H12339

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

DESCRIPTIVE REPORT

Type of Survey: Multibeam and Sidescan Sonar

Registry Number: H12339

LOCALITY

State: Virginia

General Locality: Atlantic Ocean

Sub-locality: 13 NM East of Parramore Island

2011

CHARLES F. HOLLOWAY

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

DATE

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY No
HYDROGRAPHIC TITLE SHEET		**H12339**

State	Virginia
General Locality	Atlantic Ocean
Sub Locality	13 NM East of Parramore Island
Scale	1:40,000
Date of Survey	12 August 2011 – 30 September 2011
Instructions Dated	07 February 2011
Project No.	OPR-D302-KR-11
Vessel	*M/V Atlantic Surveyor* D582365
Chief of Party	Charles F. Holloway
Surveyed by	Alex Bernier, Jediah Bishop, Gary Davis, Paul Donaldson, Chuck Holloway, Colette LeBeau, Katie Offerman, Evan Robertson, Eva Rosendale, Andrew Seaman, Deborah Smith, Blake Walker, Bridget Williams
Soundings by echosounder	Multibeam RESON SeaBat 7125 SV
Verification by	***Atlantic Hydrographic Branch***
Soundings in	Meters
Soundings at	MLLW

REMARKS:		
	Contract:	DG133C-08-CQ-0003
	Contractor:	Science Applications International Corporation 221 Third Street, Newport, RI 02840 USA
	Subcontractor:	N/A
	Times:	All times are recorded in UTC
	UTM Zone:	Zone 18 North
	Purpose:	To provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of the assigned area: Sheet 4 (H12339) in the Atlantic Ocean, Coast of Virginia.

DESCRIPTIVE REPORT

H12339

SAIC Document Number: 12-TR-005

Changes in this document shall be recorded in the following table in accordance ISO9001:2008 Procedures.

Revisions				
Rev	**Date**	**Pages Affected**	**Approved By**	**Remarks**
0	16 Mar 2012	All	C.F. Holloway	Initial Document
1	30 May 2012	All	C.F. Holloway	Updated sections dealing with BAGs. Updated scale of sheet. Updated header and footer on all pages.

Science Applications International Corporation (SAIC) warrants only that the survey data acquired by SAIC 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.

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. Revisions and Rednotes were generated during office processing. The processing branch concurs with all information and recommendations in the DR unless otherwise noted. Page numbering may be interrupted or non-sequential. All pertinent records for this survey, including the Descriptive Report, 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
Hydrographic Survey H12339
Scale 1:40,000, Surveyed 2011
M/V Atlantic Surveyor
Science Applications International Corporation (SAIC)
Charles F. Holloway, Lead Hydrographer

PROJECT
Project Number: OPR-D302-KR-11
Dates of Instructions: 07 February 2011 **Task Order#:** T006

Dates of Supplemental Instructions: 13 April 2011, 20 April 2011, 19 July 2011, 04 August 2011, 23 September 2011, 11 October 2011, and 21 March 2012
Sheet Designation: 4
Registry Number: H12339
Purpose: To provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of the assigned area.

A. AREA SURVEYED

The area surveyed was a section of the Atlantic Ocean off the coast of Virginia, 13 nautical miles (NM) East of Parramore Island (Figure A-1). H12339 was surveyed in accordance with the following documents:

1. Project Instructions, OPR-D302-KR-11, dated 07 February 2011
2. Statement of Work, Hydrographic Survey Services, SAIC, DG133C-08-CQ-003, dated 12 May 2011
3. Tides and Water Levels Statement of Work OPR-D302-KR-2011 Delaware, Maryland, Virginia Coast, dated 09 February 2011
4. *NOS Hydrographic Surveys Specifications and Deliverables,* April 2011, Revised 05 October 2011 (HSSD)

Documents 1, 2, and 3 above are provided in Separates III.

The final line kilometers, bottom samples, item investigations, and other survey statistics are listed in Table A-1. The survey was conducted utilizing multibeam sonar and towed sidescan sonar from 12 August to 30 September 2011 (Table A-2). H12339 was surveyed using set line spacing in order to achieve 200% sidescan coverage with resulting multibeam coverage. The CUBE depth range observed for H12339 was from 10.618 meters (35 feet, 0.280-meter uncertainty) to 35.496 meters (116 feet, 0.280-meter uncertainty).

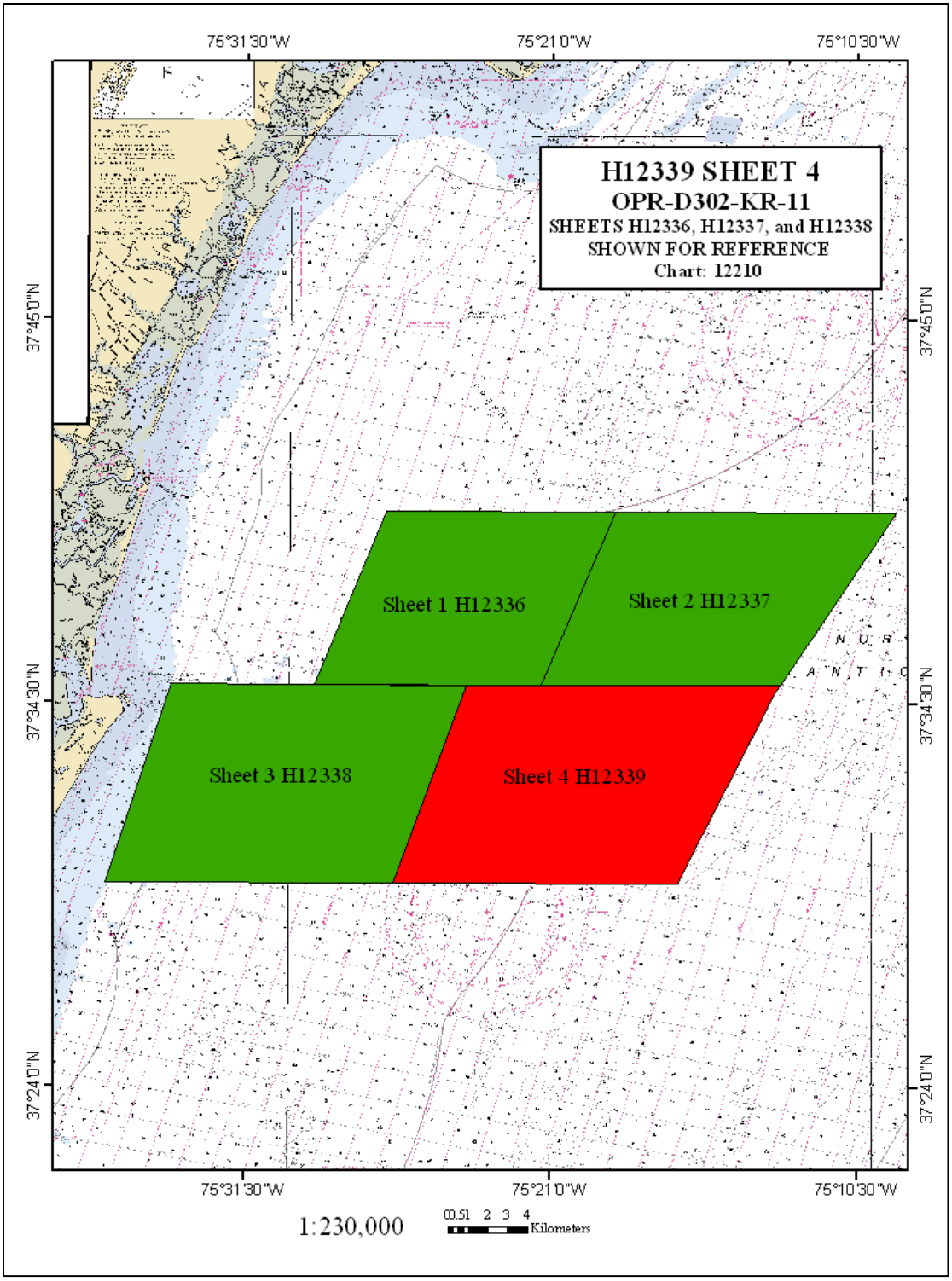

Figure A-1. H12339 Survey Bounds

Table A-1. Hydrographic Survey Statistics

M/V Atlantic Surveyor, Sheet 1 H12339	Value
LNM Single beam only sounding lines (main scheme only)	N/A
LNM Multibeam only sounding lines (main scheme only)	N/A
LNM Lidar sounding lines (main scheme only)	N/A
LNM Sidescan sonar only lines (main scheme only)	N/A
LNM Main scheme lines (multibeam and sidescan)	1311.98
LNM Crosslines from multibeam	115.69
LNM Lidar crosslines	N/A
LNM development lines non main scheme	N/A
LNM shoreline/nearshore investigations	N/A
Number of Bottom Samples	43
Number of items investigated that required additional time/effort in the field beyond the above operations not developed by sonar	N/A
Total number of square nautical miles	44.91

Table A-2. Dates of Multibeam Data Acquisition in Calendar and Julian Days

Calendar Date	Julian Day
12 August 2011	224
13 August 2011	225
18 August 2011	230
19 August 2011	231
20 August 2011	232
21 August 2011	233
23 August 2011	235
24 August 2011	236
25 August 2011	237
30 August 2011	242
31 August 2011	243

Calendar Date	Julian Day
1 September 2011	244
2 September 2011	245
3 September 2011	246
4 September 2011	247
5 September 2011	248
6 September 2011	249
10 September 2011	253
11 September 2011	254
12 September 2011	255
29 September 2011	272
30 September 2011	273

B. DATA ACQUISITION AND PROCESSING

B.1 EQUIPMENT

SAIC used their **ISS-2000** software on a Windows XP platform to acquire these survey data. Survey planning and data analysis were conducted using SAIC's **SABER** software on Red Hat Enterprise 5 Linux platforms. Klein 3000 sidescan data were collected on a Windows XP platform using Klein's **SonarPro** software. Triton **Isis** was used to review all sidescan data. Subsequent processing and the generation of coverage mosaics were accomplished using **SABER** on a Linux platform.

A detailed description of the systems used to acquire and process these data has been included in Section A of the Data Acquisition and Processing Report; Revision 1 (DAPR, REV 1) for OPR-D302-KR-11 delivered concurrently with this Descriptive Report (DR). The original submitted DAPR was delivered with the original H12336 Descriptive Report submitted on 16 December 2011. The information in Table B-1 below summarizes the systems listed in the DAPR REV 1. There was one variation from the equipment configuration described in both the DAPR (dated 16 December 2011) and DAPR REV 1. Upon recommencing survey operation and prior to data collection on JD 272, sound speed measurements from the RESON SV-70 were noted to be approximately 5 m/s slower than those derived from the Moving Vessel Profiler-30 (MVP-30) sensors. This anomaly was attributed to biofouling on the RESON SV-70 sensor located near the multibeam transducers. Sound speed values derived from the MVP-30 were therefore manually entered into the RESON system for JD 272 and JD 273. The post survey calibrations of the RESON SVP 70 and Applied Microsystems Ltd. Smart SV&P sensors are included in Separates II.

Table B-1. Major Systems by Manufacturer and Model Number

System	Manufacturer / Model Number	Subsystem
Multibeam Sonar	RESON SeaBat 7125 SV	7P Sonar Processor
		RESON SVP 70
Sidescan Sonar	Klein 3000 Towfish	K-1 K-Wing Depressor
		Transceiver/Processing Unit
Vessel Attitude System	Applanix POS/MV Inertial Navigation System	
Positioning Systems	Applanix POS/MV 320	
	Trimble 7400 GPS Receiver	
	Trimble Probeacon Differential Beacon Receiver	
Sound Speed System	Brooke Ocean Technology Ltd. Moving Vessel Profiler-30	Applied Microsystems Ltd. Smart SV and Pressure Sensor
Bottom Sample System	WILDCO Petite Ponar Grab (7128-G40)	

B.1.1 Survey Vessel

The platform for multibeam sonar, sidescan sonar, and sound speed data collection was the *M/V Atlantic Surveyor*. Table B-2 provides vessel characteristics for the *M/V Atlantic Surveyor*. Three 20-foot ISO containers were secured on the aft deck. One was used as the real-time data acquisition office; another as the data processing office; the third for spares storage, maintenance, and repairs. A 10-foot ISO container housed a 80 kW generator that provided dedicated power to the sidescan winch, ISO containers, and all survey equipment.

Table B-2. Survey Vessel Characteristics *M/V Atlantic Surveyor*

Vessel Name	LOA	Beam	Draft	Max Speed	Gross Tonnage	Power (Hp)	Registration Number
M/V Atlantic Surveyor	110’	26’	9’	14 knots	Displacement 68.0 Net Tons Deck Load 65.0 Long Tons	900	D582365

The Position Orientation System/Marine Vessels (POS/MV) Inertial Measurement Unit (IMU) was mounted below the main deck of the vessel, port of the keel. The RESON 7125 transducer was hull-mounted port of the vessel’s keel in close proximity to the IMU. The Brooke Ocean Technology Moving Vessel Profiler 30 (MVP-30) was mounted to the starboard stern quarter. The Klein 3000 sidescan sonar was towed along the centerline axis from an A-frame mounted on the stern of the vessel. A J-frame mounted on the starboard rail of the ship served as the location for bottom sample collection.

B.2 QUALITY CONTROL

SAIC performs various quality control checks throughout survey operations and data processing. Refer to the Section B of the DAPR REV 1 for further details regarding the processing flow SAIC utilizes and details for each process.

There were 115.69 linear nautical miles of crosslines and 1311.98 linear nautical miles of main scheme lines surveyed on H12339. This resulted in crossline mileage that represented approximately 8.8 percent of the main scheme mileage which meets the requirement in Section 5.2.4.3 of the HSSD, to achieve at least eight percent for a multibeam survey. Crosslines were oriented at 90°/270° and were spaced 750 meters apart, while the main scheme lines were oriented at 27.6°/207.6° and were spaced 65 meters apart. Comparison between crosslines and main scheme data is discussed in Section B.2.5. Refer to the "H12339_Multibeam_Processing_Log" section within Separates I for information on the delineation of main scheme and crossline data files. During main scheme operations, the sidescan sonar range scale of 75 meters provided a consistent 150-meter imagery swath.

B.2.1 Sonar System Quality Checks

Specific details regarding each of the multibeam sonar system quality checks can be found throughout the DAPR REV 1.

