H12560

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

DESCRIPTIVE REPORT

Type of Survey:	Basic Hydrographic Survey
Registry Number:	H12560

LOCALITY

State(s):	Virginia
General Locality:	Coastal Virginia
Sub-locality:	13 NM East of Sand Shoal Inlet

2013

CHIEF OF PARTY
Charles F. Holloway

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H12560**

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:	**Coastal Virginia**
Sub-Locality:	**13 NM East of Sand Shoal Inlet**
Scale:	**40000**
Dates of Survey:	**08/06/2013 to 10/04/2013**
Instructions Dated:	**04/06/2012**
Project Number:	**OPR-D302-KR-13**
Field Unit:	**Leidos (formerly SAIC)**
Chief of Party:	**Charles F. Holloway**
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:

Contract: DG133C-08-CQ-0003

Contractor: Leidos 221 Third Street, Newport, RI 02840 USA.

Subcontractors: Divemasters, Inc., 15 Pumpshire Road, Toms River, NJ 08753; Rotator Staffing Services, 25 Kennedy Blvd., East Brunswick NJ 08816.

Leidos Doc 14-TR-018.

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 Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/.

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Descriptive Report to Accompany Survey H12560

Project: OPR-D302-KR-13

Locality: Coastal Virginia

Sublocality: 13 NM East of Sand Shoal Inlet

Scale: 1:40000

August 2013 - October 2013

Leidos (formerly SAIC)

Chief of Party: Charles F. Holloway

A. Area Surveyed

The area surveyed was a section of Coastal Virginia 13 NM East of Sand Shoal Inlet (Figure 1).

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
37° 20’ 48.23” N 075° 36’ 23.88” W	37° 14’ 51.36” N 075° 33’ 55.06” W

Table 1: Survey Limits

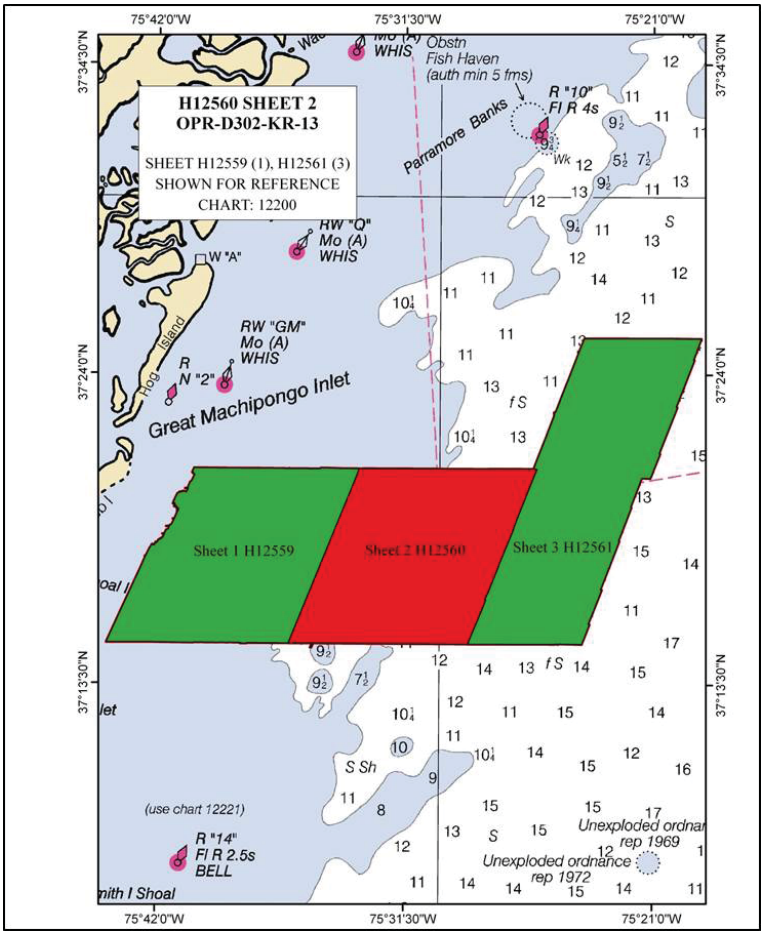

Figure 1: H12560 Survey Bounds

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

A.2 Survey Purpose

The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products. This project will cover approximately 109 square nautical miles, of which approximately 87 square nautical miles are designated critical survey area, as designated in the NOAA Hydrographic Survey Priorities (NHSP), 2012 Edition.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Leidos, formerly Science Applications International Corporation (SAIC), warrants only that the survey data acquired by Leidos and delivered to NOAA under Contract DG133C-08-CQ-0003 reflects the state of the sea floor in existence on the day and at the time the survey was conducted.

H12560 was surveyed in accordance with the following documents:
1. Project Instructions, OPR-D302-KR-13, dated 06 April 2012
2. Statement of Work, Hydrographic Survey Services, dated 11 April 2013
3. NOS Hydrographic Specifications and Deliverables, April 2013, released 18 April 2013 (HSSD)

A.4 Survey Coverage

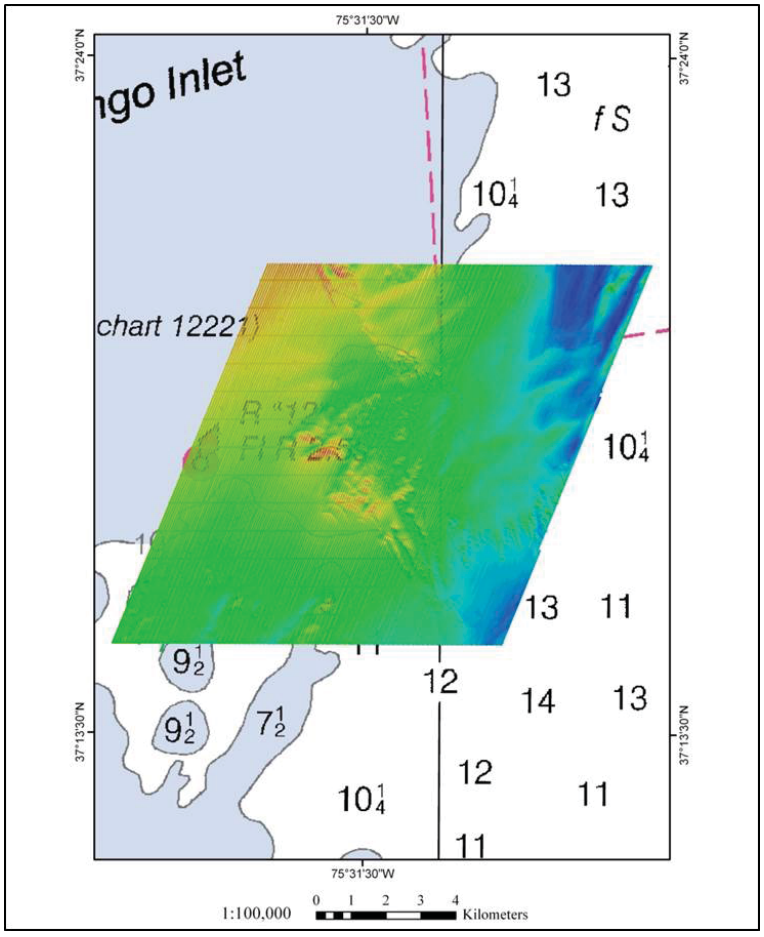

Figure 2: Final Bathymetry Coverage for H12560

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:

