

H111616

NOAA FORM 76-35A  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SERVICE

## DESCRIPTIVE REPORT

Type of Survey: Hydrographic Single Beam & 100% Sidescan

Field No. : Sheet A

Registry No. : H11616

### LOCALITY

State: Mississippi

General Locality: Mississippi Sound

Sublocality: Between Clermont Harbor and Grand Island

2007

CHIEF OF PARTY

Joseph Burke

### LIBRARY & ARCHIVES

DATE: \_\_\_\_\_

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:  H11616
<b>HYDROGRAPHIC TITLE SHEET</b>		FIELD NUMBER: Sheet A
State: <u>Mississippi</u>		
General Locality: <u>Mississippi Sound</u>		
Locality: <u>Between Clermont Harbor and Grand Island</u>		
Scale: <u>1:40,000</u> Date of Survey: <u>January 2007 to March 2007</u>		
Instructions Dated: <u>25-Sep-06</u> Project Number: <u>S-J977-KR-CC</u>		
Vessels: <u>High Roller, Hydro Surveyor</u>		
Chief of Party: <u>Joseph Burke</u>		
Surveyed by: <u>Scott Croft, T. Shannon, Stephen Kirkland, John Baker</u>		
Soundings taken by echosounder, hand lead line, or pole: <u>Odom Hydrotrac Echosounder</u>		
Graphic record scaled by: <u>N/A</u>		
Graphic record checked by: <u>N/A</u>		
Protracted by: <u>N/A</u> Automated plot by: <u>HP 1055 Plotter</u>		
Verification by: <u>C&amp;C Technologies Personnel</u>		
Soundings in: Feet: <u>X</u> Fathoms: <u>        </u> Meters: <u>        </u> at MLW: <u>        </u> MLLW: <u>X</u>		
<b>Remarks:</b> <u>Single Beam Debris Mapping Survey of Sheet A</u> <u>Data collection in meters, referenced to MLLW, later converted into feet</u> <u>100% side scan sonar coverage</u> <u>CTC time was used exclusively</u> <u>Grab samples were taken</u> <u>Tidal Zones: CGM 78 - 83</u> <u>Tidal Station: 8747437</u>		

## TABLE OF CONTENTS

A. AREA SURVEYED .....	1
B. DATA ACQUISITION AND PROCESSING.....	3
B.1 EQUIPMENT .....	3
B.2 QUALITY CONTROL .....	4
B.3 CORRECTIONS TO ECHO SOUNDINGS.....	5
C. VERTICAL AND HORIZONTAL CONTROL.....	5
D. RESULTS AND RECOMMENDATIONS .....	6
D.1 CHART COMPARISON.....	6
D.1.1 CHARTS AND NOTICES TO MARINERS .....	6
D.1.2 CHARTED SOUNDINGS.....	6
D.1.3 SHOALS AND HAZARDOUS FEATURES.....	8
D.1.5 INVESTIGATION ITEMS.....	12
D.1.6 DANGER TO NAVIGATION REPORTS.....	25
D.2 ADDITIONAL RESULTS .....	26
D.2.1 PRIOR SURVEYS.....	26
D.2.2 AIDS TO NAVIGATION.....	26
D.2.3 EXISTING INFRASTRUCTURE.....	26
D.2.4 OTHER PERTINENT INFORMATION.....	26
LETTER OF APPROVAL .....	28