A Brooke Ocean Technology Moving Vessel Profiler (MVP) with an Applied Microsystems SV&P Smart Sensor was used to collect sound speed profile (SSP) data. SSP data were obtained at frequent intervals as defined in Section 5.2.3.3 of the HSSD. Please refer to Section A.8 of the DAPR REV 1 for details regarding acquisition of sound speed profiles. Details regarding application of sound speed profiles can be found in Section C.1.3 of the DAPR REV 1. A total of 551 profiles were applied to online data for H12339. For information regarding the start and end of online data, please reference the "Sidescan Review Log" and "Watchstander Logs" sections within in Separates I.

Confidence checks of the sound speed profile casts were conducted periodically (generally every seven survey days) by comparing at least two consecutive casts taken with different SV&P Smart Sensors. Ten confidence checks were conducted during H12339, the results can be found in Separates II within the "Atlantic Surveyor Comparison Cast Log" section. The calibration reports for each sensor used are also documented under "Certificate of Calibration Records" within Separates II.

Sound speed profiles were obtained for four different survey purposes. The "Atlantic Surveyor Sound Speed Profile Log", located in Separates II, is a cumulative report detailing each cast associated with H12339. This log is separated by the purpose of the applied cast; with individual tables for "Used for MB" (applied to online Multibeam), "Used for Comparison", "Used for Lead Line", and "Used for Closing". Additionally in a separate folder on the delivery drive, in the “H12339\Data\Processed\SVP\CARIS_SSP” folder, there are four sound speed profile files (.svp). These four files contain concatenated SSP data that has been formatted for use in CARIS. The CARIS SSP files are designated based on the purpose of the cast and their filenames are the registry number and the purpose of the cast as noted in the tables within the sound speed profile log (i.e. Used_for_MB). Sound speed files are delivered with the H12339 delivery in the “H12339\Data\Processed\SVP” folder. The sound speed files are broken out into sub-folders which correspond to the purpose of the cast.

Details regarding how and when static draft measurements were taken can be found in Section C.1.1 of the DAPR REV 1. The static draft values applied for each day of data collection are presented in the “Daily Draft Log” section within Separates I. Please refer to Section C.1.2 of the DAPR REV 1 for details regarding the dynamic draft look-up table and application of dynamic draft.

Horizontal positioning of the multibeam transducer by the POS/MV was verified by daily comparison checks against an independent Trimble DGPS system. These daily positional checks are presented in Separates I, “Daily Positioning Confidence Checks”. Further details can be found in Section C.2 of this Descriptive Report.

All multibeam files have delayed heave, (Applanix *TrueHeave*™) files (.thv) from the POS/MV, applied during post processing. There were a few instances where delayed heave was not applied due to short time gaps in the delayed heave file. When delayed heave was not available, the real-time heave was used. All cases where delayed heave was not applied were investigated and the loss of delayed heave application had no effect on the data. For specific details on delayed heave collection and application, see sections B.2 and C.3 of the DAPR REV 1. Delayed heave files are included with the H12339 data delivery in "H12339\Data\Processed\Delayed_Heave" folder.

Multibeam confidence checks were conducted during port calls (approximately every 10 survey days) by performing lead line measurements. Details regarding lead line comparisons can be found in Section A.6 of the DAPR REV 1. Of the seven lead lines performed, there were mean differences of less than 0.044 meters per set with the standard deviation of the means from all sets less than 0.011 meters. A complete listing of all lead line measurements can be found in Separates I in the section titled "Atlantic Surveyor Lead Line Comparison". Multibeam files used for confidence checks are located in a sub folder within the multibeam data folder named "Used_for_Lead_Line".

As discussed in Section A.7 of the DAPR REV 1, sidescan data were collected and maintained in eXtended Triton Format (XTF), and are preserved at full resolution. Towfish navigation is recomputed using the **SABER** Navup routine. The Navup routine populates the sensor X and sensor Y fields within the XTF files with the final sidescan position contained within the catenary data files recorded by **ISS-2000**.

Sidescan sonar confidence checks were performed at least once per day, as specified in Section 6.3.1 of the HSSD. Sidescan data reviewers verified that distinct bottom features or objects were visible to the outer edges of the sonar record. Confidence checks are included in the "Sidescan Review Log" located in Separates I.

B.2.2 Multibeam Coverage Analysis

These survey operations were conducted at a set 65-meter line spacing to achieve 200% sidescan sonar coverage at the 75-meter range scale setting. Based on the 60° beam angle used as the cutoff for acceptable multibeam data, the effective swath width for the multibeam coverage was approximately 3.5 times the water depth. Though full bottom coverage multibeam was not required, in depths greater than approximately 20 meters there was sufficient outer beam overlap to provide 100% multibeam bottom coverage.

A PFM CUBE surface was used to assess and document multibeam survey coverage. The CUBE depth is populated as either the node's chosen hypothesis or the depth of a feature or designated sounding set by the hydrographer, which overrides the chosen hypothesis. As noted previously, the range of CUBE depths encountered was from 10.618 meters (35feet, 0.280-meter uncertainty) to 35.496 meters (116 feet, 0.280-meter uncertainty). Based on this depth range encountered in H12339 and Section 5.2.2.3 of the HSSD, the final CUBE surface was generated at one-meter grid node resolution. Over significant features, that were located in depths less than 20 meters, CUBE surfaces

were generated at half-meter grid node resolution as defined in Section 5.2.2.1 of the HSSD. Two significant features were identified (features 5 and 6) in H12339 in water depths 20 meters or less, and separate half-meter resolution PFM grids were made for each. Data within the half-meter resolution CUBE PFM grids also remain in the one-meter CUBE PFM grid.

The **SABER** Gapchecker routine flagged multibeam data gaps exceeding the allowable limit of three contiguous nodes. In addition, 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 while the survey operations were still underway. A final review of the coverage showed no areas with four or more contiguous nodes without data. The final CUBE surface had valid depths in 100% of the nodes.

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 CUBE Number of Soundings layer of the PFM grid. The CUBE Number of Soundings layer reports the number of soundings that were used to compute the chosen hypothesis. Analysis of the H12339 final one-meter PFM grid revealed that more than 99% of all nodes contained five or more soundings; for the original submitted data as well as the supplemental PFM grid, satisfying the requirements for complete multibeam coverage of set line spacing surveys, as specified in Section 5.2.2.2 of the HSSD. A complete analysis based on the **Frequency Distribution** routine is provided in Table B-3 for the original submitted PFM grid. As a result of the upgraded PFM library, there are slight differences between the original submitted one-meter PFM and the supplemental delivered PFM, refer to Section B.4.1 for specifics about the PFM library. Therefore, while the number of binned grid nodes that had a particular number of CUBE soundings contributing to the node differ slightly between the originally submitted one-meter PFM and the supplemental delivery, the cumulative percentage did not change.

Table B-3. Frequency Distribution of the H12339 One-Meter CUBE Number of Soundings Layer

CUBE No. of Soundings Contributing to Grid Node	Binned Grid Node Count	Percent
1	41257	100.00%
2	38801	99.97%
3	35360	99.95%
4	31692	99.92%
5	30262	99.90%
6	32357	99.88%
7	31056	99.86%
8	29569	99.84%
9	27983	99.82%
10	29811	99.80%
11-384	150143473	99.78%

Analysis of both the original submitted and the supplemental delivered half-meter PFM grids (features 5 and 6) indicate that the feature PFMs maintained a minimum of 98% of all individual nodes containing five or more soundings.

B.2.3 Survey System Uncertainty Model

The Total Propagated Uncertainty (TPU) model that SAIC has adopted has 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 SAIC's use and application of the **SABER** Total Propagated Uncertainty model, see Section B.1 in the DAPR REV 1.

B.2.4 CUBE Uncertainty Analysis

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. 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. The allowable Order 1a horizontal uncertainty is depth dependent and defined as 5 meters + 5% of the depth. The allowable Order 1a vertical uncertainty is also dependent on depth and defined by the equation:

$$\pm\sqrt{a^2 + (b \times d)^2}$$

Where, for Order 1a surveys:
a = 0.5 meters
b = 0.013
d = depth

During the creation of the CUBE surface, two separate vertical uncertainty surfaces are calculated by the **SABER** software, CUBE Standard Deviation and Average Total Propagated Uncertainty (Average TPU). A third vertical uncertainty surface is generated from the larger of these two uncertainties at each node and is referred to as the Final Uncertainty. For specific details on this process see Section B.2 of the DAPR REV 1.

The final one-meter PFM CUBE surface, in both the original submitted data as well as the supplemental data, contained final vertical uncertainties that ranged from 0.270 to 0.992 meters while the IHO Order 1a maximum allowable vertical uncertainty was calculated to vary between 0.519 to 0.680 meters for the depths observed in H12339. The **SABER Check PFM Uncertainty** function was used to highlight all of the cases where computed final node vertical uncertainty exceeded IHO Order 1a. The final one-meter PFM CUBE surface contained 525 individual CUBE nodes with final uncertainties that exceeded IHO Order 1a. A review of the areas with final uncertainties exceeding

IHO Order 1a revealed that 35 of the nodes with high vertical uncertainties surrounded feature 6 which was a large obstruction, five nodes with high vertical uncertainties surrounded feature 4, and six nodes surrounded feature 2. The remainder of the nodes tended to be associated with shoals where data were collected before and after JD 239 when Hurricane Irene passed over the survey area.

The **SABER Check PFM Uncertainty** function was also run on each of the half-meter feature PFM CUBE surfaces. Results are listed in Table B-4 are for the original submitted half-meter feature PFM CUBE surfaces as well as the supplemental delivery of the half-meter feature PFM grids.

Table B-4. Features Area PFM Nodes Exceeding the Allowable IHO Order 1a Uncertainty

Features Area	Number of CUBE nodes which Exceed IHO Order 1a
5	0
6	354

The **SABER Frequency Distribution** tool was also used to review vertical uncertainties within the one-meter and four half-meter resolution PFM grids. This tool creates statistical data about the distribution of values within a selected surface. To examine the vertical uncertainty, the routine was run on the Final Uncertainty layer of each PFM. The results from the routine show that more than 99.43% of all grid nodes in the one-meter PFM contained vertical uncertainties of 0.30 meters or less (Table B-5). While the number of nodes that fell within the vertical uncertainty range differed slightly between the original submitted one-meter data and the supplemental delivered PFM, the cumulative percentages did not change. When performed on the original submitted and supplemental delivered individual half-meter feature PFMs, at least 99% of all grid nodes contained vertical uncertainties of 0.50 meters or less.

Table B-5. Frequency Distribution Results for Vertical Uncertainty in the One-meter PFM

Final Uncertainty (meters)	Count	Cumulative Percent
0.000 - 0.300	149619667	99.43%
0.300 - 0.600	851668	100.00%
0.600 - 0.900	281	100.00%
0.900-0.992	5	100.00%

B.2.5 Junction and Crossing Analysis

Three types of repeatability analyses were performed on H12339 multibeam data; junction analysis of gridded crossings within H12339, junction analysis with adjacent completed sheets, and beam-by-beam crossing analysis.

B.2.5.1 Junction Analysis

The **SABER Junction Analysis** tool was used during the survey to conduct a daily comparison 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 application of all correctors and completion of final processing, separate one-meter CUBE PFM grids were built. One grid contained the full valid swath (±60° cutoff) of all main scheme multibeam data and the other included only the Class 1 (±5° cutoff) crossline data.

The **SABER Frequency Distribution** tool was used to analyze the resulting difference grid. Comparisons of all final crossing data in H12339 showed that 95.16% of comparisons were within 20 centimeters and 99.45% of comparisons were within 30 centimeters (Table B-6). These comparisons fall within the requirement defined in Section 5.2.4.3 of the HSSD stating that at least 95% of the depth difference values be within the maximum allowable total vertical uncertainty (calculated to be between 0.519 to 0.680 meters for H12339).

The difference grid used was created by subtracting the H12339 main scheme CUBE depths from the H12339 cross CUBE depths. Therefore, positive values indicate that H12339 crossline data are deeper than H12339 main scheme data. The crossline data were shoaler than the crossline data in 44.55% of junctions and the crossline data were deeper than main scheme data in 56.06% of the junctions across the entire survey area. Though the distribution is skewed slightly in the positive direction, the differences are fairly well spread about zero, as visualized in Figure B-1.