	HULL ID	*M/V Atlantic Surveyor*	*Total*
LNM	**SBES Mainscheme**	0	0
	MBES Mainscheme	0	0
	Lidar Mainscheme	0	0
	SSS Mainscheme	0	0
	SBES/MBES Combo Mainscheme	0	0
	SBES/SSS Combo Mainscheme	0	0
	MBES/SSS Combo Mainscheme	1026.3	1026.3
	SBES/MBES Combo Crosslines	85.1	85.1
	Lidar Crosslines	0	0
Number of Bottom Samples			0
Number AWOIS Items Investigated			1
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Items Investigated by Dive Ops			0
Total Number of SNM			35.75

Table 2: Hydrographic Survey Statistics

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

Survey Dates	Julian Day Number
08/06/2013	218
08/07/2013	219
08/08/2013	220
08/09/2013	221
08/10/2013	222
08/11/2013	223
08/12/2013	224
08/13/2013	225
08/14/2013	226
08/15/2013	227
08/16/2013	228
08/17/2013	229
08/20/2013	232
08/21/2013	233
08/22/2013	234
10/01/2013	274
10/04/2013	277

Table 3: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Leidos used their ISS-2000 software on a Windows XP platform to acquire these survey data. Survey planning and data analysis were conducted using the Leidos SABER software on Red Hat Enterprise 5 Linux platforms. L-3 Klein 3000 side scan data were collected on a Windows XP platform using L-3 Klein's SonarPro software. Subsequent processing and review of the side scan data, including the generation of coverage mosaics, were accomplished using SABER.

A detailed description of the systems and vessel used to acquire and process these data is included in the Data Acquisition and Processing Report (DAPR) for OPR-D302-KR-13, previously delivered with the H12559 Descriptive Report (DR) on 16 May, 2014. There were no variations from the equipment configuration described in the DAPR.

B.1.1 Vessels

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

Hull ID	*M/V Atlantic Surveyor*
LOA	110 feet
Draft	9 feet

Table 4: Vessels Used

The M/V Atlantic Surveyor was used to collect multibeam sonar (RESON 7125 SV), side scan sonar (L-3 Klein 3000), and sound speed data during twenty-four hours per day survey operations.

A detailed description of the vessel used is included in Section A of the Data Acquisition and Processing Report (DAPR).

B.1.2 Equipment

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

Manufacturer	Model	Type
Teledyne RESON	Seabat 7125 SV	MBES
L-3 Klein	3000	SSS
Applanix	POS/MV 320	Positioning and Attitude System
Trimble	Probeacon	Positioning System
Rolls Royce	MVP-30	Sound Speed System

Table 5: Major Systems Used

A detailed description of the equipment installed on each vessel is included in Section A of the Data Acquisition and Processing Report (DAPR).

B.2 Quality Control

B.2.1 Crosslines

Crosslines, acquired for this survey, totalled 8.3% of mainscheme acquisition.

There were 85.1 linear nautical miles of crosslines and 1026.3 linear nautical miles of main scheme lines surveyed on H12560. This resulted in crossline mileage approximately 8.3% of the main scheme mileage which meets the requirement (Section 5.2.4.3 of the HSSD) to achieve at least eight percent for a multibeam survey using set line spacing. The main scheme lines were orientated 22°/202° and spaced 65 meters apart. Crosslines were oriented 90°/270° and spaced 800 meters apart. Refer to the "Multibeam Processing Log" section within Separates I for information on the delineation of main scheme and crossline data files.

In the field, hydrographers conducted daily comparisons of main scheme to near nadir crossline data to ensure that no systematic errors were introduced and to identify potential problems with the survey system. After the application of all correctors and completion of final processing in the office, separate two-meter CUBE PFM grids were built. One grid contained the full valid swath (±60° from nadir) of main scheme multibeam data and the other included only the near nadir swath (±5° from nadir) crossline data. A difference grid was then generated by subtracting the CUBE depths in the main scheme PFM from the CUBE depths in the crossline PFM.

The SABER Frequency Distribution Tool was used to analyze the difference grid. Comparisons of all final crossing data in H12560 showed that 98.61% were within 25 centimeters. These comparisons fall within the requirement defined in Section 5.2.4.3 of the HSSD, which states that at least 95% of the depth difference values are to be within the maximum allowable total vertical uncertainty (calculated to be between 0.520 and 0.612 meters for the water depths observed in H12560). See Separates II for a complete discussion of the analysis and tabular results.

B.2.2 Uncertainty

The Total Propagated Uncertainty (TPU) model that Leidos has adopted had its genesis at the Naval Oceanographic Office (NAVOCEANO), and is based on the work by Rob Hare and others ("Error Budget Analysis for NAVOCEANO Hydrographic Survey Systems, Task 2 FY 01", 2001, HSRC FY01 Task 2 Final Report). Once the TPU model is applied to the GSF bathymetry data, each beam is attributed with the horizontal uncertainty and the vertical uncertainty at the 95% confidence level. For specific details on the use and application of the SABER Total Propagated Uncertainty model, see Section B.1 in the DAPR.

The vertical and horizontal uncertainty values that were estimated by the TPU model for individual multibeam soundings varied little across the dataset, tending to be most affected by beam angle in the multibeam data. During application of horizontal and vertical uncertainties to the GSF files, individual beams where either the horizontal or vertical uncertainty exceeded the maximum allowable IHO S-44 5th edition Order 1a specifications were flagged as invalid. As a result, all individual soundings used in development of the final CUBE depth surface had modeled vertical and horizontal uncertainty values at or below the allowable IHO S-44 5th edition, Order 1a uncertainty.

During the creation of the CUBE surface, two separate vertical uncertainty surfaces are calculated by the SABER software. One surface contains the standard deviation of all soundings that are contributing to the CUBE hypothesis (Hyp. StdDev) and the other contains the average of the vertical uncertainty of all soundings contributing to the CUBE hypothesis (Hyp. AvgTPU). A third vertical uncertainty surface is generated from the larger value of these two uncertainties at each node and is referred to as the Hypothesis Final Uncertainty (Hyp. Final Uncertainty). For specific details on this process see Section B.2 of the DAPR.

The final two-meter PFM CUBE surface contained final vertical uncertainties that ranged from 0.270 to 0.659 meters. The IHO Order 1a maximum allowable vertical uncertainty was calculated to range between 0.520 to 0.612 meters, based on the minimum CUBE depth (11.044 meters) and maximum CUBE depth (27.204 meters). The SABER Check PFM Uncertainty function was used to highlight all instances in the Hyp. Final Uncertainty surface where a given node exceeded the IHO Order 1a allowable vertical uncertainty for the CUBE depth at that node. The final two-meter PFM CUBE surface contained one CUBE node with a final vertical uncertainty that exceeded IHO Order 1a allowable vertical uncertainty. This high vertical uncertainty resulted from a small depth difference in the outer beams of adjacent swaths.

The SABER Check PFM Uncertainty function was also run on each of the two half-meter feature PFM Hyp. Final Uncertainty surfaces. The results are listed in Figure 3. As expected, there are higher numbers of nodes that exceed uncertainty limits due to the smaller node resolution and the high variability of sounding depths around features.