## **APPENDICES**

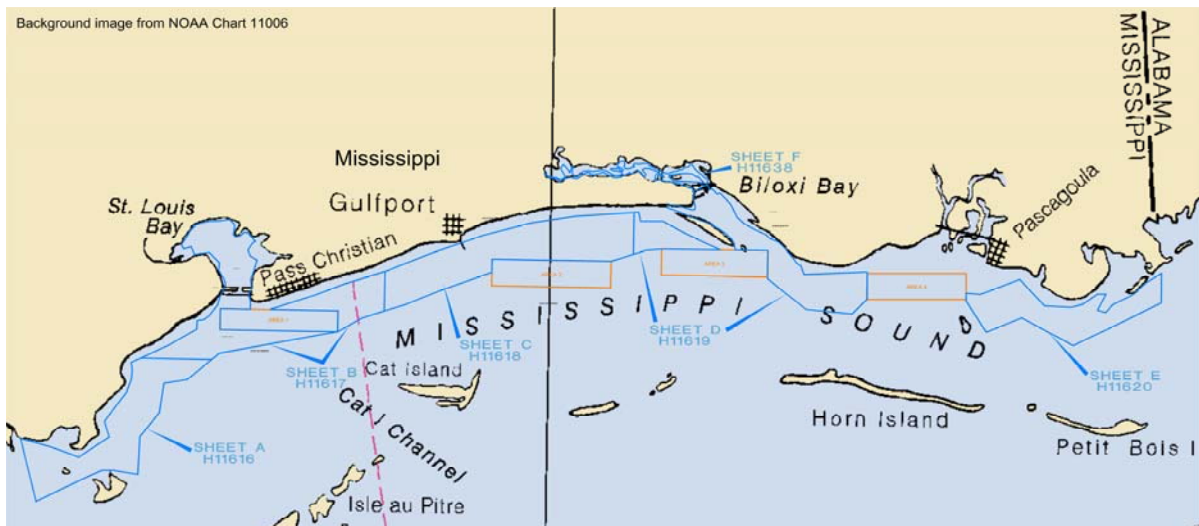
Appendix I	Danger to Navigation Reports
Appendix II	List of Geographic Names
Appendix III	Progress Sketch
Appendix IV	Tides and Water Levels
Appendix V	Supplemental Survey Records and Correspondence

## **SEPARATES**

Separates I	Acquisition and Processing Logs
Separates II	Side Scan Sonar
Separates III	Sound Velocity Profile Data
Separates IV	Statement of Work
Separates V	Crossline Comparisons

## A. AREA SURVEYED

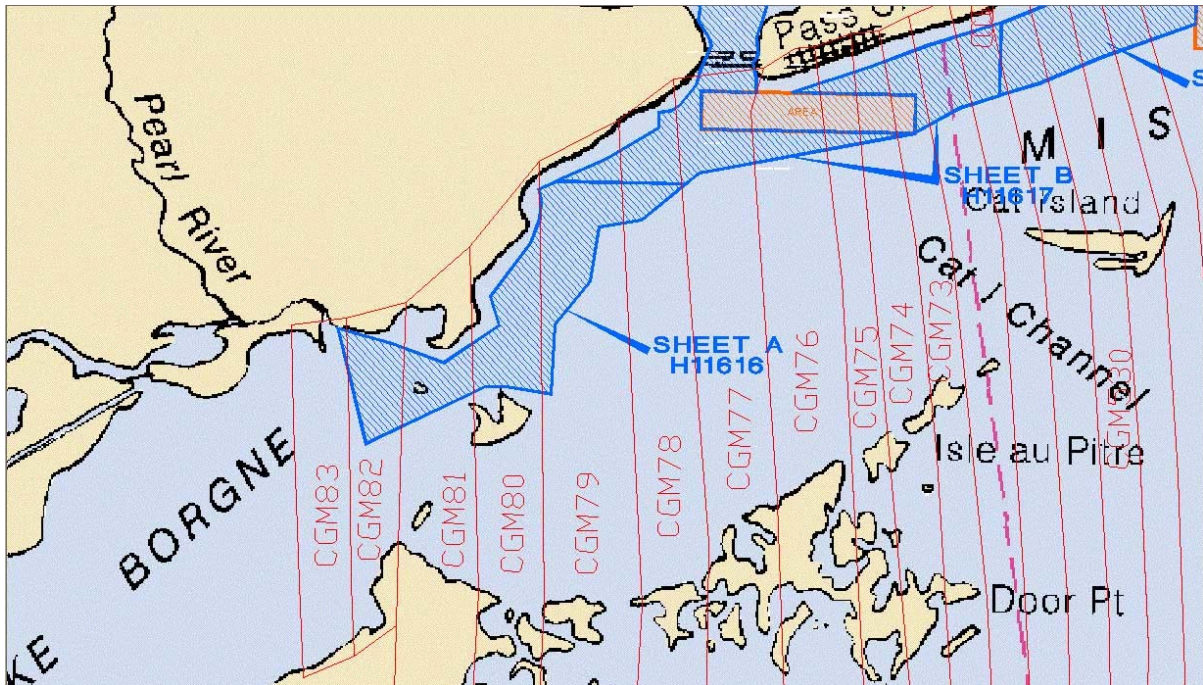
The survey area is located between Clermont Harbor and Grand Island, along the coast of Mississippi in the Mississippi Sound. The following sketch shows the layout of the Project (OPR-J977-KR-CC) and Sheet A (H11616). Water depths in the survey area range from 3.6 feet to 34.8 feet Mean Lower Low Water (MLLW).