Table B-6. Junction Analysis, Main Scheme Lines vs. Crosslines, H12339

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent
0.00-0.05	391680	37.65%	205026	19.71%	182546	17.55%	4108	0.39%
0.05-0.10	310245	67.46%	176313	36.65%	133932	30.42%		
0.10-0.15	199573	86.65%	118963	48.09%	80610	38.17%		
0.15-0.20	88529	95.16%	50602	52.95%	37927	41.81%		
0.20-0.25	33078	98.33%	15955	54.48%	17123	43.46%		
0.25-0.30	11602	99.45%	4288	54.90%	7314	44.16%		
0.30-0.35	3676	99.80%	1065	55.00%	2611	44.41%		
0.35-0.40	1359	99.93%	376	55.03%	983	44.51%		
0.40-0.45	534	99.99%	152	55.05%	382	44.54%		
0.45-0.50	101	99.99%	62	55.05%	39	44.55%		
0.50-0.55	36	100.00%	33	55.06%	3	44.55%		
0.55-0.60	15	100.00%	15	55.06%	0	44.55%		
0.60-0.63	3	100.00%	3	55.06%	0	44.55%		

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent
Totals	1040431	100.00%	572853	55.06%	463470	44.55%	4108	0.39%
Reference Grid: h12339_1m_main_saber5_17Feb2012_pfm_h12339_1m_cross_CL1_saber5_17Feb2012_pfm.dif								

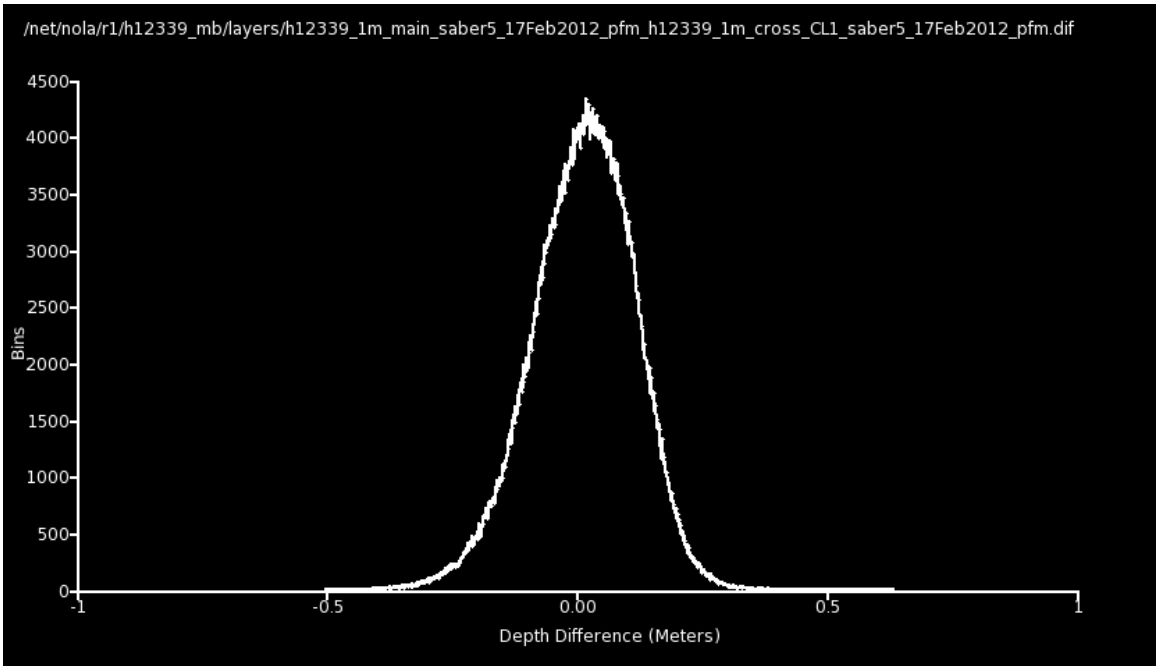

Figure B-1. Frequency Distribution Plot of Depth Differences for H12339 Main Scheme Lines vs. H12339 Crosslines

Sheet-to-sheet junction analyses were performed between H12339 and adjacent sheets for which all edits and final correctors were applied to the data. Adjacent survey sheets with finalized data for junction analysis are listed in Table B-7. Refer to Figure B-2 for the general locality of each sheet.

Table B-7. Surveys for Junction to H12339

Registry No.	Scale	Year of Acquisition	Field Party	Date Delivered to AHB	Location of Junction
H12336	1:40,000	2011	SAIC	16 December 2011; Supplemental delivery on 30 May 2012	Northwest
H12337	1:40,000	2011	SAIC	20 January 2012; Supplemental delivery on 30 May 2012	North
H12338	1:40,000	2011	SAIC	17 February 2011; Supplemental delivery on 30 May 2012	West

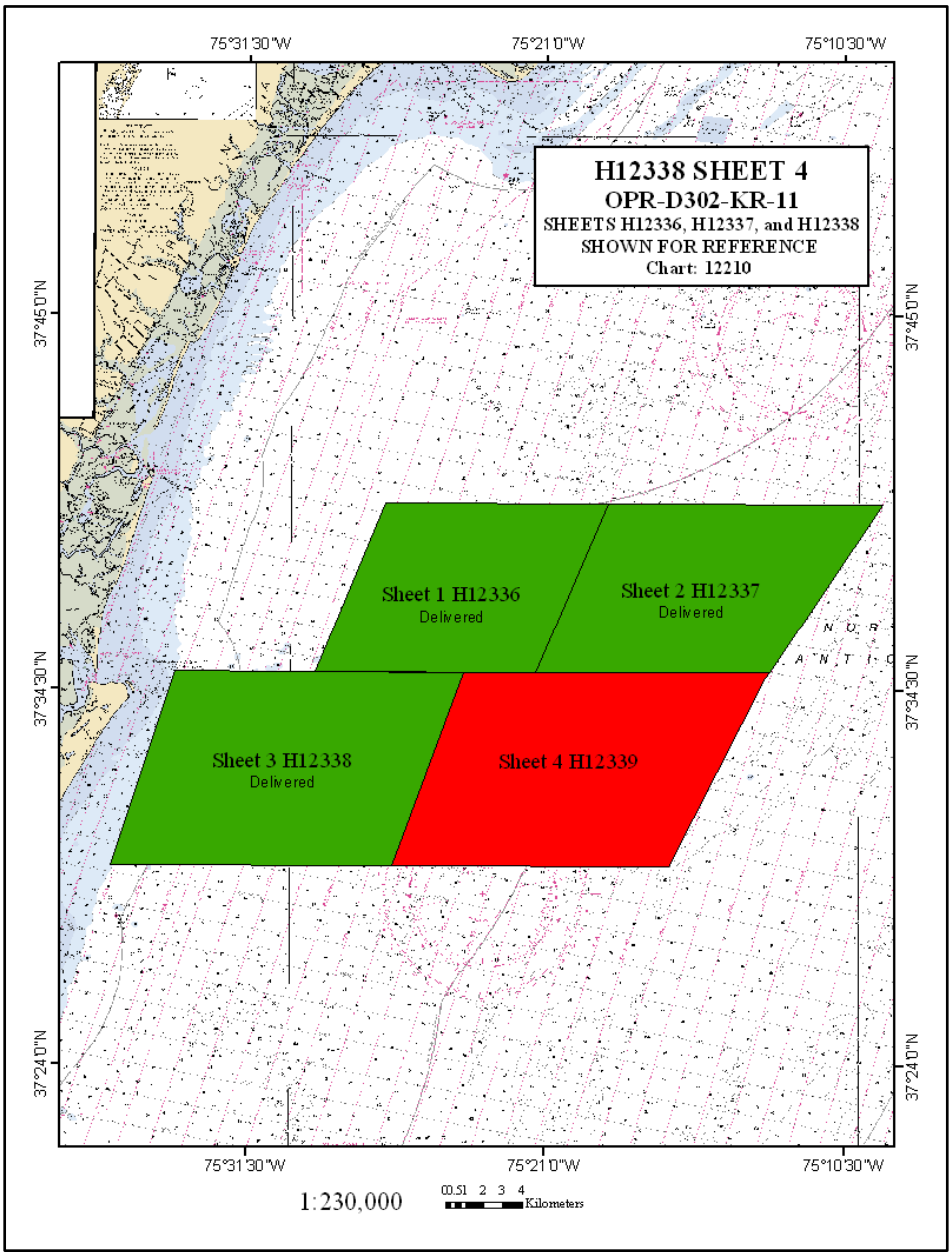

Figure B-2. General Locality and Status of Sheets in Reference to H12339

Table B-8 depicts the junction analysis between H12339 and H12336 (Sheet 1, Project Number OPR-D302-KR-11) that was surveyed between 25 June 2011 and 18 August 2011 and borders H12339 to the northwest. Junction analysis was conducted on the differences between the CUBE depths from the final one-meter PFM grid for each sheet in the common area of these two sheets. The H12339 CUBE depths within the overlap area of the two sheets varied from 14.872 meters to 21.308 meters resulting in allowable vertical uncertainties between 0.536 and 0.572 meters. The results showed that 96.72% of the comparisons were within 25 centimeters and 99.56% were within 35 centimeters.

Junction analysis was performed by subtracting the H12336 data from the H12339 data. Therefore positive values indicate that H12339 depth data were deeper than H12336 depth data. Throughout the common area, H12339 CUBE depths were shoaler than H12336 29.83% of the time and were deeper than H12336 66.40% of the time (Table B-8). Though the distribution is skewed in the positive direction, the differences are fairly well spread about zero, as visualized in Figure B-3.

Table B-8. Junction Analysis, H12339 vs. H12336

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent
0.00-0.05	67069	36.96%	34472	19.00%	25758	14.19%	6839	3.77%
0.05-0.10	49983	64.50%	32925	37.14%	17058	23.59%		
0.10-0.15	30122	81.10%	23799	50.25%	6323	27.08%		
0.15-0.20	19629	91.92%	16812	59.52%	2817	28.63%		
0.20-0.25	8713	96.72%	7490	63.65%	1223	29.30%		
0.25-0.30	4000	98.92%	3386	65.51%	614	29.64%		
0.30-0.35	1161	99.56%	905	66.01%	256	29.78%		
0.35-0.40	548	99.86%	472	66.27%	76	29.83%		
0.40-0.45	157	99.95%	143	66.35%	14	29.83%		
0.45-0.50	67	99.99%	67	66.39%	0	29.83%		
0.50-0.55	21	100.00%	21	66.40%	0	29.83%		
Totals	181470	100.00%	120492	66.40%	54139	29.83%	6839	3.77%
Reference Grid: h12339_1m_all_saber5_14Feb2012_pfm_H12336_1m_MLLW_pfm.dif								

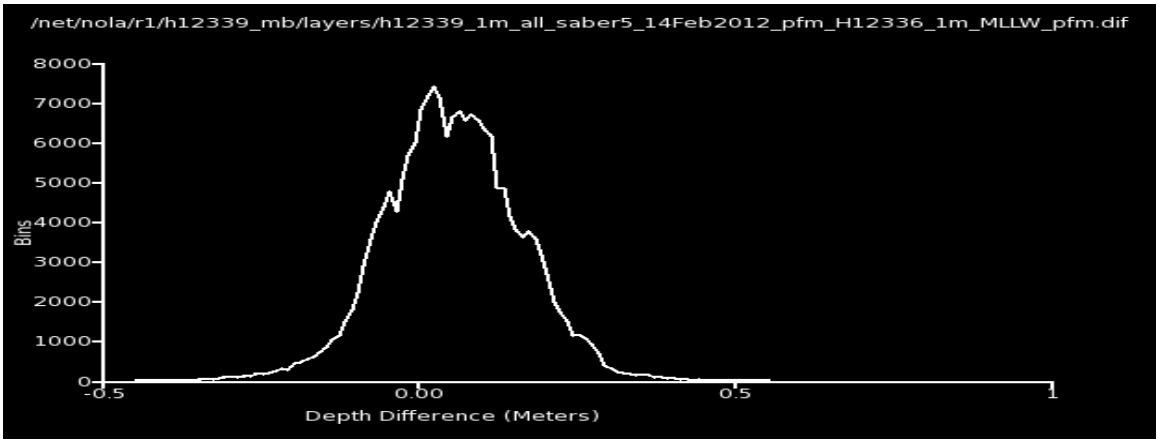

Figure B-3. Frequency Distribution Plot of Depth Differences for H12339 vs. H12336

Table B-9 depicts the junction analysis between H12339 and H12337 (Sheet 2, Project Number OPR-D302-KR-11) that was surveyed between 10 July and 02 September 2011 and borders H12339 to the north. Junction analysis was conducted on the differences between the CUBE depths from the final one-meter PFM grid for each sheet in the common area of these two sheets. The H12339 CUBE depths within the overlap area of the two sheets varied from 18.551 meters to 29.334 meters resulting in allowable vertical uncertainties between 0.555 and 0.629 meters. The results showed that 98.09% of the comparisons were within 25 centimeters and 99.42% were within 30 centimeters.

Junction analysis was performed by subtracting the H12337 data from the H12339 data. Therefore positive values indicate that H12339 depth data were deeper than H12337 depth data. Throughout the common area, H12339 CUBE depths were shoaler than H12337 58.55% of the time and were deeper than H12337 37.47% of the time (Table B-9). Though the distribution is skewed slightly in the negative direction, the differences are fairly well spread about zero, as visualized in Figure B-4.

Table B-9. Junction Analysis, H12339 vs. H12337

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent
0.00-0.05	243134	40.09%	99229	16.36%	119760	19.75%	24145	3.77%
0.05-0.10	165184	67.32%	63818	26.88%	101366	36.46%		
0.10-0.15	107334	85.02%	34824	32.62%	72510	48.41%		
0.15-0.20	56248	94.29%	19795	35.89%	36453	54.42%		
0.20-0.25	23026	98.09%	8021	37.21%	15005	56.90%		
0.25-0.30	8045	99.42%	1281	37.42%	6764	58.01%		
0.30-0.35	2759	99.87%	163	37.45%	2596	58.44%		
0.35-0.40	600	99.97%	52	37.46%	548	58.53%		
0.40-0.45	146	99.99%	50	37.47%	96	58.55%		
0.45-0.50	30	100.00%	17	37.47%	13	58.55%		
0.50-0.55	6	100.00%	2	37.47%	4	58.55%		
Totals	606512	100.00%	227252	37.47%	355115	58.55%	24145	3.98%
Reference Grid: h12339_1m_all_saber5_14Feb2012_pfm_H12337_1m_MLLW_pfm.dif								

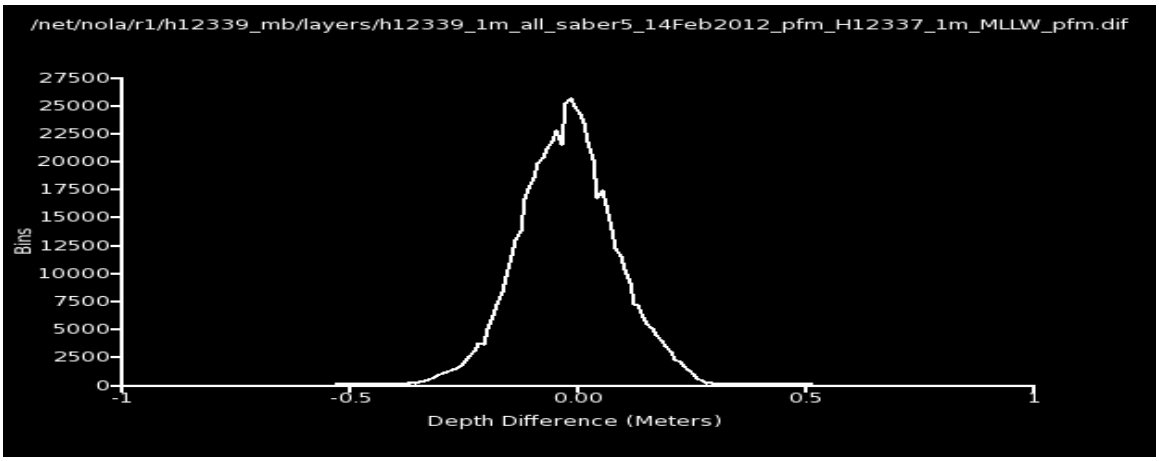

Figure B-4. Frequency Distribution Plot of Depth Differences for H12339 vs. H12337

Table B-10 depicts the junction analysis between H12339 and H12338 (Sheet 3, Project Number OPR-D302-KR-11) that was surveyed between 22 July and 03 October 2011 and borders H12339 to the west. Junction analysis was conducted on the differences between the CUBE depths from the final one-meter PFM grid for each sheet in the common area of these two sheets. The H12339 CUBE depths within the overlap area of the two sheets varied from 13.399 meters to 25.504 meters resulting in allowable vertical uncertainties between 0.529 and 0.600 meters. The results showed that 98.83% of the comparisons were within 25 centimeters and 99.47% were within 30 centimeters.