The SABER Frequency Distribution Tool was also used to review the Hyp. Final Uncertainty surface within the two-meter grid and two half-meter resolution PFM grids. The results show that in the two-meter PFM, 99.75% of all nodes had final uncertainties less than or equal to 0.300 meters. In the two individual feature PFM grids, at least 99.78% of all grid nodes contained total vertical uncertainties of 0.300 meters or less.

Feature Area	Feature Number	Number of Cube Nodes Exceeding IHO Order 1a	Percent of Nodes with TVU ≤ 0.300
1	1	28	99.78%
2	5	28	99.79%

Figure 3: Number of Nodes Exceeding the Allowable IHO Order1a Uncertainty in the Feature BAG Files 1 of 2 and 2 of 2

B.2.3 Junctions

An analysis of H12560 junctions with contemporary surveys H12396, H12397, and H12559 was performed. Note that the Project Instructions stated that junctions should be performed on H12395 as well, however, there were no overlapping data from H12560 and this survey. Figure 4 shows the general locality of H12560 as it relates to the sheets for which junctions were performed. Details for H12396, H12397, and H12559 are listed in Table 6. See Separates II for a complete discussion of the junction results and tabular listings. Analysis of the junction with H12561 was not conducted, as the processing efforts for this sheet were still ongoing.

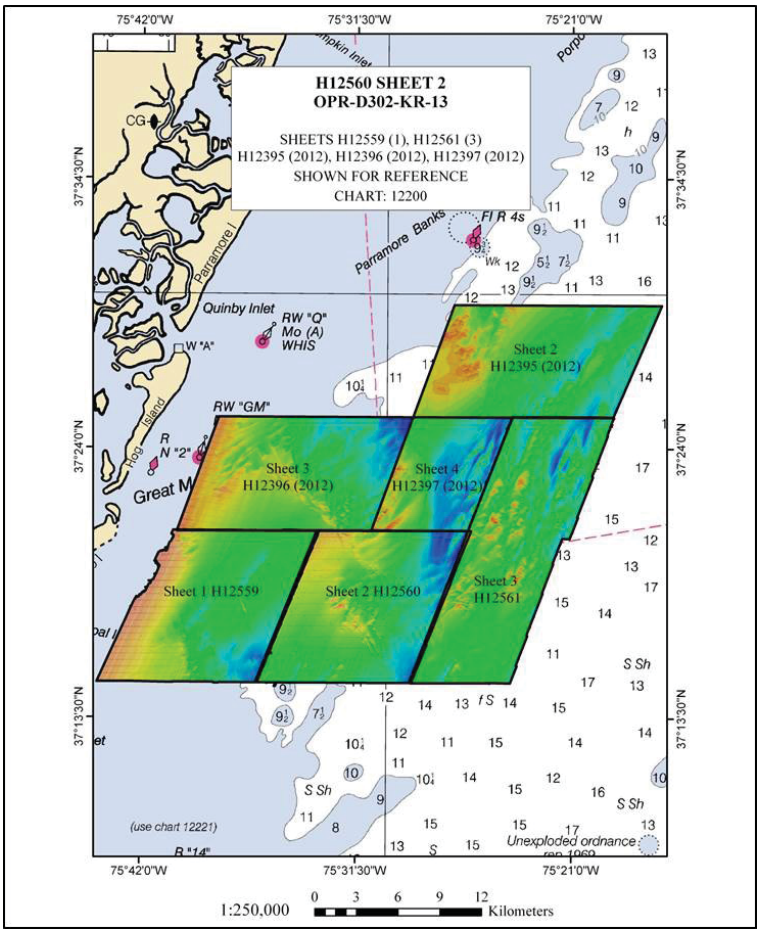

Figure 4: General Locality of H12560 with Contemporary Surveys

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12396	1:40000	2012	Leidos (formerly SAIC)	NW
H12397	1:40000	2012	Leidos (formerly SAIC)	NE
H12559	1:20000	2013	Leidos (formerly SAIC)	W

Table 6: Junctioning Surveys

H12396

H12560 junctions with H12396 to the Northwest. 94.33% of the soundings differ by ±0.55 meters.

H12397

H12560 junctions with H12397 to the Northeast. 96.58% of the soundings differ by ±0.40 meters.

H12559

H12560 junctions with H12559 to the West. 99.35% of the soundings differ by ±0.30 meters.

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: On the M/V Atlantic Surveyor, the MVP-30 was used to collect sound speed profile (SSP) data. SSP data were obtained at intervals frequent enough to meet depth accuracy requirements. Section 5.2.3.3 of the HSSD requires that if the sound speed measured at the sonar head differs by more than two meters/second from the commensurate profile data, then another cast shall be acquired. There were times when the sound speed values exceeded the two meters/second threshold due to the local temporal and tidal variability. During these times, several profiles were acquired and reapplied in an effort to reduce these effects. The product of this effort resulted in the final data bearing no significant artifacts due to sound speed differences.

Additional information can be found in Section A.8 of the DAPR.

A total of 459 sound speed profiles were applied to online data for H12560. All profiles that were applied for online bathymetry data collection were acquired within the bounds of the survey area. Please refer to the DAPR for specific details regarding acquisition (Section A.8) and application (Section C.1.3) of sound speed profiles.

Confidence checks of the sound speed profile casts were conducted periodically (approximately once per week) by comparing at least two consecutive casts taken with different SV and P Smart Sensors. Six sound speed confidence checks were conducted during H12560 and the results can be found in Separates II within the “Comparison Cast Log” section.

Sound speed profiles were obtained for four different survey purposes. The “Sound Speed Profile Log” section of Separates II is a cumulative report detailing each cast associated with H12560. The log is separated by the purpose of the applied cast; with individual tables for “Used for MB” (online bathymetry), “Used for Comparison”, “Used for Lead Line”, and “Used for Closing”. Additionally, in a separate folder on the delivery drive (H12560/Data/Processed/SVP/CARIS_SSP), there are four CARIS SSP files (.svp). These files contain concatenated SSP data that have been formatted for use in CARIS. The CARIS SSP files are designated based on the purpose of the cast and their filenames match the tables within the "Sound Speed Profile Log". All sound speed profile files are delivered with the H12560 delivery data and are broken out into sub-folders, which correspond to the purpose of each cast.

B.2.8 Coverage Equipment and Methods

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

B.2.9 Coverage Analysis

The Project Instructions specified coverage requirements in the survey area as “(1) 200% Side Scan Sonar (SSS) with concurrent Set Line Spacing, Multibeam (MBES) and Backscatter, or (2) 200% SSS with concurrent Vertical Beam Echosounder (VBES), or (3) Object Detection MBES with Backscatter”. Leidos choose to meet the coverage requirements with 200% side scan with concurrent set line spacing multibeam. To achieve this coverage the M/V Atlantic Surveyor used a towed L-3 Klein 3000 side scan sonar set to a 75-meter range and a main scheme line spacing of 65 meters. This survey scenario provided a consistent 150-meter side scan imagery swath and up to 20 meters of side scan overlap between adjacent lines within each 100% coverage and resulting multibeam coverage.

The SABER Gapchecker routine was used to flag bathymetry data gaps exceeding the allowable limit of three contiguous nodes. Additionally, the entire surface was visually scanned for holidays at various points during the data processing effort. Additional survey lines were run to fill any holidays that were detected. A final review of the CUBE Depth surface in the two-meter grid showed that valid depths exist in 100% of the nodes and there were no areas where three or more nodes sharing adjacent sides lacked data.