Descriptive Report to Accompany Hydrographic Survey H11616



The survey area is spilt by six tidal zones, CGM 78 - 83. Tidal data from the Bay Waveland Yacht Club tide station (8747437) was used to process all of the tidal data. A sketch showing the layout of the tidal zones is shown below.





## B. DATA ACQUISITION AND PROCESSING

### B.1 EQUIPMENT

System	Manufacturer	Model
Side Scan Sonar	Geoacustics	196D(transducers)
Single Beam Sonar	Odom	Hydrotrac
Motion Sensor	TSS	335B, 320
Positioning System	CNAV DGPS	2050m

See the Data Acquisition and Processing Report for a detailed description of the equipment used for hydrographic operations.

The *High Roller*, a 41-foot Lafitte skiff, was used for hydrographic operations in Sheet A. The vessel is 16 feet wide and has an approximate draft of 2.6 feet. A central reference point (CRP) was established from which offsets to all equipment were measured. The relevant offsets are presented in the following table where X is positive forward, Y is positive starboard, and Z is positive down.

	Hydrotrac Head	Side Scan Sonar Towpoint	CNAV DGPS Antennae
X Offset	-5.18m	5.72 m	0 m
Y Offset	0 m	0m	0 m
Z Offset	.67 m	N/A	-5.18 m

The *Hydro Surveyor*, a 22-foot survey vessel, was used to run all contact investigations. The vessel is 7.5 feet wide, and has a draft of approximately 1.2 feet. The CNAV DGPS antennae was used as the central reference point for this vessel. A cleat on the forward deck of the boat was used as the side scan tow point. The relevant offsets are presented in the following table where X is positive forward, Y is positive starboard, and Z is positive down.



	Hydrotrac Head	Side Scan Sonar Towpoint	CNAV Antennae
X Offset	-4 m	1.4 m	0 m
Y Offset	0 m	0m	0 m
Z Offset	2.6 m	1.8 m	0 m

Detailed vessel diagrams are presented in the Data Acquisition and Processing Report.

## B.2 QUALITY CONTROL

This survey follows the coast in an east-west direction in its southern half, and in a roughly north-south direction in its northern half. The survey lines were drawn to parallel the survey outline. The line spacing was set at 70 meters based on the criteria of 100 percent side scan coverage, with the exception of the data collected in the very shallow areas outside of the Pearl River delta. In this area spacing was reduced to 40 meters. The side scan sonar was operated at a 75 meter per channel range except for investigation lines where the range was typically reduced to 50 meters.

In order to verify that the single beam was working properly, lead lines were conducted frequently. Pole measured depths were taken simultaneously with single beam collection in areas where the depth is similar to those found in the survey area. The results were compared and, if needed, the single beam was corrected.

Sheet A (H11616) adjoins with Sheet B (H11617). The junction between Sheets A and B was evaluated and the soundings were found to agree to within 1 foot.





Layback corrections were applied to all side scan .XTF data collected by the *High Roller* during office processing. Side scan sonar data collected by the *Hydro Surveyor* does not require layback correction, as the towfish was towed directly beneath the CNAV GPS antennae. All side scan data can be imported into a Caris project using a zero vessel file.

### B.3 CORRECTIONS TO ECHO SOUNDINGS

No deviations from the Correction to Echo Soundings section in the Data Acquisition and Processing Report occurred.

### C. VERTICAL AND HORIZONTAL CONTROL

Tide and water level corrections were determined and applied in accordance with Attachment #7 of the Statement of Work. Data from the Bay Waveland Yacht Club, MS (8747437) tidal station was used. Tidal zoning as set forth in the Statement of Work was applied. The following table shows the tidal zone and correctors that were used for this sheet. Tidal data were processed using the 1983-01 epoch.