Junction analysis was performed by subtracting the H12338 data from the H12339 data. Therefore positive values indicate that H12339 depth data were deeper than H12338 depth data. Throughout the common area, H12339 CUBE depths were shoaler than H12338 34.63% of the time and were deeper than H12338 59.74% of the time (Table B-10). Though the distribution is skewed slightly in the positive direction, the differences are fairly well spread about zero, as visualized in Figure B-5.

Table B-10. Junction Analysis, H12339 vs. H12338

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent
0.00-0.05	613647	55.44%	317932	28.72%	233394	21.08%	62321	3.77%
0.05-0.10	304429	82.94%	203427	47.10%	101002	30.21%		
0.10-0.15	111149	92.98%	79486	54.28%	31663	33.07%		
0.15-0.20	47374	97.26%	35520	57.49%	11854	34.14%		
0.20-0.25	17399	98.83%	13644	58.72%	3755	34.48%		

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent
0.25-0.30	7117	99.47%	6059	59.27%	1058	34.57%		
0.30-0.35	3340	99.77%	2913	59.53%	427	34.61%		
0.35-0.40	1333	99.89%	1189	59.64%	144	34.63%		
0.40-0.45	572	99.95%	527	59.69%	45	34.63%		
0.45-0.50	299	99.97%	282	59.71%	17	34.63%		
0.50-0.60	219	99.99%	202	59.73%	17	34.63%		
0.60-0.70	51	100.00%	47	59.73%	4	34.63%		
0.70-0.80	23	100.00%	23	59.74%	0	34.63%		
0.80-0.83	3	100.00%	3	59.74%	0	34.63%		
Totals	1106955	100.00%	661254	59.74%	383380	34.63%	62321	5.63%
Reference Grid: h12339_1m_all_saber5_14Feb2012_pfm_H12338_1m_MLLW_pfm.dif.dif								

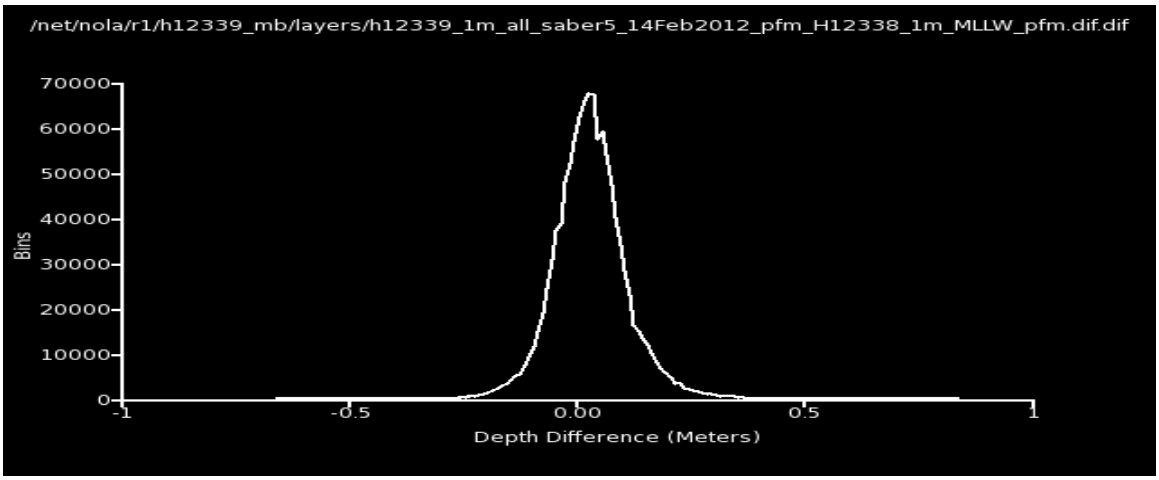

Figure B-5. Frequency Distribution Plot of Depth Differences for H12339 vs. H12338

B.2.5.2 Crossing Analysis

Twenty-five crossings were selected from areas consisting of a relatively flat bottom for beam-by-beam comparison (Figure B-6). The chosen crossings were confirmed to encompass the H12339 survey area both spatially and temporally. The results of the comparisons are presented in Separates IV of this report. The crossings show a general trend of uniform differences in beam depths across the swaths of the files with the majority of the differences less than 20 centimeters. Sound speed artifacts were observed in a few of the crossings; however none of these artifacts were outside of the data quality

specifications or had a significant effect on the final gridded surface. There were no offset biases observed.

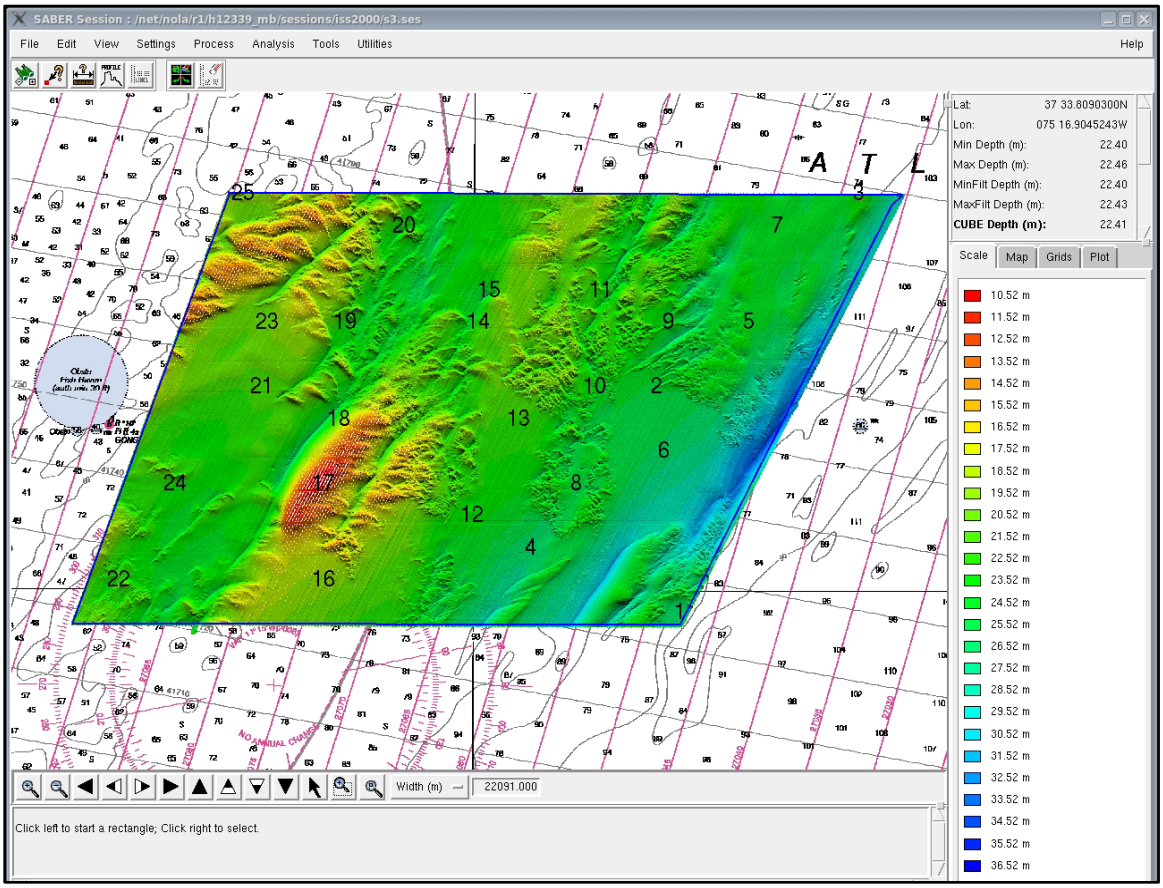

Figure B-6. Location of 25 Crossings Used in the Crossing Analysis for H12339

B.2.6 Sidescan Coverage Analysis

The Project Instructions required 200% sidescan coverage for all depths. The 200% sidescan 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 reviewed using tools in **SABER** to verify data quality and swath coverage. The first and second 100% coverage mosaics are determined to be complete and sufficient to meet the Project Instructions, for 200% sidescan sonar coverage.

Each 100% coverage mosaic is delivered as a geo-referenced image (image file [.tif] and a corresponding world file [.tfw]).

B.3 CORRECTIONS TO ECHO SOUNDINGS

Please refer to the DAPR REV 1 for a description of all corrections applied to echo soundings. There were no deviations from the corrections described therein except as previously noted within section B.1.

B.4 DATA PROCESSING

Please refer to Sections B.2 and B.3 of the DAPR REV 1 for a description of all data processing steps performed. There were no deviations from the processes described therein.

B.4.1 Bathymetry Data Processing

The final gridded multibeam data are delivered as Bathymetric Attributed Grids (BAGs). The BAGs were exported from the CUBE Depth and Final Uncertainty surfaces within the CUBE PFM grid, which are defined in Section B.2.4 of the DAPR REV 1. Based on a request by NOAA's Atlantic Hydrographic Branch (AHB), SAIC limited the resulting BAG file size to approximately 300 megabytes (MB). Therefore, multiple BAGs were produced from the single CUBE PFM grid of the sheet. For the original submission for this sheet, six BAGs at one-meter grid resolution were submitted for the entire H12339 area. The BAG file named H12339_1m_MLLW_1of6.bag is the southernmost one-meter BAG, while the BAG file named H12339_1m_MLLW_6of6.bag is the northernmost one-meter BAG. A summary of the final one-meter BAG files (converted from the one-meter CUBE PFM grid) and the two half-meter BAG files (converted from two half-meter feature area CUBE PFM grids) is provided in Table B-11. The depth range and uncertainty range for each delivered BAG is detailed in Table B-12.

Table B-11. Summary of H12339 BAG Files

BAG File Name	Comments
H12339_1m_MLLW_1of6.bag	Southernmost 1.0-meter BAG
H12339_1m_MLLW_2of6.bag	
H12339_1m_MLLW_3of6.bag	
H12339_1m_MLLW_4of6.bag	
H12339_1m_MLLW_5of6.bag	
H12339_1m_MLLW_6of6.bag	Northernmost 1.0-meter BAG
H12339_Features_Area_1_50cm_MLLW_1of2.bag	Feature 5; 0.5-meter BAG
H12339_Features_Area_2_50cm_MLLW_2of2.bag	Feature 6; 0.5-meter BAG

Table B-12. Summary of H12339 BAG Depth and Uncertainty Values

BAG File Name	Depth Range (meters)	Uncertainty Range (meters)
H12339_1m_MLLW_1of6.bag	17.230 – 31.964	0.280 – 0.551
H12339_1m_MLLW_2of6.bag	10.735 – 33.888	0.270 – 0.641
H12339_1m_MLLW_3of6.bag	10.618 – 35.496	0.270 – 0.959
H12339_1m_MLLW_4of6.bag	16.211 – 34.588	0.280 – 0.797
H12339_1m_MLLW_5of6.bag	13.400 – 31.932	0.271 – 0.992
H12339_1m_MLLW_6of6.bag	13.222 – 30.362	0.270 – 0.902
H12339_Features_Area_1_50cm_MLLW_1of2.bag	18.034 – 19.636	0.280 – 0.477
H12339_Features_Area_2_50cm_MLLW_2of2.bag	15.877 – 20.267	0.280 – 1.734

As requested by NOAA's AHB, six additional non-standard BAG files corresponding to each of the standard BAG files listed in Table B-11, were generated for the original delivery of this sheet. These additional BAG files were generated through the same process as the standard BAG files. Currently the BAG format only allows for two layers to be defined within the BAG, a Depth layer and an Uncertainty layer. Therefore, each of the non-standard BAG files were created with the CUBE Depth layer, populating the Depth layer of the BAG and each of the following surfaces populating the Uncertainty layer of the BAG:

- CUBE Number of Hypotheses
- CUBE Standard Deviation
- CUBE Hypothesis Strength
- CUBE Number of Soundings
- Average TPU
- Standard Deviation

A detailed description of these layers can be found in Section B.2.5 of the DAPR REV 1.

Please note when reviewing these additional, non-standard BAGs the file name designates the layer which populates the Uncertainty layer of the BAG. 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.

As discussed in the DAPR REV 1 the BAG version was updated in April 2012. SAIC regenerated BAGs in version 1.5.0 and is submitting them as a supplemental delivery along with this revision to the descriptive report. These new BAG files include not only the Depth and Uncertainty layers but also the Depth Solution Group Surfaces and Node Group Surfaces which include the following surfaces:

- Depth
- Uncertainty
- Standard Deviation
- Number of Soundings
- Shoal Depth
- Hypothesis Strength
- Number of Hypotheses

Please refer to Section B 2.5 of the DAPR REV 1 for details about the optional surfaces. With the inclusion of additional surfaces into one BAG file, the total number of BAG files built from the single CUBE PFM grid of the sheet is different from the originally submitted data. Seventeen BAG version 1.5.0 files at one-meter grid resolution are submitted for the entire H12339 area. However, with version 1.5.0 BAGs that include the optional surfaces contained in the Depth Solution Group and Node Group, non-standard BAG files are no longer required. Therefore non-standard BAG files are not included with this supplemental delivery. Refer to the DAPR REV 1 for a discussion of the layers included within each BAG file.

Please note however, when the BAG 1.5.0 support was added to **SABER**, the PFM library was also upgraded. The precision of the positions of the min/max X/Y values in the PFM header and the precision of the offsets saved in the PFM depth records were increased in this version of PFM and thus the positions of depth records (soundings) read from the PFM may be slightly different from previous versions of the PFM library. Some depth records that were very close to the extreme of the CUBE capture radius may or may not be included in a CUBE node when compared to the same PFM created with the previous PFM library. This minor discrepancy resulted in slightly different CUBE depth and uncertainty values between BAGs in a small number of nodes distributed throughout the BAGs. When differences were observed, they were generally on the scale of one centimeter or smaller.