All grids were examined for the number of soundings contributing to the chosen CUBE hypotheses for each node by running SABER’s Frequency Distribution Tool on the Hypothesis Number of Soundings (Hyp # Soundings) surface of the PFM grid. The Hyp # Soundings surface reports the number of soundings that were used to compute the chosen hypothesis. Analysis of the H12560 two-meter PFM grid revealed that 99.74% of all nodes contained three or more soundings; satisfying the requirements for set line spacing surveys, as specified in Section 5.2.2.3 of the HSSD.

Analysis of the two half-meter PFM grids showed a minimum of 95.74% of all individual nodes contained five or more soundings to meet object detection coverage (HSSD Section 5.2.2.1).

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

In accordance with the April 2013 NOS HSSD and the Project Instructions, Leidos collected multibeam backscatter with all GSF data acquired by the RESON 7125 SV. The multibeam settings were checked to ensure acceptable quality standards were met and to avoid any acoustic saturation of the backscatter data. The multibeam backscatter data acquired by each system were written to the GSF in real-time by ISS-2000 and are delivered in the final GSF files for each sheet.

B.5 Data Processing

B.5.1 Software Updates

There were no software configuration changes after the DAPR was submitted.

The following Feature Object Catalog was used: NOAA Extended Attribute Files V5-2.

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
H12560_MB_2m_MLLW	BAG	2 meters	11.044 meters - 27.204 meters	N/A	MBES TracklineSBES Set Line Spacing

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12560_MB_50cm_MLLW_1of2	BAG	50 centimeters	21.070 meters - 23.177 meters	N/A	Object Detection
H12560_MB_50cm_MLLW_2of2	BAG	50 centimeters	20.168 meters - 21.626 meters	N/A	Object Detection
H12560_ss_1_100	SSS Mosaic	1 meters	-	N/A	100% SSS
H12560_ss_2_100	SSS Mosaic	1 meters	-	N/A	100% SSS

Table 7: Submitted Surfaces

A PFM CUBE Depth surface was used to assess and document multibeam survey coverage. The CUBE depth is populated with either the node's chosen hypothesis or the depth of a feature or designated sounding set by the hydrographer, which overrides the chosen hypothesis. The range of CUBE depths in H12560 was from 11.044 meters, 0.270-meter uncertainty (36 feet) to 27.204 meters, 0.288-meter uncertainty (89 feet). Section 5.2.2.3 of the HSSD requires a four-meter grid resolution for depths ranging from zero meters to 40 meters for set line spacing surveys. Due to the range of depths encountered on this project, Leidos requested and was granted permission to deliver all final grids at the higher two-meter node resolution. Therefore, final CUBE surfaces for H12560 were generated at two-meter grid node resolution. Over significant features, CUBE surfaces were generated at half-meter grid node resolution to meet the object detection specifications defined in Section 5.2.2.1 of the HSSD. Two significant features were identified in H12560 and two half-meter resolution PFM grids were generated to cover these features. Data within the half-meter resolution CUBE PFM grids also remain in the two-meter CUBE PFM grid.

The final gridded bathymetry data are delivered as Bathymetric Attributed Grids (BAG). The BAG files were exported from CUBE PFM grids as detailed in Section B.2.4 of the DAPR.

As of the date of delivery of H12560, CARIS does not support version 1.5.1 BAGs with optional surfaces. Therefore, BAG version 1.1.0 files are delivered. Since the BAG version 1.1.0 files only contain two surfaces, the standard CUBE Depth and Final Hyp. Uncertainty, BAGs will be delivered with the additional surfaces delivered as supplemental non-standard BAG files. These additional BAG files were generated through the same process as the standard BAG files. The version 1.1.0 BAG format only allows for a Depth surface and an Uncertainty surface. Therefore, each of the non-standard BAG files were created with the CUBE Depth values populating the Depth surface of the BAG and each of the additional group surfaces listed below populating the Uncertainty surface of the BAG.

Please note when reviewing these additional, non-standard version 1.1.0 BAG files the file name designates the layer that populates the Uncertainty layer of the BAG (Figure 5). Please also note that when displayed the two layers of the BAG remain named Depth and Uncertainty. These non-standard BAGs are provided

for review purposes only and are not intended to be used as archival products. These additional surfaces are referred to as Elevation Solution Group surfaces and Node Group surfaces.

Note that by definition, BAG files contain elevations not depths however; many software packages display a BAG elevation surface as a depth (positive values indicating water depth).

The Elevation Solution Group is made up of the following three surfaces:

· shoal elevation - the elevation value of the least-depth measurement selected from the sub-set of measurements that contributed to the elevation solution.
· number of soundings - the number of elevation measurements selected from the sub-set of measurements that contributed to the elevation solution.
· stddev - the standard deviation computed from all elevation values which contributed to any hypothesis within the node. Note that the stddev value is computed from all measurements contributing to the node, whereas shoal elevation and number of soundings relate only to the chosen elevation solution.

The Node Group is made up of the following two surfaces:

· hypothesis strength - the CUBE computed strength of the chosen hypothesis.
· number of hypotheses - the CUBE computed number of hypotheses.

BAG File Name	Comments
H12560_MB_2m_MLLW_CUBE_Depth_Node_Std_Dev	Standard Deviation (Elevation Solution) of 2.0-meter BAG
H12560_MB_2m_MLLW_CUBE_Depth_Hyp_Nmbr_of_Sndgs	Number of Soundings (Elevation Solution) of 2.0-meter BAG
H12560_MB_2m_MLLW_CUBE_Depth_Node_Shoal_Depth	Shoal Depth (Elevation Solution) of 2.0-meter BAG
H12560_MB_2m_MLLW_CUBE_Depth_Node_Hyp_Str	Hypothesis Strength (Node Group) of 2.0-meter BAG
H12560_MB_2m_MLLW_CUBE_Depth_Node_Nmbr_of_Hyp	Number of Hypotheses (Node Group) of 2.0-meter BAG
H12560_MB_50cm_MLLW_CUBE_Depth_Node_Std_Dev_1of2	Standard Deviation (Elevation Solution) of 0.5-meter BAG
H12560_MB_50cm_MLLW_CUBE_Depth_Hyp_Nmbr_of_Sndgs_1of2	Number of Soundings (Elevation Solution) of 0.50-meter BAG
H12560_MB_50cm_MLLW_CUBE_Depth_Node_Shoal_Depth_1of2	Shoal Depth (Elevation Solution) of 0.50-meter BAG
H12560_MB_50cm_MLLW_CUBE_Depth_Node_Hyp_Str_1of2	Hypothesis Strength (Node Group) of 0.50-meter BAG
H12560_MB_50cm_MLLW_CUBE_Depth_Node_Nmbr_of_Hyp_1of2	Number of Hypotheses (Node Group) of 0.50-meter BAG
H12560_MB_50cm_MLLW_CUBE_Depth_Node_Std_Dev_2of2	Standard Deviation (Elevation Solution) of 0.50-meter BAG
H12560_MB_50cm_MLLW_CUBE_Depth_Hyp_Nmbr_of_Sndgs_2of2	Number of Soundings (Elevation Solution) of 0.50-meter BAG
H12560_MB_50cm_MLLW_CUBE_Depth_Node_Shoal_Depth_2of2	Shoal Depth (Elevation Solution) of 0.50-meter BAG
H12560_MB_50cm_MLLW_CUBE_Depth_Node_Hyp_Str_2of2	Hypothesis Strength (Node Group) of 0.50-meter BAG
H12560_MB_50cm_MLLW_CUBE_Depth_Node_Nmbr_of_Hyp_2of2	Number of Hypotheses (Node Group) of 0.50-meter BAG

