468902156<br>Date: 2020.11.30 08:28:25 -05'00'     |
| Joshua Hiteshew             | Chief Survey Technician | 11/06/2020 | HITESHEW.JOSHUA.TAYLOR.1537939652<br>Digitally signed by HITESHEW.JOSHUA.TAYLOR.1537939652<br>Date: 2020.11.30 16:44:26 Z         |
| ENS Tyler Aldrich, NOAA     | Sheet Manager           | 11/06/2020 | ALDRICH.TYLER.JAMES.1542491473<br>Digitally signed by ALDRICH.TYLER.JAMES.1542491473<br>Date: 2020.11.28 11:23:27 -05'00'         |