A summary of the version 1.5.0 one-meter BAG files (converted from the one-meter CUBE PFM grid) and the two half-meter BAG files (converted from two half-meter feature area CUBE PFM grids) is provided in Table B-13. The depth range and uncertainty range for each delivered BAG is detailed in Table B-14. Please disregard Table B-11 and Table B-12 as well as the originally submitted BAG files for H12339 if there is a CARIS version available which supports version 1.5.0 BAG files at the time of review of this sheet. SAIC has inquired with CARIS on the timeframe for support of version 1.5.0 BAGs and as of the date of delivery of this report we have only heard back that it will likely be summer of 2012. SAIC will notify AHB once a release date is announced. If an updated version of CARIS is not available when review of this sheet begins, the original delivered BAGs (both standard and non-standard) provide the information required to perform the review, just as in past year's deliveries. With the exception of the two half-meter feature areas BAG files for H12339.

In addition to the delivery of BAG version 1.5.0 files, the supplemental delivery contains two half-meter H12339 feature areas BAG files in BAG version 1.1.0, the same version as the original submission in 16 March 2012. During processing efforts for the supplemental delivery SAIC determined that the GSF files used to create the originally delivered half-meter BAG files were not the final GSF files, and therefore there were differences in new PFM versus the PFM used for the original delivery. The GSF files that SAIC delivered to AHB from the original submission of 16 March 2012 remain the final GSF version. If the updated version of CARIS is not available when the review of H12339 is performed, please review the originally submitted BAG files from the one-meter PFM, from the 16 March 2012 submission, and the two-half meter BAG files from the 30 May 2012 delivery with the associated non-standard BAG files.

Table B-13. Summary of Supplemental Delivery H12339 BAG Files

BAG File Name	Comments
H12339_1m_MLLW_1of17.bag	Southernmost 1.0-meter BAG
H12339_1m_MLLW_2of17.bag	
H12339_1m_MLLW_3of17.bag	
H12339_1m_MLLW_4of17.bag	
H12339_1m_MLLW_5of17.bag	
H12339_1m_MLLW_6of17.bag	
H12339_1m_MLLW_7of17.bag	
H12339_1m_MLLW_8of17.bag	
H12339_1m_MLLW_9of17.bag	
H12339_1m_MLLW_10of17.bag	
H12339_1m_MLLW_11of17.bag	
H12339_1m_MLLW_12of17.bag	
H12339_1m_MLLW_13of17.bag	
H12339_1m_MLLW_14of17.bag	
H12339_1m_MLLW_15of17.bag	
H12339_1m_MLLW_16of17.bag	
H12339_1m_MLLW_17of17.bag	Northernmost 1.0-meter BAG
H12339_Features_Area_1_50cm_MLLW_1of2.bag	Feature 5; 0.5-meter BAG
H12339_Features_Area_2_50cm_MLLW_2of2.bag	Feature 6; 0.5-meter BAG

Table B-14. Summary of Supplemental Delivery H12339 BAG Depth and Uncertainty Values

BAG File Name	Depth Range (meters)	Uncertainty Range (meters)
H12339_1m_MLLW_1of17.bag	17.662 – 31.233	0.280 – 0.517
H12339_1m_MLLW_2of17.bag	17.230 – 31.732	0.280 – 0.502
H12339_1m_MLLW_3of17.bag	17.270 – 31.964	0.280 – 0.551
H12339_1m_MLLW_4of17.bag	14.719 – 31.987	0.280 – 0.570
H12339_1m_MLLW_5of17.bag	12.058 – 33.014	0.270- 0.641
H12339_1m_MLLW_6of17.bag	10.647 – 34.083	0.270- 0.727
H12339_1m_MLLW_7of17.bag	10.618 – 35.070	0.270 – 0.959
H12339_1m_MLLW_8of17.bag	12.781 – 35.486	0.270- 0.924
H12339_1m_MLLW_9of17.bag	13.862 – 34.972	0.270 – 0.542
H12339_1m_MLLW_10of17.bag	16.767 – 34.011	0.280 – 0.669
H12339_1m_MLLW_11of17.bag	16.307 – 33.221	0.280 – 0.797
H12339_1m_MLLW_12of17.bag	13.400 – 32.297	0.271 – 0.636
H12339_1m_MLLW_13of17.bag	13.743 – 31.791	0.280 – 0.992
H12339_1m_MLLW_14of17.bag	14.014 – 31.344	0.280 – 0.611
H12339_1m_MLLW_15of17.bag	13.222 – 30.399	0.270 – 0.497
H12339_1m_MLLW_16of17.bag	13.672 – 29.915	0.280 – 0.902
H12339_1m_MLLW_17of17.bag	14.679 – 29.633	0.280 – 0.599
H12339_Features_Area_1_50cm_MLLW_1of2.bag	16.034 - 19.636	0.280 - 0.477
H12339_Features_Area_2_50cm_MLLW_2of2.bag	15.877 - 20.267	0.280 - 1.734

B.4.2 Sidescan Data Processing

The Klein 3000 sidescan sonar data were collected in eXtended Triton Format (XTF) and maintained at full resolution, with no conversion or down sampling techniques applied. Sidescan sonar contacts were made through Triton **Isis**. Sidescan contact information is delivered in several ways. The spreadsheet "H12339_Sidescan_Contacts_List", located in Appendix II, notes all sidescan contacts that were identified within H12339. Contacts for which an **Isis** contact file was created are delivered in Separates V (*_n.CON files) for which details regarding these files can be found in Section B.3.3 of the DAPR REV 1. Sidescan contacts that have been correlated to a multibeam feature are included in the Feature Correlator Sheets, found in Appendix II. Sidescan sonar contacts are also delivered as a Sidescan Sonar Contacts S-57 file. Additionally all contact image files (.tif) are delivered in Separates V.

C. VERTICAL AND HORIZONTAL CONTROL

No vertical or horizontal controls were established, recovered, or occupied during OPR-D302-KR-11 data acquisition, which includes H12339. Therefore a Horizontal and Vertical Control Report is not required. Vertical and horizontal control specifics pertaining to H12339 are discussed below.

C.1 VERTICAL CONTROL

The vertical datum for H12339 is Mean Lower Low Water (MLLW). The Project Instructions specified NOAA tide station 8631044 Wachapreague, VA as the source for water level correctors. A full explanation of the tide zone assessment is detailed in Section C.4 of the DAPR REV 1. For H12339, 8631044 Wachapreague, VA was the source of all final verified water level heights for determining correctors to soundings. All data for H12339 were contained within three tide zones which were provided from NOAA and are summarized in Table C-1.

Table C-1. Water Level Zoning Parameters Applied on Sheet H12339

Zone	Time Corrector (minutes)	Range Ratio	Reference Station
SA46	-66	0.87	8631044
SA55	-66	0.90	8631044
SA55A	-72	0.90	8631044

SAIC did not revise the delivered tide zones for tide station 8631044 Wachapreague, VA as the water level zoning parameters provided by National Ocean Service (NOS), Table C-1, were deemed adequate for the application of observed verified water levels. As a result, they were accepted as final and applied to all H12339 multibeam data.

No final tide note was provided by the NOAA Center for Operational Oceanographic Products and Services (CO-OPS). SAIC is not required to have a final tide note from CO-OPS for H12339. SAIC has provided a final tide note in Appendix IV.

C.2 HORIZONTAL CONTROL

The survey data for sheet H12339 were collected in horizontal datum North American Datum of 1983 (NAD-83), using geodetic coordinates, while data display and products used the UTM Zone 18, North projection. The following equipment was used for positioning on the *M/V Atlantic Surveyor*:

- POS/MV Model 320 Version 4, Serial Number 2575 with a Trimble Probeacon Differential Receiver (primary sensor)
- Trimble 7400 RSi GPS Receiver with a Trimble Probeacon Differential Receiver (secondary sensor)

Please refer to the DAPR REV 1 for details regarding all antenna and transducer offsets.

Differential correctors used for online data were from the U.S. Coast Guard Stations at Driver, VA, Annapolis, MD, Reedy Point, DE, and New Bern, NC. The differential receivers were programmed to only receive differential corrector data from these four stations.

Horizontal positioning of the multibeam transducer by the POS/MV was verified by frequent comparison checks against an independent Trimble 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. All daily positioning confidence checks for H12339, were within 1.30 meters. These daily positional checks are presented in a standalone table within Separates I, "Daily Positioning Confidence Checks". All soundings with total horizontal uncertainties which exceeded the maximum allowable IHO S-44 5th edition Order 1a specifications were flagged as invalid and therefore were not used in the CUBE depth calculations.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

For chart comparisons, survey data are compared to the largest scale chart that encompasses the entire area. In the case of H12339, the survey area is fully covered by one Raster Chart (BSB) and one Electronic Navigational Chart (ENC). Details of each chart are listed below.

Chart 12210	**Chincoteague Inlet to Great Machipongo Inlet**
Scale	1:80,000
Edition and Date	38th, 05/01/2008
Notice to Mariners corrected through	38.171, 02/25/2012

ENC US4VA70M	**Chincoteague Inlet to Great Machipongo Inlet**
Scale	1:80,000
Edition and Issue Date	11th, 03/03/2011
Update and Date	9, 11/10/2011

The chart comparisons were conducted using SAIC's **SABER** software to view the BSB raster charts with overlain layers of H12339 data such as the CUBE gridded surface, selected soundings, contacts, and features. For ENC comparisons, a combination of Jeppesen's **dKart Inspector**, SevenCs' **SeeMyDENC**, and CARIS' **EasyView** were used in conjunction with **SABER**. Results from the comparisons are described below. Charting recommendations for depths follow Section 5.1.2 of the HSSD where depths and uncertainties are to be reported in meters rounded to the nearest millimeter by

standard arithmetic rounding (round half up). Chart depth units are rounded using NOAA cartographic rounding (0.75 round up).

Notice to Mariners publications from the United States Coast Guard (USCG) District 5 were reviewed for changes subsequent to the date of the Hydrographic Survey Project Instructions or Statement of Work and before the end of survey that affect the area within H12337 as requested in Section 8.1.4 of the HSSD. There were no entries within the Notice to Mariners publications that affected H12339 survey area.

H12339 data meets data accuracy standards and bottom coverage requirements. Recommend updating the common areas of all charts using data from this survey. All charting recommendations for all features are provided under Appendix II, Survey Feature Report.

D.1.1 Chart 12210 Chincoteague Inlet to Great Machipongo Inlet (1:80,000)

Chart 12210 encompasses all of H12339.

CUBE depths within sheet H12339 generally agreed within ±4 feet of the charted depths.

The charted 60-foot depth curves across H12339 were generally in good agreement with the CUBE depths with the following exceptions.

CUBE depths between 56 and 59 feet were found in a 400 by 200 meter area centered in approximately 37° 34’ 20.59”N 075° 18’ 55.29”W.

Recommendations:

- Add a 60-foot depth curve around the appropriate depths in this area.

The charted 60 and 58-foot soundings and discrete 60-foot depth curve centered in approximately 37° 33’ 26.93”N 075° 18’ 41.96”W were in CUBE depths of 63 to 70 feet.

Recommendation:

- Remove 60-foot depth curve and update soundings.

The charted 60-foot sounding and discrete 60-foot depth curve in approximately 37° 32’ 48.36”N 075° 18’ 54.68”W were in CUBE depths of 64 to 76 feet.

Recommendation:

- Remove 60-foot depth curve and update sounding.

The charted 60-foot sounding and discrete 60-foot depth curve in approximately 37° 32’ 59.02”N 075° 19’ 25.99”W were in CUBE depths of 66 to 70 feet.

Recommendation:

- Remove 60-foot depth curve and update sounding.

The charted 90-foot depth curves across H12339 were generally in good agreement with the CUBE depths except in the southeast corner of the survey area where some minor discrepancies were noted.

The charted 89-foot sounding and discrete 90-foot depth curve in approximately 37° 31’ 38.75”N 075° 16’ 18.35”W were in CUBE depths of 92 to 95 feet.

Recommendation:

- Remove 90-foot depth curve and update sounding.

The charted dangerous wreck and cleared to 56 feet (AWOIS 987) in approximately 37° 32’ 15.62”N 075° 24’ 41.70”W was not found. Refer to Appendix II for further details concerning charting recommendations.

The charted dangerous obstruction with a reported depth of 43 feet (AWOIS 2888) in approximately 37° 31' 53.27"N 075° 21' 32.51"W was found (feature 6) in 37° 31' 53.20"N 075° 21' 28.29"W with a least depth of 58 feet (17.800 meters, 0.028 meters uncertainty). Refer to Appendix II for further details concerning feature recommended for charting.

There were three features identified within the H12339 survey area which were not charted and are recommended for charting. Refer to Appendix II for further details concerning new features recommended for charting.

D.1.2 ENC US4VA70M Chincoteague Inlet to Great Machipongo Inlet (1:80,000)

US4VA70M encompasses all of H12339.

CUBE depths within sheet H12339 generally agreed within ±1.5 meters of the charted depths.

The charted 18.2-meter depth curves across H12339 were generally in good agreement with the CUBE depths with the following exception.

CUBE depths between 17.410 and 17.889 meters were found in a 400 by 200 meter area centered in approximately 37° 34’ 20.59”N 075° 18’ 55.29”W .

Recommendations:

- Add an 18.2-meter depth curve around the appropriate depths in this area.

The charted 17.6-meter sounding in 37° 33’ 34.77”N 075° 18’ 38.35”W and 18.2-meter sounding in 37° 33’ 16.70”N 075° 18’ 46.31”W and discrete 18.2-meter depth curve were in CUBE depths of 19.169 to 23.140 meters.

Recommendation:

- Remove 18.2-meter depth curve and update soundings.

The charted 18.2-meter sounding in 37° 32’ 48.30”N 075° 18’ 54.90”W and discrete 18.2-meter depth curve were in CUBE depths of 19.521 to 23.207 meters.

Recommendation:

- Remove 18.2-meter depth curve and update sounding.

The charted 18.2-meter sounding in 37° 32’ 59.56”N 075° 19’ 26.15”W and discrete 18.2-meter depth curve were in CUBE depths of 19.319 to 23.207 meters.

Recommendation:

- Remove 18.2-meter depth curves and update soundings.

The charted 27.4-meter depth curves across H12339 were generally in good agreement with the CUBE depths except in the southeast corner of the survey area where some minor discrepancies were noted.