Figure 5: Summary of Non-standard H12560 BAG Files

B.5.3 Side Scan Coverage Analysis

For all details regarding side scan data processing, see Section B.3 of the DAPR. The Project Instructions required (1) 200% Side Scan Sonar (SSS) with concurrent Set Line Spacing Multibeam (MBES) and Backscatter, or (2) 200% SSS with concurrent Vertical Beam Echosounder (VBES), or (3) Object Detection MBES with Backscatter. Leidos chose to meet the coverage requirements with 200% side scan with concurrent set line spacing multibeam. The 200% side scan coverage was verified by generating two separate 100% coverage mosaics at one-meter cell size resolution as specified in Section 8.3.1 of the HSSD. The first and second 100% coverage mosaics were independently reviewed using tools in SABER to verify data quality and swath coverage. Both coverage mosaics are determined to be complete and sufficient to meet the requirements contained within the Project Instructions. The mosaics are delivered as TIFF (.tif) images with accompanying world files (.tfw).

· H12560_ss_1_100_mosaic
· H12560_ss_2_100_mosaic

Side scan sonar contacts were investigated and confirmed using SABER Contact Review. All side scan sonar contacts and accompanying images are delivered in the Side Scan Sonar Contacts S-57 file.

C. Vertical and Horizontal Control

No vertical or horizontal controls were established, recovered, or occupied during data acquisition for OPR-D302-KR-13, which includes H12560. Therefore a Horizontal and Vertical Control Report was not required.

C.1 Vertical Control

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

Standard Vertical Control Methods Used:

Discrete Zoning

The following National Water Level Observation Network (NWLON) stations served as datum control for this survey:

Station Name	Station ID
Duck, NC	8651370

Table 8: NWLON Tide Stations

File Name	Status
8651370_verified_07102013_10062013.tid	Verified Observed

Table 9: Water Level Files (.tid)

File Name	Status
D302KR2013CORP.zdf	Final

Table 10: Tide Correctors (.zdf or .tc)

No final tide note was provided by the NOAA Center for Operational Oceanographic Products and Services (CO-OPS). Leidos is not required to have a final tide note from CO-OPS for H12560 however, a final tide note has been provided by Leidos in Appendix I.

The Project Instructions specified NOAA tide station 8651370 Duck, NC as the source for water level correctors. A full explanation of the tide zone assessment is detailed in Section C.4 of the DAPR. For H12560, 8651370 Duck, NC was the source of all final verified water level heights for determining correctors to soundings. All data for H12560 were contained within two tide zones (SA54 and SA55) which were provided from NOAA.

Leidos did not revise the delivered tide zones for tide station 8651370 Duck, NC as the water level zoning parameters in the file D302KR2013CORP.zdf, provided by National Ocean Service (NOS) were deemed adequate for the application of observed verified water levels. As a result, they were accepted as final and applied to all H12560 bathymetry data.

C.2 Horizontal Control

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

The projection used for this project is UTM Zone 18, North.

Please refer to the DAPR for details regarding all antenna and transducer offsets.

Horizontal positioning of the multibeam transducer by the POS/MV was verified by frequent comparison checks against an independent DGPS system. During survey data acquisition, the ISS-2000 real-time system provided a continuous view of the positioning comparison between the POS/MV and the Trimble DGPS. An alarm was triggered within ISS-2000 if the comparisons were not within an acceptable range. Any soundings with total horizontal uncertainties exceeding the maximum allowable IHO S-44 5th edition Order

1a specifications were flagged as invalid and therefore not used in the CUBE Depth calculations. Daily positioning confidence checks for H12560 were conducted several times throughout the day and a daily value is presented as a table within Separates I, “Daily Positioning Confidence Checks”. Daily positioning confidence checks for the M/V Atlantic Surveyor were within 0.61 meters.

The following DGPS Stations were used for horizontal control:

DGPS Stations
Driver, VA (289 kHz)
Annapolis, MD (301 kHz)
New Bern, NC (294 kHz)

Table 11: USCG DGPS Stations

D. Results and Recommendations

D.1 Chart Comparison

The chart comparisons were conducted using the Leidos SABER software to view the BSB raster charts with overlain data for H12560 such as the CUBE gridded surface, selected soundings, contacts, and features. Charting recommendations for depths follow Section 5.1.2 of the HSSD where depths and uncertainties are to be rounded by standard arithmetic rounding (round half up) and accompanying chart depth units are rounded using NOAA cartographic rounding (0.75 round up). All CUBE depths and uncertainty values are provided to millimeter precision.

For ENC comparisons, a combination of Jeppesen’s dKart Inspector, SevenCs’ SeeMyDENC, and CARIS’ EasyView were used in conjunction with SABER.

United States Coast Guard (USCG) District 5 Local Notice to Mariners publications were reviewed for changes subsequent to the date of the Hydrographic Survey Project Instructions and before the end of survey (as specified in Section 8.1.4 of the HSSD). The Notice to Mariners reviewed were from week 27/13 (02 July 2013) until week 41/13 (08 October 2013).

D.1.1 Raster Charts

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

Chart	Scale	Edition	Edition Date	LNM Date	NM Date
12221	1:80000	8	02/2014	04/29/2014	04/26/2014
12200	1:419706	50	07/2011	04/29/2014	04/26/2014

Table 12: Largest Scale Raster Charts

12221

Chart 12221 covers the survey area west of 075° 29’ 00.00”W.

There are no federally maintained channels within H12560 on this chart.

The charted 60-foot depth curves were generally found to be in agreement with the H12560 survey data.

CUBE depths within sheet H12560 were generally within ±3 feet of the charted depths.

There were no charted soundings or features not specifically assigned as an AWOIS item within H12560 on this chart.

The AWOIS item on this chart is discussed in Section D.1.3.

All new uncharted features found, assigned AWOIS items, and charted feature updates are documented in the Final Feature File (S-57).

12200

Chart 12200 covers the entire survey area.

There are no federally maintained channels within H12560 on this chart.

The charted 10-fathom depth curves were generally found to be in agreement with the H12560 survey data.

CUBE depths within sheet H12560 were generally within ±1 fathom of the charted depths.

There were no charted soundings or features not specifically assigned as an AWOIS item within H12560 on this chart.

The AWOIS item on this chart is discussed in Section D.1.3.

All new uncharted features found, assigned AWOIS items, and charted feature updates are documented in the Final Feature File (S-57).

D.1.2 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US5VA12M	1:80000	22	04/06/2012	02/26/2014	NO
US3DE01M	1:419706	14	04/24/2013	04/28/2014	NO

Table 13: Largest Scale ENCs

US5VA12M

Chart US5VA12M covers the survey area west of 075° 29’ 00.00”W.

There are no federally maintained channels within H12560 on this chart.

The charted 18.2-meter depth curve is generally in agreement with the H12560 survey data.

CUBE depths within sheet H12560 were generally within ±1 meter of the charted depths.

There were no charted soundings or features not specifically assigned as an AWOIS item within H12560 on this chart.

The AWOIS item on this chart is discussed in Section D.1.3.

All new uncharted features found, assigned AWOIS items, and charted feature updates are documented in the Final Feature File (S-57).

US3DE01M

Chart US3DE01M covers the entire survey area.

There are no federally maintained channels within H12560 on this chart.

The charted 18.2-meter depth curve is generally in agreement with the H12560 survey data.

CUBE depths within sheet H12560 were generally within ±1 meter of the charted depths.

There were no charted soundings or features not specifically assigned as an AWOIS item within H12560 on this chart.

The AWOIS item on this chart is discussed in Section D.1.3.

All new uncharted features found, assigned AWOIS items, and charted feature updates are documented in the Final Feature File (S-57).

D.1.3 AWOIS Items

All assigned and information AWOIS item updates are included in the Final Feature File (S-57).

AWOIS 959 was not found. The 500-meter search radius was investigated with 200% side scan and resulting multibeam coverage. No features and two non-significant contacts were found inside the search area. Leidos determined the contacts were not AWOIS 959.

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

See the S-57 Final Feature File for all the details and recommendations regarding new uncharted features investigated.

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

Junction analysis with prior contemporary surveys H12396 (2012), H12397 (2012), and H12559 (2013) were conducted and the results are presented in Section B.2.3 of this Report.

D.2.3 Aids to Navigation

Within H12560 there was one USCG maintained Aid to Navigation (ATON), Hog Island Lighted Buoy 12. This ATON is not included in the S-57 Final Feature file as called for in the HSSD.

The Feature Correlator Sheet for the ATON is presented as a JPEG file in the Multimedia folder, named by the feature number (H12560_Feature_004).

ATON Hog Island Lighted Buoy 12 (Fl R 2.5s) was compared to the United States Coast Guard Light List Volume II Atlantic Coast, updated through LNM week 19/14. It was found to be serving its intended purpose.

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

No significant features 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 Designated Soundings

No designated soundings were set for H12560.

D.2.11 Final Feature S-57 File

Included with the H12560 delivery is the S-57 Final Feature File, H12560_FFF.000. Details on how this file was generated and quality controlled can be found in Section B.2.6 of the DAPR. The S-57 feature file delivered for H12560 contains millimeter precision for the value of sounding (VALSOU) attribute. As specified in Section 8.2 of the HSSD, the S-57 feature file is in the WGS84 datum and is unprojected with all depth units in meters. All of the features found in H12560 are retained within the S-57 Final Feature File.

Feature Correlator Sheets were exported as image files (.jpg) and are included in the S-57 Final Feature File under the NOAA Extended Attribute field “images” where applicable.

D.2.12 Side Scan Sonar Contacts S-57 File

Included with the H12560 delivery is the Side Scan Sonar Contact S-57 File, H12560_SSCon.000. Details on how this file was generated and quality controlled can be found in Section B.2.6 of the DAPR. As specified in Section 8.2 of the HSSD, the S-57 feature file is in the WGS84 datum and is unprojected with all depth units in meters.

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.

Report Name	Report Date Sent
Descriptive Report, H12559	2014-05-16
Data Acquisition and Processing Report	2014-05-16

Approver Name	Approver Title	Approval Date	Signature
Charles F. Holloway	Lead Hydrographer	05/23/2014	Charles F. Holloway Digitally signed by Charles F. Holloway DN: cn=Charles F. Holloway, o=Marine Survey and Engineering Solutions, ou=Leidos, email=hollowaycf@leidos.com, c=US Date: 2014.05.22 15:01:06 -04'00'

F. Table of Acronyms

Acronym	Definition
ACD	Automatic Contact Detection
AHB	Atlantic Hydrographic Branch
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
CO-OPS	Center for Operational Products and Services
CTD	Conductivity Temperature Depth
CSF	Composite Source File
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Detached Position
DPC	Data Processing Center
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
EPF	Error Parameters File
FFF	Final Feature File
GAMS	GPS Azimuth Measurement Subsystem
GPS	Global Positioning System
GSF	Generic Sensor Format
HSD	Hydrographic Surveys Division
HSSD	Hydrographic Survey Specifications and Deliverables
HVCR	Horizontal and Vertical Control Report
IHO	International Hydrographic Organization
IMU	Inertial Measurement Unit
LNM	Local Notice to Mariners
LNM	Linear Nautical Miles
ISS-2000	Integrated Survey System 2000
ISSC	Integrated Survey System Computer
JD	Julian Day
MBES	Multibeam Echosounder
MCD	Marine Chart Division

Acronym	Definition
MHW	Mean High Water
MLLW	Mean Lower Low Water
MVE	Multi-View Editor
MVP	Moving Vessel Profiler
NAD 83	North American Datum of 1983
NM	Notice to Mariners
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
OCS	Office of Coast Survey
PFM	Pure File Magic
POS/MV	Position and Orientation System for Marine Vessels
PRF	Project Reference File
SABER	Survey Analysis and area Based EditoR
SBES	Singlebeam Echosounder
SNM	Square Nautical Miles
SSS	Side Scan Sonar
SSP	Sound Speed Profiler
TPU	Total Propagated Uncertainty
USCG	United Stated Coast Guard
UTM	Universal Transverse Mercator
ZDF	Zone Definition File

APPENDIX I

TIDES AND WATER LEVELS

APPENDIX I. TIDES AND WATER LEVELS

Field Tide Note

A field tide note was not required for H12560.

Final Tide Note

Observed verified water levels for the station in Duck, NC (8651370) were downloaded from the NOAA Tides and Currents web site. Water Level correctors were prepared for each zone using the **SABER Create Water Level Files** software. The **SABER Apply Correctors** software applied the water level data to the multibeam data according to the zone containing the nadir beam of each ping.

Please refer to the H12560 Descriptive Report Section C.1 for details regarding final tides for H12560. The water level zoning correctors, based entirely on Duck, NC (8651370), were applied to all multibeam data for H12560.

No final tide note was provided by NOAA Center for Operational Oceanographic Products and Services (CO-OPS), Leidos is not required to have a final tide note from CO-OPS.

The on-line times for acquisition of valid hydrographic data are presented in the Abstract Times of Hydrography, H12560 (Table A-1).

Abstract Times of Hydrography

Project: OPR-D302-KR-13
Registry #: H12560
Contractor Name: Leidos
Date: 23 May 2014
Sheet Designation: 2
Inclusive Dates: 06 August 2013 – 04 October 2013
Field work is complete.

Begin Date	Begin Julian Day	Begin Time	End Date	End Julian Day	End Time
8/06/2013	218	03:57:08	8/06/2013	218	12:14:16
8/07/2013	219	16:50:49	8/08/2013	220	07:31:57
8/09/2013	221	18:05:14	8/14/2013	226	09:29:42
8/15/2013	227	18:01:34	8/17/2013	229	06:22:28
8/20/2013	232	18:20:37	8/22/2013	234	16:39:15
10/01/2013	274	02:44:10	10/01/2013	274	10:27:14
10/04/2013	277	13:46:43	10/04/2013	277	15:23:02

Table A-1: Abstract Times of Hydrography, H12560

Transmittal Letter to CO-OPS

A transmittal letter to CO-OPS was not required for H12560.