The charted 27.1-meter sounding in 73° 31’ 39.05”N 075° 16’ 18.65”W and discrete 27.4-meter depth curve were in CUBE depths of 17.821 to 29.475 meters.

Recommendation:

- Remove 27.4-meter depth curve and update sounding.

The charted dangerous wreck cleared to 17 meters (AWOIS 987) in 37° 32’ 16.39”N 075° 24’ 42.31”W was not found. Refer to Appendix II for further details concerning charting recommendations.

The charted dangerous obstruction with a reported depth of 13.1 meters (AWOIS 2888) in 37° 31' 53.47"N 075° 21' 33.03"W was found (feature 6) in 37° 31' 53.20"N 075° 21' 28.29"W with a least depth of 17.800 (58 feet, 0.280 meters uncertainty). Refer to Appendix II for further details concerning feature recommended for charting.

There were three features identified within the H12339 survey area which were not charted and are recommended for charting. Refer to Appendix II for further details concerning new features recommended for charting.

D.1.3 Automated Wreck and Obstruction Information Service (AWOIS) Item Investigations

As defined in the Project Instructions, there were a total of four AWOIS items assigned for project OPR-D302-KR-11; two of which fell within the H12339 survey bounds (Table D-1). The AWOIS items which fell within H12339 were identified for full investigation. Detailed AWOIS item investigation reports for H12339 can be found in Appendix II Section I of this Descriptive Report.

Table D-1. AWOIS Listings Received from NOAA for H12339

AWOIS Number	Search Type	Chart 12210	ENC US4VA70M
987	Full	X	X
2888	Full	X	X

D.1.4 Designated Soundings

Designated soundings are used to help better preserve the shallowest sounding relative to the computed depth surface. Separate flags exist in the Generic Sensor Format (version 3.01) for designated soundings and features. The designated sounding in the final CUBE surface has also been flagged as a designated sounding in the GSF files. All depths flagged as features and designated soundings will override the CUBE best estimate of the depth in the final BAG files. All of the features and designated soundings that have been set for H12339 are listed within two spreadsheets "H12339_Multibeam_Features_List" and "H12339_Designated_Soundings_List" located in Appendix II. Both the designated soundings and features flags as defined within GSF are mapped to the same HDCS flag when ingested into CARIS (PD_DEPTH_DESIGNATED_MASK). The following pages discuss the two designated soundings that were set in the H12339 survey data.

D.1.4.1 Designated Sounding 1

Designated Sounding 1 is a small non-significant object with a least depth of 20.892 meters in 37° 34' 29.35"N 075° 20' 59.24"W. The object is approximately 0.60 meters high lying in a shallow 0.30 meter depression. A designated sounding was set because the CUBE depth at this position was 21.446 meters, 0.554 meters deeper than the least depth of the object. Thus setting the designated sounding preserved the least depth of the object (Figure D-1 and Figure D-2). Two sidescan contacts were made on this object, contact number 246081233 and contact number 246053509.

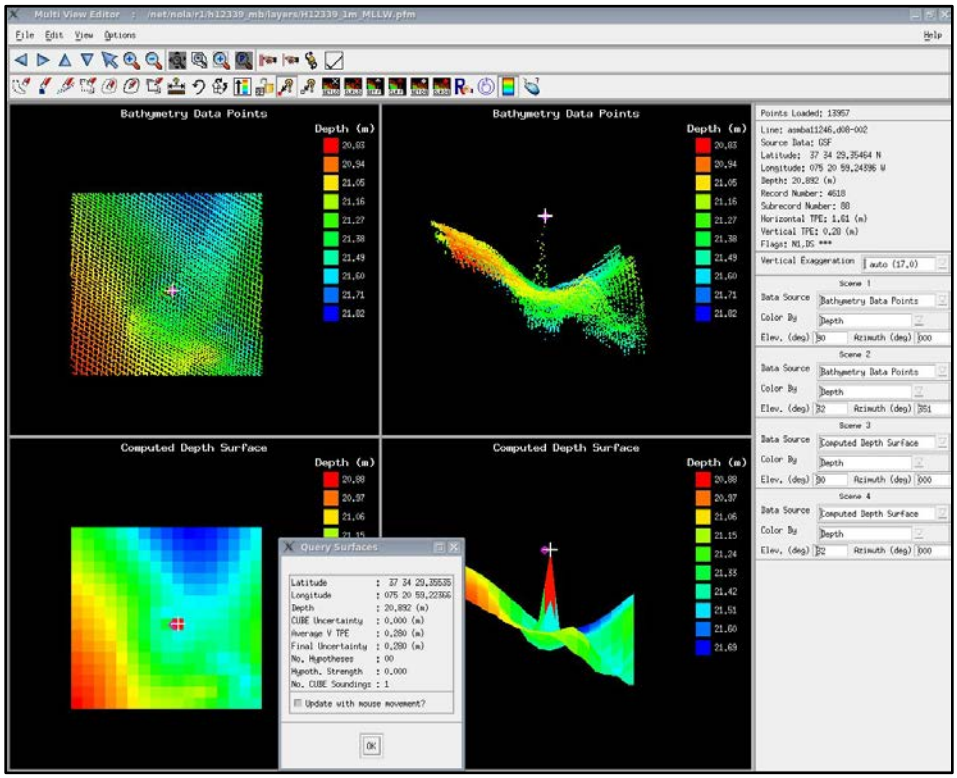

Figure D-1. Designated Sounding 1 CUBE Surface when Set in MVE

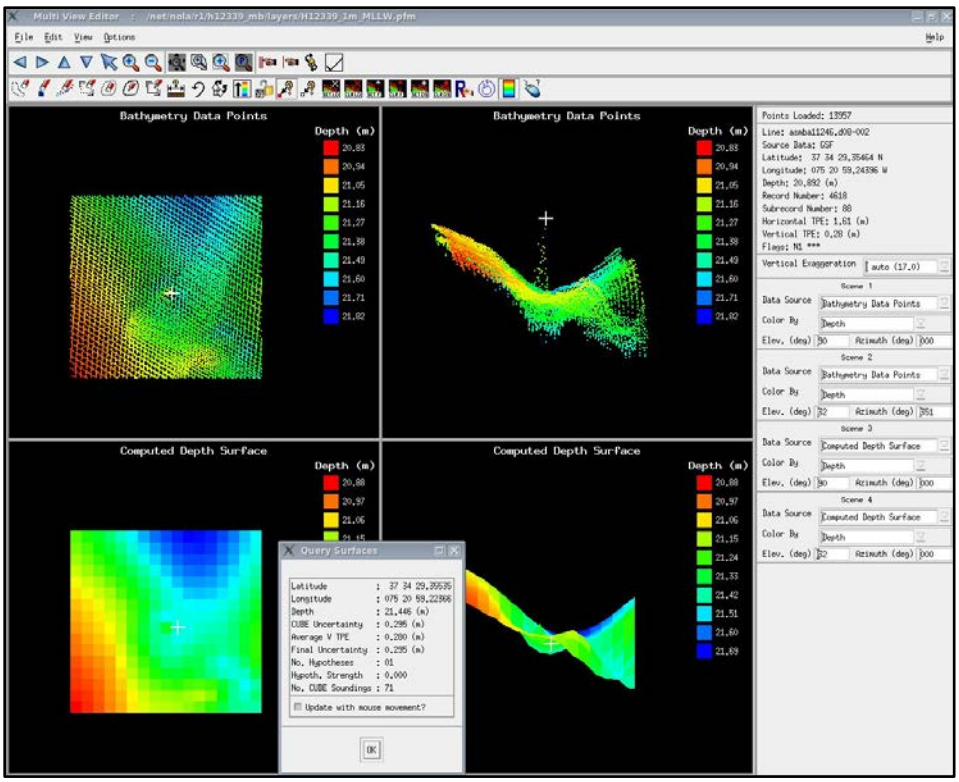

Figure D-2. Designated Sounding 1 CUBE Surface when NOT Set in MVE

D.1.4.2 Designated Sounding 2

Designated Sounding 2 is a small non-significant object with a least depth of 24.900 meters in 37° 32' 55.10"N 075° 17' 06.15"W. The object is approximately 0.45 meters high lying in a shallow 0.42 meter depression in approximately 23.29 meters of water. A designated sounding was set because the CUBE depth at this position was 25.208 meters, 0.308 meters deeper than the least depth of the object. Thus, setting the designated sounding preserved the least depth of the object (Figure D-3 and Figure D-4). Two sidescan contacts were made on this object, contact number 232133503 and contact number 232070831.

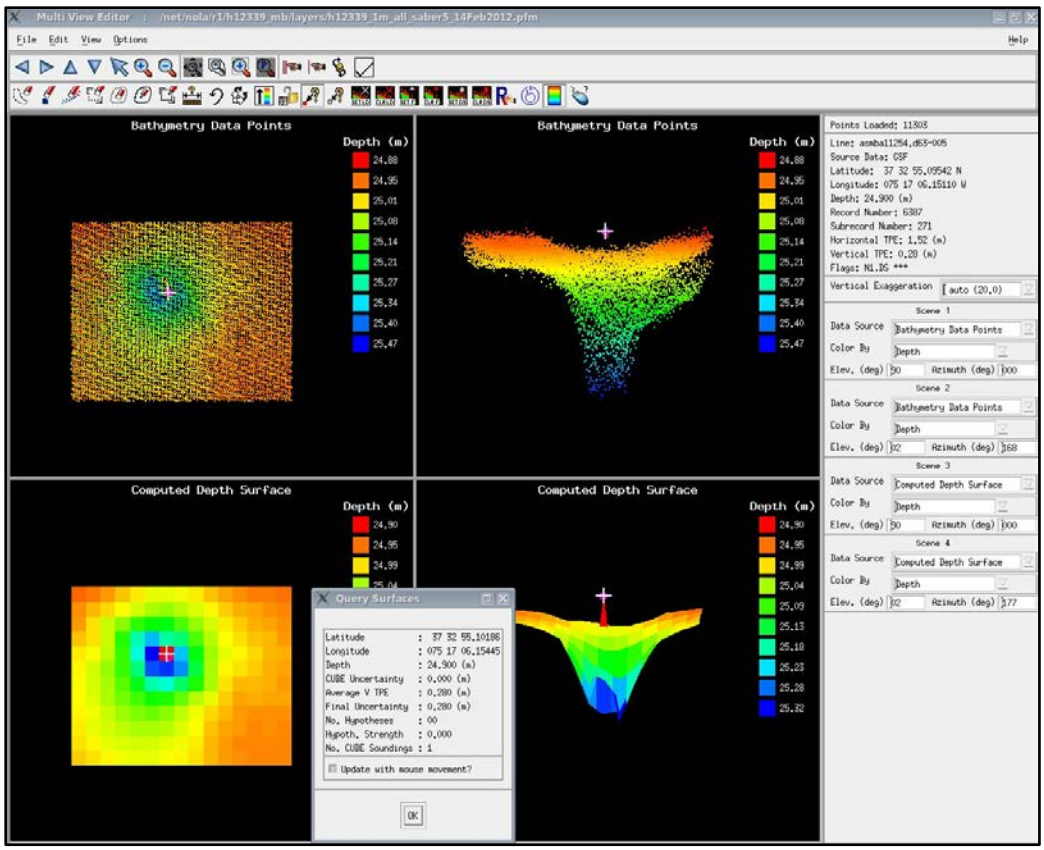

Figure D-3. Designated Sounding 2 CUBE Surface when Set in MVE

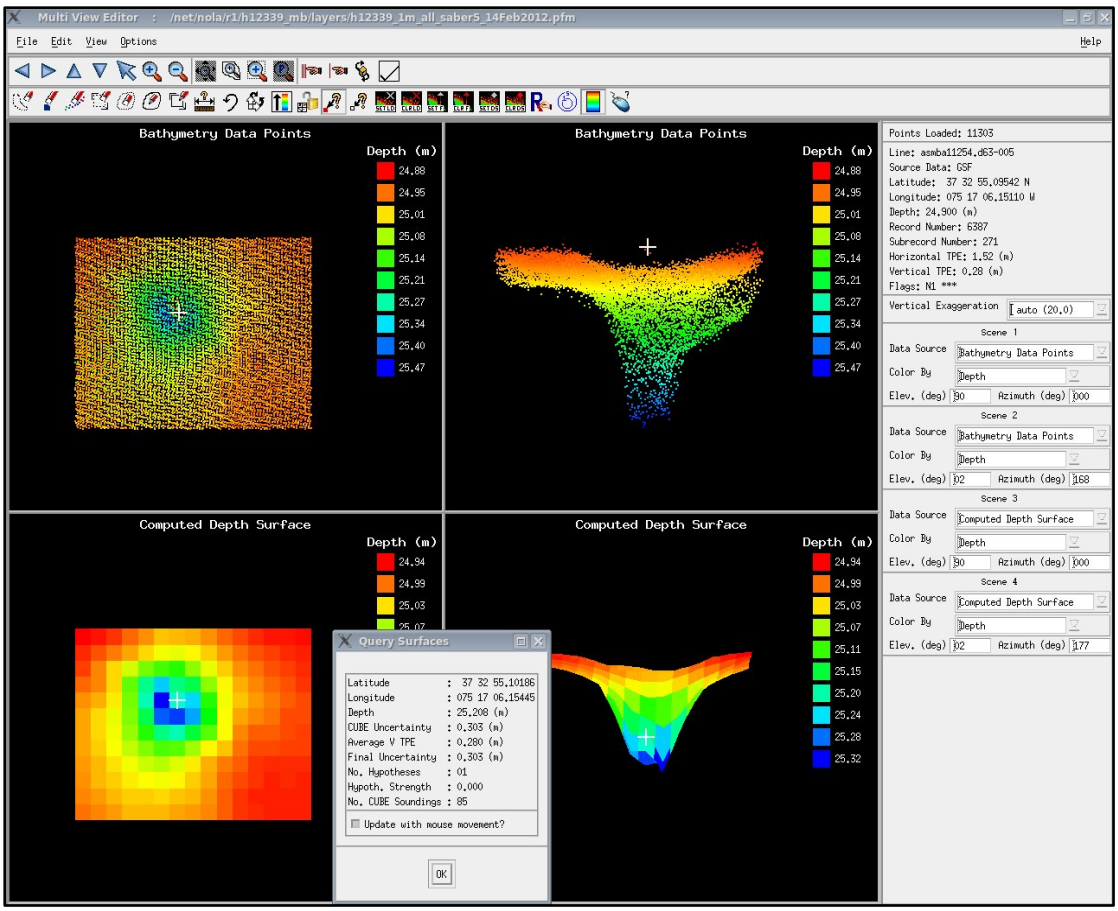

Figure D-4. Designated Sounding 2 CUBE Surface when NOT Set in MVE

D.1.5 Danger to Navigation Reports

No Danger to Navigation Reports were submitted for this survey.