Other Correspondence Relating to Tides

There is no other correspondence relating to tides and/or water levels.

APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

APPENDIX II. SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

This appendix contains copies of email exchanges between Leidos and NOAA concerning various aspects of the survey, data processing, and submittal topics. Note that there were no DTONs submitted for this sheet.

CORRESPONDENCE

From: Lucy Hick - NOAA Federal [mailto:lucy.hick@noaa.gov]
Sent: Thursday, December 06, 2012 3:57 PM
To: Evans, Rhodri E.
Cc: Mark Lathrop - NOAA Federal; Marc Moser - NOAA Federal; Melissa Sampson - NOAA Federal; Corey
Allen - NOAA Federal
Subject: Re: Draft Project Area & Instructions for OPR-D302-KR-13

Rod,

Yes. If you choose to use the 200% Side Scan Sonar (SSS) with concurrent Set Line Spacing Multibeam (MBES) and Backscatter method (Option #1), please use HSSD sections 5.2.2.3 and 6.0 (and subsections) to determine the requirements.

It is worthwhile to note that the use of sidescan sonar to meet object detection requirements does not alleviate the responsibility to investigate features or acquire splits. All significant shoals and features found in waters less than 30m deep shall be developed to the object detection standards described in HSSD 5.2.2.1.

Best Regards,
Lucy

On Thu, Dec 6, 2012 at 3:31 PM, Evans, Rhodri E. <RHODRI.E.EVANS@saic.com> wrote:
Lucy,

We looked at #6 below, and apologize for our error in mixing up the sheets/years. The junctioning you provide in the draft PI is correct.

We have a question on the coverage type and the node resolution we should be using for the "200% side scan sonar and set line spacing multibeam" option. If this option is employed, is section 5.2.2.3 Set Line Spacing the applicable Coverage and Resolution for multibeam grids? See table reproduced from page 90 in the Hydrographic Surveys Specifications and Deliverables (2012 Edition).

Depth Range (m)	Resolution (m)
0-20	2
16-40	4

Thanks Rod.

From: Evans, Rhodri E.
Sent: Thursday, December 06, 2012 2:50 PM
To: Lucy Hick - NOAA Federal

Cc: Mark Lathrop - NOAA Federal; Marc Moser - NOAA Federal; Melissa Sampson - NOAA Federal; Corey
Allen - NOAA Federal
Subject: RE: Draft Project Area & Instructions for OPR-D302-KR-13

Lucy,

Thanks for these very thorough answers. We will get back to you on #6.

Regards, Rod.

From: Lucy Hick - NOAA Federal [mailto:lucy.hick@noaa.gov]
Sent: Thursday, December 06, 2012 2:42 PM
To: Evans, Rhodri E.
Cc: Mark Lathrop - NOAA Federal; Marc Moser - NOAA Federal; Melissa Sampson - NOAA
Federal; Corey Allen - NOAA Federal
Subject: Re: Draft Project Area & Instructions for OPR-D302-KR-13

Dear Rod,

See replies in-line below and the attached revised draft Project Instructions. Please note that these Project Instructions are still subject to change based on budgetary or other requirements.

Let me know if you have any additional questions.

Best Regards,
Lucy

On Thu, Dec 6, 2012 at 11:04 AM, Evans, Rhodri E. <RHODRI.E.EVANS@saic.com> wrote:
Good morning Lucy,

Further to receipt and review of your draft PI for the 2013 Coastal Virginia project (OPR-D302-KR-13), SAIC has the following questions and requests for clarification:

1. The PI state under Purpose and Location: "…approximately 87 square nautical miles…", The details on page 2 add up to 109. Please confirm that the 3 sheets totaling 109 sq. nautical miles are the applicable survey;
The entire survey is 109 SNM, however only 87 SNM are designated critical by the 2012 NHSP document. For clarification, I will change the Purpose and Location text to read:

"The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products. This project will cover

approximately 109 square nautical miles, of which approximately 87 square nautical miles are designated critical survey area, as designated in the NOAA Hydrographic Survey Priorities (NHSP), 2012 Edition."

2. Inshore Limit: "There is no inshore limit defined for this survey." Previous inshore limits were defined as "The inshore limit of hydrography will be the farthest offshore of the following: (1) the 24-foot depth contour or (2) the inshore limit depicted graphically." The northwest corner of Sheet 1 falls inshore of the 18-foot depth curve and extends almost to the 12-foot depth curve. Is SAIC required to survey to this limit as depicted graphically?

The inshore limit was pushed to the west, in order to accommodate the full radius of two assigned AWOIS items. We do not intend for you to acquire data inshore of the 24-foot depth contour, with the expection of these two AWOIS items. I will re-instate the Inshore Limit requirement in the PIs as follows:

"The inshore limit of hydrography will be the farthest offshore of the following: (1) the 24-foot depth contour with the exception of the area covered by the search radius of any assigned AWOIS items or (2) the inshore limit depicted graphically."

3. Coverage Type: "Object Detection" This is contrary to the description of the Coverage Required which states "200% Side Scan Sonar (SSS) with concurrent Set Line Spacing Multibeam (MBES) and Backscatter, or 200% SSS with concurrent Vertical Beam Echosounder (VBES), or Object Detection MBES with Backscatter " which is Set Line Spacing coverage except for Object Detection coverage on significant features. Please clarify;

We require you to perform object detection coverage and provide you with three options for obtaining this coverage:

(1) 200% Side Scan Sonar (SSS) with concurrent Set Line Spacing Multibeam (MBES) and Backscatter, or
(2) 200% SSS with concurrent Vertical Beam Echosounder (VBES), or (3) Object Detection MBES with Backscatter

According to the HSSD section 6, "...the use of side scan sonar may be required for supplementing echo-sounding by searching the region between regular sounding lines for additional indications of dangers and bathymetric irregularities to meet object detection requirements." I understand that this may seem contrary to HSSD section 5.2.2, which states, "Object Setection Coverage...[is] attainable only with multibeam sonars."

However, the intention is that object detection coverage can be obtained by either 100% MBES, as described in HSSD section 5.2.2.1 or 200% SSS, as described in HSSD section 6 (and subsections).

I plan to propose some verbiage changes to the 2013 HSSD in order to clarify this. In the meantime, please note that for OPR-D302-KR-13, any of the above mentioned acquisition methods is valid for obtaining object detection coverage.

4. Please confirm that Backscatter data is required to be acquired. Further, is there a requirement to process any of the backscatter data and incorporate this into a deliverable product?;
We do indeed intend for you to acquire backscatter data for this project. There is no requirement to process the backscatter data. You will only be required to deliver the raw backscatter data. There is no requirement for incorporation into any other deliverable product. Please note that the collection of quality MBES bathymetry is a priority over the collection of MBES backscatter and shall not be compromised when acquiring MBES data.

5. Please confirm that no bottom samples are required.
We have used the criteria that for areas where prior surveys were conducted after 1970, no bottom samples will be required. In this case, the entire area was previously surveyed in 1981. Therefore, we will not be requiring bottom samples for this project.

6. Junctions: Please add Registry number H12337 (40000, 2011, SAIC, N) which junctions Sheet 3 to the north.
Our survey database does not show 12337 as junctioning with any sheets in this project. Instead, H12395 (40000, 2012, SAIC, N) junctions with Sheet 3 to the north. See graphic below. Please advise.

7. Please provide the project CSF, PRF, and AWOIS files as soon as they are ready.
I am still working on putting together the CSF and PRF. In the meantime, for your convenience, please find attached the AWOIS files in ESRI Shapefile format. Please note that these are subject to change, based on budgetary and other requirements.

8. Based on the 2012 tide zoning for Duck (8651370), we request additional Tide Zoning for the west side of Sheet 1.
We will provide you with updated tide zoning, which covers the complete assigned survey area for the 2013 project, as soon as it is ready.

Thanks in advance.

Regards, RE.
Rod Evans Ph.D | SAIC
Assistant Vice President
Acting Site Manager Newport/Mystic & Hydrographic Survey Services Manager
Marine Survey and Engineering Solutions
ph: 401.848.4783 | cell: 401.439.1037 | e: evansrh@saic.com

Science Applications International Corporation
221 Third Street, Building A
Newport, RI 02840 USA.
www.saic.com

From: Lucy Hick - NOAA Federal [mailto:lucy.hick@noaa.gov]
Sent: Thursday, November 29, 2012 11:18 AM
To: Evans, Rhodri E.
Cc: Marc Moser - NOAA Federal; Corey Allen - NOAA Federal; Mark Lathrop - NOAA Federal; Melissa
Sampson - NOAA Federal
Subject: Draft Project Area & Instructions for OPR-D302-KR-13

Dear Rod,

My name is Lucy Hick. I am a Physical Scientist with NOAA's Office of Coast Survey's (OCS) Hydrographic Surveys Division (HSD). While Mark Lathrop remains the COR for your contract, I will be acting as the primary point of contact for the 2013 Coastal Virginia project. Please direct all future communication to both Mark and me.

I am sending you both the proposed project area and the draft Project Instructions for the 2013 Coastal Virginia project (OPR-D302-KR-13). Please be away that these are both subject to change, as there may be further modifications due to budget or other requirements. However, I am providing this information for your convenience in order to help prepare for the upcoming negotiation process.

Please let me know if you have any questions regarding either the proposed survey area or the draft Project Instructions.

Best Regards,
Lucy

Lucy Hick
Physical Scientist / COR-In-Training
Hydrographic Surveys Division - Operations Branch
Office of Coast Survey
National Oceanic & Atmospheric Administration
(301) 713-2702 x125
Lucy.Hick@noaa.gov

From: Lucy Hick - NOAA Federal [mailto:lucy.hick@noaa.gov]
Sent: Wednesday, April 03, 2013 11:09 AM
To: Evans, Rhodri E.
Cc: Melissa Sampson - NOAA Federal; Mark Lathrop - NOAA Federal; Megan Greenaway - NOAA Federal; Karen Hart
Subject: Extended Attribute Files

Rod,
The following CARIS files customized and maintained by the Hydrographic Surveys Division are used by OCS during acquisition and processing:
Profiles_Pools_ProductInfo
* Atr_lut.txt
* Obj_lut.txt
* NOAA Profile Version #.#.#.xml
* NOAAunifiedPool.xml
* S57productinfo_NOAA.xml

Symbolization
* psymrefs.dic
* psymreft.dic

System_Files
* NOAA_cataloguecontrol.xml

When using the NOAA Customized Attribute files the following items should be noted:
* To install the customized files into the appropriate CARIS folders follow the Install_readme_v#_#_#.txt file.
* The BathyExtensionPool. xml and the notebookPool.xml are included in this package but they are managed by CARIS, not NOAA HSD. The Bathy pool and Notebook pool are referenced by NOAA's customized Catalogue Control file and therefore both of these pool files must reside in the \System\S57Config\system folders for all of the CARIS applications that utilize NOAA customized files. By default, CARIS installs the BathyExtensionPool.xml file into the CARIS\BDB\40\System\S57Config\system folder and the notebookPool.xml file into the CARIS\Notebook\31\System\S57Config\system folder.
* Ensure the CARIS Environment is set to point to the correct:
  - XML Catalogue Control File -> NOAA_cataloguecontrol.xml
  - Object Catalogue File -> NOAA Profile Version #.#.#.xml
  - S57 Product Info File -> S57productinfo_NOAA.xml

The latest version of NOAA's Customized Attribute files are contained in the attached zip file.

If you have questions regarding NOAA's customized files please contact Megan Greenaway in HSD Operations at megan.greenaway@noaa.gov 757-441-6746 x209.
For further information regarding CARIS pools, profiles, and catalogs contact Karen Hart in CARIS US at karen.hart@caris.com 703-299-9712 x12.
Best Regards,
Lucy

From: Lucy Hick - NOAA Federal [mailto:lucy.hick@noaa.gov]
Sent: Monday, April 29, 2013 4:36 PM
To: Evans, Rhodri E.
Cc: Quintal, Rebecca T.; Melissa Sampson - NOAA Federal; Mark Lathrop - NOAA Federal
Subject: Survey Outline Deliverables

Rod,

The Statement of Work, Section 6.6, has been revised to include the requirement to provide the survey outlines in a .000 format. You can reference the 2013 Hydrographic Specifications and Deliverable (HSSD), Section 8.1.2, for more detail. It is not a requirement to follow the 2013 HSSD other than this specific section.

I have attached 2013 HSSD and an updated version of the draft SOW for TO#8, which includes this change.
Please contact me if you have questions regarding this change.

Thank you,
Lucy

Lucy Hick
Physical Scientist / COR Level 1
Hydrographic Surveys Division - Operations Branch
Office of Coast Survey
National Oceanic & Atmospheric Administration
(301) 713-2702 x125
Lucy.Hick@noaa.gov

From: Lucy Hick - NOAA Federal [mailto:lucy.hick@noaa.gov]
Sent: Thursday, May 30, 2013 4:56 PM
To: Evans, Rhodri E.
Cc: Mark Lathrop - NOAA Federal; Melissa Sampson - NOAA Federal; Marc Moser - NOAA Federal
Subject: Re: DG133C-08-0003, T008 (SAIC)

Rod,
I am pleased to hear that this Task Order has finally been awarded. Once you have an idea of your schedule, I'd like to discuss a convenient time to come down for a site visit. Also, for this Task Order, we will be using NOAA's Task Order Management & Information System (TOMIS). You have already been assigned as the SAIC POC in TOMIS.
One of the requirements for TOMIS is the establishment of a very high level Deliverable Schedule. We are asking you to define a set of major deliverables, as well as their

expected due date. Once these are established in TOMIS, you should receive automatic reminders when a deliverable is due.

I am attaching a blank Excel Deliverable Tracking Log spreadsheet. Please fill complete this Log for your major deliverables and return to me, so that I can enter the information into TOMIS. For your reference, I am also attaching an example spreadsheet with instructions.
Please let me know if you have any questions.
I am looking forward to working with you on this project.

Best Regards,
Lucy

Lucy Hick
Physical Scientist / COR Level 1
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Office of Coast Survey
National Oceanic & Atmospheric Administration
(301) 713-2702 x125
Lucy.Hick@noaa.gov

APPROVAL PAGE

H12560

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 NGDC for archive

- H12560_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12560_GeoImage.pdf

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

Approved:_____

Lieutenant Commander Matthew Jaskoski, NOAA
Chief, Atlantic Hydrographic Branch