D.2 ADDITIONAL RESULTS

D.2.1 Shoreline Verification

Shoreline verification was not required for H12339.

D.2.2 Comparison with Prior Surveys

Comparison with prior surveys was not required under this Task Order.

D.2.3 Aids to Navigation

There were no Aids to Navigation that fell within the H12339 survey area.

D.2.4 S-57 Feature File

Included with H12339 delivery is the S-57 feature file, 3S412339.000. Details on how this file is generated and quality reviewed can be found in Section B.2.6 of the DAPR REV 1. The **SABER** software was recently modified to allow the value of sounding (VALSOU) attribute be at least millimeter precision and to allow for the NOAA Extended Attributes, as defined in the HSSD. The S-57 feature file delivered for H12339 contains millimeter precision for depth. Following specifications, the S-57 feature file is in the WGS84 datum and is unprojected with all units in meters. All six of the features addressed in H12339 are retained within the S-57 feature file.

Feature Correlator sheets are presented in Appendix II. At the request of AHB, the Feature Correlator sheet was exported as an image file (.jpg) and is included under the NOAA Extended Attribute field "images" with the S-57 feature file for all features.

D.2.5 Sidescan Sonar Contacts S-57 File

As requested by AHB, SAIC also generated a supplemental S-57 file to present the sidescan contacts. Details on how this file was generated, attributed, and quality reviewed can be found in Section B.3.4 of the DAPR REV 1. Note that both the feature and sidescan S-57 files share the same name "3S412339.000". The supplemental sidescan S-57 feature file is located in the directory named "H12339\Data\Processed\S-57_Features\Side_Scan_Sonar_S-57_File_as_Cartographic_symbol", while the S-57 final feature file is located in the directory named "H12339\Data\Processed\S-57_Features".

The "H12339_Sidescan_Contacts_List", located in Appendix II of this report, also provides the same information as the sidescan S-57 file.

D.2.6 Bottom Characteristics

In accordance with both the Project Instructions and Section 7.1 of the HSSD, bottom characteristics were obtained for H12339. Bottom characteristics were determined at a set distance of approximately 2000 meters, evenly distributed throughout the H12339 survey area. Forty-three of the 44 assigned samples were collected. There were multiple unsuccessful attempts to collect one bottom sample (H12339_BS_04). Bottom characteristics are included in the H12339 S-57 feature file, 3S412339.000, within the Seabed Area (SBDARE) object and are classified according to the requirements set forth in Appendix 10 of the HSSD. In addition to being maintained within the S-57 feature file, bottom characteristic results are represented in Appendix V of this document. Table Appendix V-1 presents the findings and is followed by images of each bottom sample collected. The uncollected bottom sample is classified as unknown in Table Appendix V-1 and is not included in the S-57 feature file per the 23 September 2011 supplemental correspondence. Bottom characteristics obtained for H12339 are sufficient to be used to update the respective raster and vector charts.

E. APPROVAL SHEET

30 May 2012

LETTER OF APPROVAL

REGISTRY NUMBER: H12339

This report and the accompanying digital data for project OPR-D302-KR-11 DELMARVA, Virginia Project is respectfully submitted.

Field operations and data processing contributing to the accomplishment of this survey, H12339, were conducted under supervision of myself and other SAIC lead hydrographers with frequent personal checks of progress and adequacy. This report and accompanying deliverable data items have been closely reviewed and are considered complete and adequate as per the Statement of Work.

Reports concurrently submitted to NOAA for this project include:

Report	Submission Date
Data Acquisition and Processing Report, REV 1	30 May 2012
H12336 Descriptive Report, REV 1	30 May 2012
H12337 Descriptive Report, REV 1	30 May 2012
H12338 Descriptive Report, REV 1	30 May 2012

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Charles F. Holloway

Digitally signed by Charles F. Holloway
DN: cn=Charles F. Holloway, o=Marine Survey and Engineering Solutions, ou=SAIC, email=hollowaycf@saic.com, c=US
Date: 2012.05.30 15:48:57 -04'00'

Charles F. Holloway
Lead Hydrographer
Science Applications International Corporation
30 May 2012

APPENDIX I

TIDES AND WATER LEVELS

APPENDIX IV. TIDES AND WATER LEVELS

Field Tide Note
A field tide note was not required for H12339.

Final Tide Note
Observed verified water levels for the station in Wachapreague, VA (8631044) 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 H12339 Descriptive Report Section C.1 for details regarding final tides for H12339. The water level zoning correctors, based entirely on Wachapreague, VA (8631044), were applied to all multibeam data for H12339.

No final tide note was provided by NOAA Center for Operational Oceanographic Products and Services (CO-OPS), SAIC 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, H12339 (Table Appendix IV-1).

Abstract Times of Hydrography

Project: OPR-D302-KR-11
Registry No.: H12339
Contractor Name: Science Applications International Corporation
Date: 16 March 2012
Sheet Designation: 4
Inclusive Dates: 12 August 2011 - 30 September 2011
Field work is complete.

Table Appendix IV-1. Abstract Times of Hydrography, H12339

Begin Date	Begin Julian Day	Begin Time	End Date	End Julian Day	End Time
08/12/2011	224	20:59:04	08/13/2011	225	20:34:54
08/18/2011	230	07:37:42	08/21/2011	233	16:24:22
08/23/2011	235	21:20:55	08/25/2011	237	02:16:12
08/30/2011	242	12:07:36	09/06/2011	249	00:22:31
09/10/2011	253	15:02:35	09/12/2011	255	01:00:19
09/29/2011	272	17:51:21	09/30/2011	273	01:48:20

Transmittal Letter to CO-OPS
A transmittal letter to CO-OPS was not required for H12339.

Other Correspondence Relating to Tides
There is no other correspondence relating to tides and/or water levels.

APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

CORRESPONDENCE

From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Wednesday, April 13, 2011 1:34 PM
To: Evans, Rhodri E.
Cc: Jeffrey Ferguson; James.M.Crocker@noaa.gov
Subject: Re: 2011 HSSD

Rod,

Yes, all FY11 task orders will use the new Specs.

Mark

On 4/13/2011 1:26 PM, Evans, Rhodri E. wrote:
Mark,

We see that the April 2011 version of the NOS Specifications and
Deliverables Document is now posted on NOAA's website. We are doing a thorough comparison to last year's version this week.

Are you able to advise me if any Task Orders that may be awarded this
Government fiscal year will be required to adhere to the 2011 HSSD document?

Thanks and Regards, RE.

From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Wednesday, April 20, 2011 1:12 PM
To: Evans, Rhodri E.
Cc: Jeffrey Ferguson; James.M.Crocker@noaa.gov
Subject: Re: 2011 HSSD

Rod,

The following should answer your questions regarding the 2011 HSSD:

1) The change section is in error. We will be happy to receive millimeter precision, but centimeter precision is the minimum level acceptable.

2) Your assumption is correct.

3) It is our intention to have AFF files created and provided for all projects this year.

Mark

On 4/20/2011 11:13 AM, Evans, Rhodri E. wrote:
Mark,

We have completed our review of the new HSSD 2011 document. In order for us to fully understand the potential impact of some of the changes on our survey data acquisition and processing/deliverables going forward would you please advise us on the following questions:

Questions on the April 2011 Specifications and Deliverables

In Section 1.2 Changes from April 2010 it states that Section
5.1.2 Units and Rounding is updated for millimeter precision, but Section 5.1.2 Units and Rounding still states "Depth values shall be recorded in meters, with a precision of at least centimeters." Please confirm the precision for depth values.

In 5.2.1.2 General Requirement Management of Multiple Grids it states "The following additional attributes shall be included if supported by the hydrographer's data processing software:" and then is followed by "Standard Deviation: Standard deviation of the depths within the capture radius of the node". We assume this means any sounding that contributed to any hypothesis for a given node. Please confirm.

In Section 8.1.4 D.1 Chart Comparisons it states "An Assigned Feature File (AFF), in .000 format incorporating the NOAA Extended Attributes defined in Section 8.2, may be provided by HSD Ops along with the project instruction to assist the contractor or NOAA field unit with this requirement". Will SAIC receive an Assigned Feature File (AFF)?

Thanks and Regards, RE.

From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Tuesday, July 19, 2011 2:14 PM
To: Evans, Rhodri E.
Subject: AFF for OPR-D302-KR-11

Rod,

Attached are the Assigned Feature File and Prior Reference File for OPR-D302-KR-11. We are providing these S57 files to contractors this year as a courtesy.

Mark

From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Thursday, August 04, 2011 9:48 AM
To: Evans, Rhodri E.
Subject: Re: AFF for OPR-D302-KR-11

Rod,

The AFF is just a file we are providing to the contractors this year as a courtesy. AWOIS items are not included. There are no special investigations associated with this file.

Mark

On 8/3/2011 1:15 PM, Evans, Rhodri E. wrote:
Mark,

We request a clarification regarding the Assigned Feature Files that were sent in your e-mail (see below dated July 19 2001).

The Project Instructions dated February 7, 2011 (OPR-D302-KR-11.pdf), listed 4 AWOIS Items for full investigation. We also received an
Excel spreadsheet (AWOIS D302-D302-KR-11.xls) and a PDF file (OPR-D302-KR-11 AWOIS.pdf) listing the four AWOIS Items: 987 (Wreck Alleghany), 2783 (Wreck Menominee), 2888 (Obstruction), and 7190 (Obstruction).

The AFF file has 6 assigned items:
Record ID 0 1AFF01.000/FE1, Obstruction (Fish Haven). Not in the original spreadsheet
Record ID 0 1AFF01.000/FE2, Obstruction (Fish Haven). Not in the original spreadsheet
Record ID 0 1AFF01.000/FE3, Obstruction in 37 29.486N 075 34.951W. Not in the original spreadsheet.
Record ID 0 1AFF01.000/FE4, Obstruction. AWOIS 2888 in the original
Spreadsheet.
Record ID 0 1AFF01.000/FE5, Wreck AWOIS 987 in the original spreadsheet Record ID 0
1AFF01.000/FE6, Wreck in 37 35.716N 075 14.810W. Not in the original spreadsheet

So the Assigned Feature File contains 4 additional items that were not in the original spreadsheet, and does not include the two AWOIS items 2783 and 7190.

The surveys cover all items in the Assigned Feature File so there is no impact on the survey estimate though we had to modified the H12339 survey to cover the FE1 (Fish Haven) and FE3 (Obstruction) items extending 15 lines by 200 meters. They both fell outside the original survey bounds in the SOW.
We request clarification regarding the assigned items:

1. 4 or 6?
2. Spreadsheet or AFF files?

Regards, RE.

From: Quintal, Rebecca T.
Sent: Friday, September 23, 2011 11:53 AM
To: Mark.T.Lathrop@noaa.gov; James M Crocker
Cc: Evans, Rhodri E.
Subject: FW: Question for NOAA on 2011 S&D

Hello Mark and Jim.

This is just a follow-up email to document what you and Rod discussed at the meeting this week so we have the information captured and can include in the Supplemental Correspondence section of the DR.

So, based on the conversation, SAIC will discuss any bottom sample stations where multiple attempts were made to obtain a sample, but none were obtained, in the DR and these stations will not be included in the S-57 file.

Thanks!
-Rebecca

From: Quintal, Rebecca T.
Sent: Monday, September 12, 2011 2:18 PM
To: 'Mark.T.Lathrop'; Evans, Rhodri E.
Cc: James M Crocker
Subject: RE: Question for NOAA on 2011 S&D

Mark,

Thanks for the reply. Just to be a little more specific.

The 2010 S&D states this on page 125:

Where SBDARE is used to describe bottom characteristics obtained through bottom sampling, NATSUR must be attributed. NATQUA is optional. Multiple characteristics and qualifiers may be used. If a bottom sample was attempted but not achieved, use NATQUA (hard).

However, that section has been revised in the 2011 S&D. The 2011 S&D (page 131) reads like this:

Bottom characteristic objects will have NATSUR encoded and may also have NATQUA encoded depending on the nature of the surface sampled. If a bottom sample was attempted but no sample was recovered the NATSUR will be categorized as Unknown.

Thanks for checking on this for us!
-Rebecca

From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Monday, September 12, 2011 2:04 PM
To: Evans, Rhodri E.
Cc: Quintal, Rebecca T.; James M Crocker
Subject: Re: Question for NOAA on 2011 S&D

Rod,

A negative bottom sample should be classified it as hard. That would be NATQUA #10. I'm not sure if you're required to submit a NATSUR with your NATQUA and you're right, there's nothing in that table that applies. I'm copying Jim Crocker to see if he has anything to add.

Mark

On 9/12/2011 1:37 PM, Evans, Rhodri E. wrote:
Mark,

Please provide us a clarification on the question below:

On page 131 in the 2011 S&D it states the following:

Bottom characteristic objects will have NATSUR encoded and may also have NATQUA encoded depending on the nature of the surface sampled. If a bottom sample was attempted but no sample was recovered the NATSUR will be categorized as Unknown.

However, the NATSUR table provided in Appendix 10 does not list an option of Unknown for NATSUR. It only lists the 18 options as defined by IHO. Please confirm that a new attribute option for NATSUR (unknown) should be used if several attempts were made and no sample was recovered.

Thank you.

Regards, RE.
Rod Evans Ph.D | SAIC
Assistant Vice President & Hydrographic Survey Services Manager
Maritime Operations Division-Marine Survey and Engineering Services
ph: 401.848.4783 | cell: 401.439.1037 | e: evansrh@saic.com

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Energy | Environment | National Security | Health | Critical Infrastructure

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From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Tuesday, October 11, 2011 10:34 AM
To: Evans, Rhodri E.
Subject: Re: SAIC Status Report

Rod,

A staggered delivery is preferable as that eases the burden on the processing branch, hence the 120 days after completion of field work stated in the Project Instructions.

However, March 31, 2012 is the official delivery requirement for Task Order 6.

Mark

On 10/11/2011 9:40 AM, Evans, Rhodri E. wrote:
Mark,

Can you please confirm that it is acceptable that the last 2 sheets fall outside of the 120 days delivery stated in the Project Instructions? All deliveries fall within the Task Order PoP ending 3/31/2012. We believe that our delivery schedule provides a better spacing of deliveries to the AHB.

Regards, RE.

From: Evans, Rhodri E.
Sent: Tuesday, October 11, 2011 9:07 AM
To: 'Mark.T.Lathrop'
Subject: SAIC Status Report

Mark,

Status Report via email reference: Task Order OMNI TO#6 DELMARVA Sheets 1-4:

The ship “Atlantic Surveyor” is now in home port (Point Pleasant, NJ). This week SAIC will fully demobilize the ship.

Our preliminary AHB delivery schedule is as follows:

H12336 – 12/16/2011
H12337 – 01/20/2012
H12339 – 02/17/2011
H12339 – 03/16/2012

The next status report will be on Monday 17 October 2011.

Regards, RE.
Rod Evans Ph.D | SAIC

Assistant Vice President & Hydrographic Survey Services Manager
Maritime Operations Division-Marine Survey and Engineering Services
ph: 401.848.4783 | cell: 401.439.1037 | e: evansrh@saic.com

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AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. Contract ID Code	Page of Pages
	1 2

2. AMENDMENT MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (if applicable)
M0001	MAR 21, 2012	NCNJ3000-12-01931	12861

6. ISSUED BY CODE WSOSFSEC
NWS/NOS/NMFS EXTERNAL CLIENTS
1325 EAST WEST HIGHWAY
SSMC2, 11TH FLOOR
SILVER SPRING MD 20910
MARK LATHROP 301-713-2702 113

7. ADMINISTERED BY (If other than item 6) CODE
See Block 6

8. NAME AND ADDRESS OF CONTRACTOR (NO., Street, Country, State and ZIP Code)
SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
10260 CAMPUS POINT DRIVE
MAIL STOP G2
SAN DIEGO CA 921211522
DUNS: 054781240
Cage Code: 52302

William Raymond 401-848-4713

CODE 00000676 FACILITY CODE

(x)	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
X	10A. MODIFICATION OF CONTRACT/ORDER NO. DG133C-08-CQ-0003/T006
	10B. DATED (SEE ITEM 13) JUN 28, 2011

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of offers ☐ is extended, ☐ is not extended.
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing items 8 and 15, and returning _____ copies of amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OR OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

Modification Amount: $0.00
Modification Obligated Amount: $0.00

13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

Check One	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
X	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible)
The purpose of this modification is to extend the delivery date from March 31, 2012 to May 31, 2012 at no additional cost to the Government.

Except as provided herein, all terms and conditions of the document referenced in item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)
Christine Lepore Contracts Manager	HARRY RIPPENBAUM, CONTRACTING OFFICER 301-713-3405 x 193 HARRY.RIPPENBAUM@NOAA.GOV

15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
Christine Lepore (Signature of person authorized to sign)	3-21-12	Harry S Rippenbaum (Signature of Contracting Officer)	MAR 21, 2012

NSN 7540-01-152-8070
Previous Edition unusable

STANDARD FORM 30. (Rev. 10-83)
Prescribed by GSA FAR (48 CFR) 53.243

APPENDIX III SURVEY

FEATURES REPORT

No DTONs, Maritime Boundaries or Wrecks

H12339_AWOIS Items

Registry Number: H12339

State: Virginia

Locality: Atlantic Ocean

Sub-locality: 13 NM East of Parramore Island

Project Number: OPR-D302-KR-11

Survey Date: 08/12/11 to 09/30/11

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12210	38th	05/01/2008	1:80,000 (12210_1)	[L]NTM: ?
12200	49th	06/01/2007	1:419,706 (12200_1)	[L]NTM: ?
13003	49th	04/01/2007	1:1,200,000 (13003_1)	[L]NTM: ?

* Correction(s) - *source: last correction applied (last correction reviewed--"cleared date")*

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	AWOIS 987 - ALLEGHANY - Charted dangerous wreck, wire drag cleared to 56 feet	AWOIS	[no data]	[no data]	[no data]	---
1.2	AWOIS 2888 - Charted dangerous obstruction, 43 foot reported depth	AWOIS	[no data]	[no data]	[no data]	---

1.1) AWOIS #987 - AWOIS 987 - ALLEGHANY - Charted dangerous wreck, wire drag cleared to 56 feet

No Primary Survey Feature for this AWOIS Item

Search Position: +37.53680°, -075.41131°
Historical Depth: 17.07 m
Search Radius: 200
Search Technique: [None]
Technique Notes: [None]

History Notes:

History: -- Charted as WD clear to 56 ft, survey not determined. H10066/82-
-OPR-d103-mi-82; item #987; 1:20,000 scale survey; odom offshore
hydrotrac control; 100m line spacing and one crossline; least depth of 69ft
found; survey not adequate to disprove wk; evaluator recommended retain as
Charted and assign to sss/wire drag survey. (entered 10/29/84 msm)
Description: --
24 no.433; barge, 912 gt. Sunk 3/1/42 by submarine; position accuracy within
1 mile, wd cleared to 56 ft; pos.37-32-14N, 75-24-37W.
27 no.805; barge; sunk 3/31/42, in 74 ft., reported thru ESF 5/20/44; position,
37-33-30N, 75-24-15W.
Proprietary: -- 20 BGE; Sunk March 31, 1942 by submarine shellfire while
in tow of Menominee; 56 ft over wreck; cargo of coal, 914 tons.

Survey Summary

Charts Affected: 12210_1, 12200_1, 13003_1

Remarks:

AWOIS 987. Wreck Not Found. Covered by 200% sidescan and 100% multibeam.

Feature Correlation

Source	Feature	Range	Azimuth	Status
AWOIS_EXPORT	AWOIS # 987	0.00	000.0	Primary

Hydrographer Recommendations

Remove Wreck.

S-57 Data

[None]

Office Notes

SAR: Feature disproved by 200% SSS and MB. AWOIS search radius was completed.

COMPILATION: Concur. No indication of wreck found during present survey operations. Delete charted dangerous wreck, wire drag cleared to 56 feet. Update area with present survey depths.

1.2) AWOIS #2888 - AWOIS 2888 - Charted dangerous obstruction, 43 foot reported depth

No Primary Survey Feature for this AWOIS Item

Search Position: +37.53180°, -075.35964°
Historical Depth: 13.11 m
Search Radius: 200
Search Technique: [None]
Technique Notes: [None]

History Notes:

History: -- Cl1083/75--OBSTR w/43ft REP charted in lat.37-31-54N long.75-21-36W. H10066/82--OPR-D103-MI-82; Iem #41; 1:20,000 scale survey; odom offshore hydrotrac control; least depth of 42ft was found approx 500m west of charted position; obstr not found w/100m line spacing; not considered disproved. Evaluator recommended retain as charted and assign to sss/wire drag survey. (entered 10/29/84 msm)

Survey Summary

Charts Affected: 12210_1, 12200_1, 13003_1

Remarks:

Object is irregularly shaped approximately 16 by 25 meters with a height of 1.3 meters. There is approximately 1.3 meters of scour around the object.

Feature Correlation

Source	Feature	Range	Azimuth	Status
AWOIS_EXPORT	AWOIS # 2888	0.00	000.0	Primary

Hydrographer Recommendations

AWOIS 2888. Update Obstn.

S-57 Data

[None]

Office Notes

SAR: Feature located at survey position using SSS and MB. AWOIS search radius was completed.

COMPILATION: Concur with conditions. Feature found in area with depths of 44 to 62 feet. This feature is 58 feet with 52 to 62 foot surrounding depths. Feature is not considered significant. Delete charted dangerous obstruction, 43 foot reported depth. Update area with present survey findings.

Feature Images

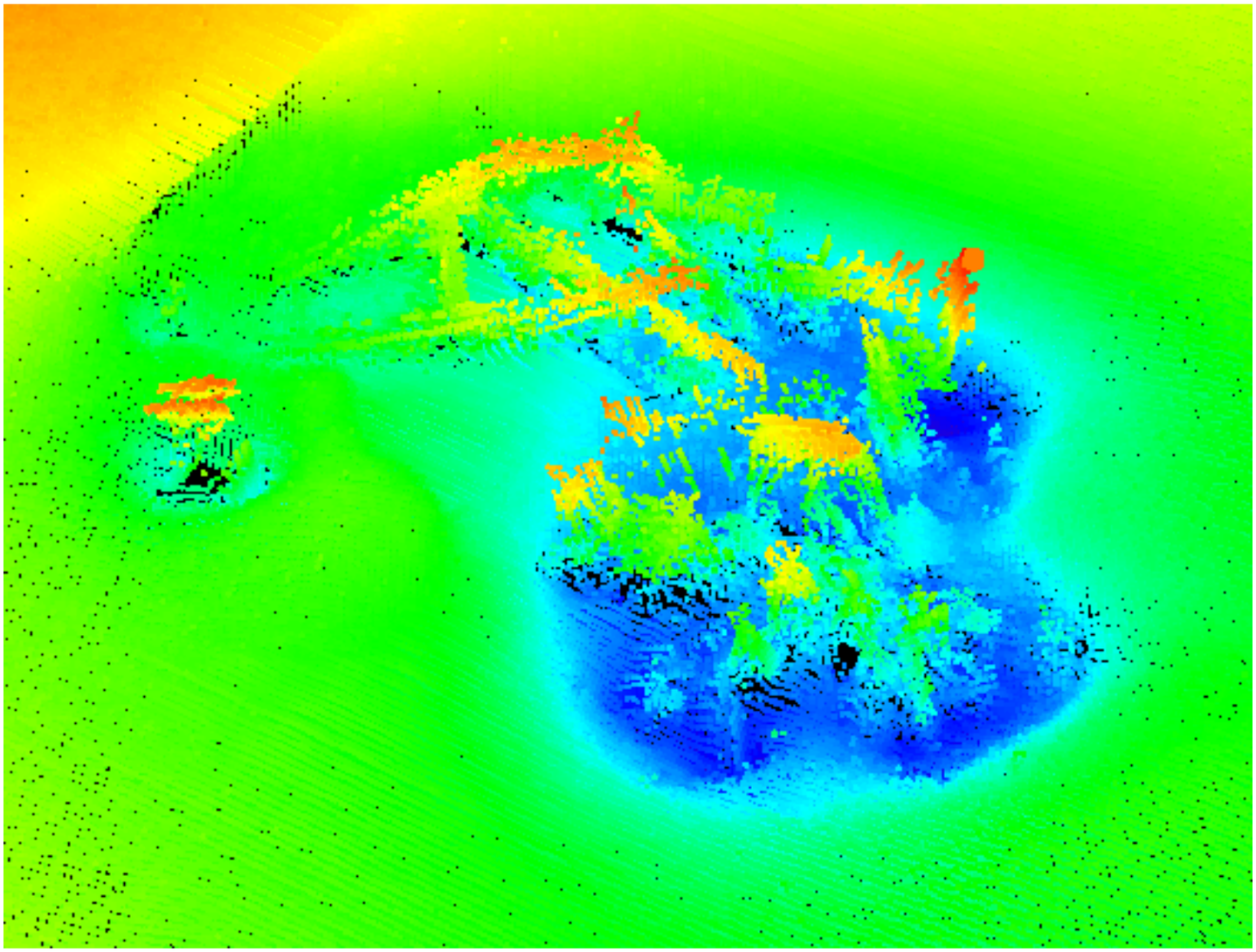

Figure 1.2.1

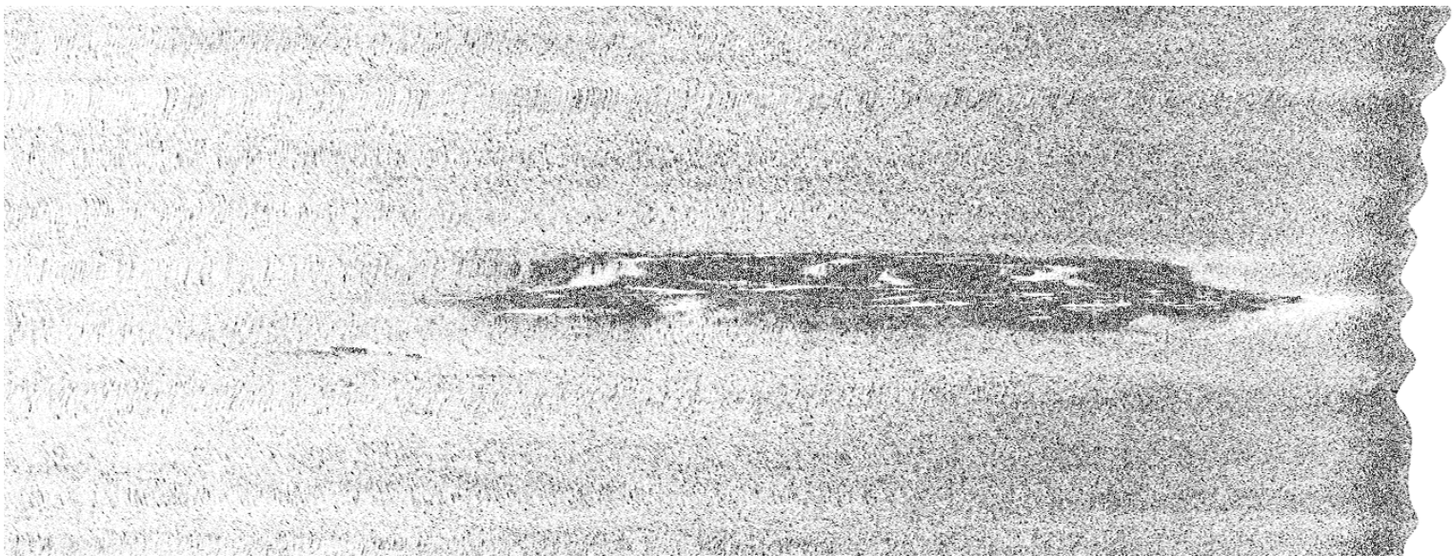

Figure 1.2.2

APPROVAL PAGE

H12339

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

- H12339_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12339_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: 

Digitally signed by Abigail Higgins
DN: cn=Abigail Higgins, o=NOAA, ou=Office of Coast Survey, email=abigail.higgins@noaa.gov, c=US
Date: 2012.08.31 14:30:31 -04'00'

LT Abigail Higgins
Chief, Atlantic Hydrographic Branch