Tide Zone	Reference Station	Time Corrector (min)	Range Ratio
CGM77	8747437	-18	0.95
CGM78	8747437	-6	0.92
CGM79	8747437	+6	0.92
CGM80	8747437	+24	0.90
CGM81	8747437	+36	0.90
CGM82	8747437	+48	0.90
CGM83	8747437	+66	0.90

The horizontal datum for the survey is the WGS84. The projection is Universal Transverse Mercator (UTM) Zone 16 North. The vertical datum for the soundings is Mean Lower Low Water (MLLW). All final soundings were projected in NAD83 in Caris Hips and Sips 6.1.

## D. RESULTS AND RECOMMENDATIONS

### D.1 CHART COMPARISON

#### D.1.1 CHARTS AND NOTICES TO MARINERS

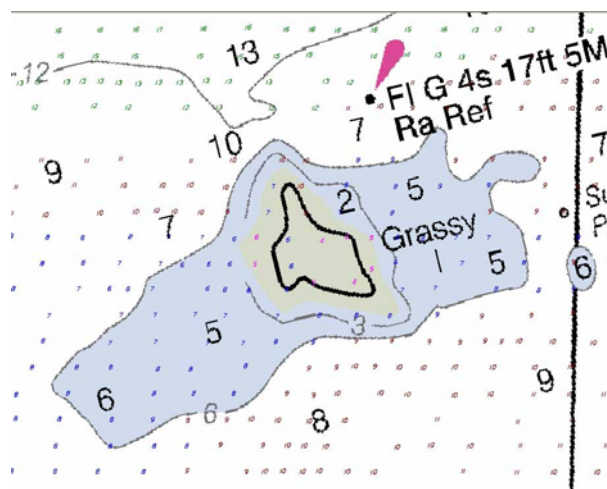
Soundings collected for this survey were compared to the following charts covering the survey area. The results of the comparisons are noted below.

Chart Number	Scale	Edition	Edition Date
11367	1:15,000	23	June, 2004
11371	1:80,000	37	October, 2004
11372	1:40,000	32	February, 2006

#### D.1.2 CHARTED SOUNDINGS

##### 11367

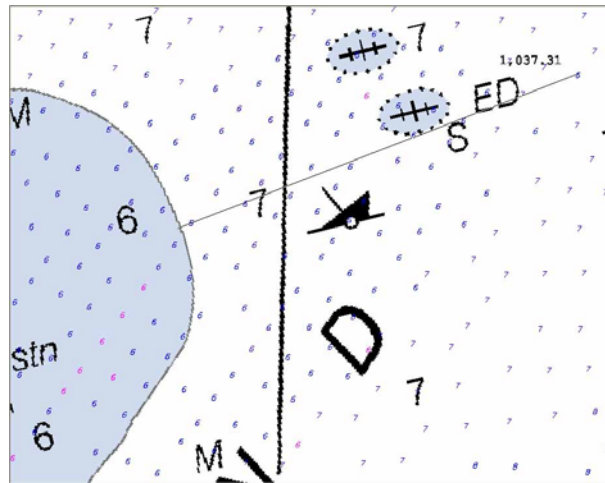
Charted soundings generally agree with the surveyed depths throughout the survey area. There are several isolated areas where changes in depth within the survey area have occurred. The most exceptional example can be seen at 30.154587° N, 89.4747017° W, adjacent to the charted grassy island. The following image displays the differences in depth.



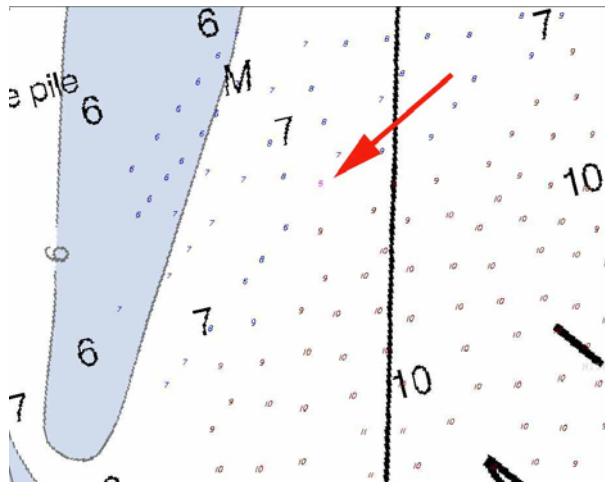
Descriptive Report to Accompany Hydrographic Survey H11616



The charted 6-foot contour located at 30.24° N, 89.40° W has extended 1000 feet east-northeast.



There is an isolated 5-foot shoal located at 30.1952296°N, 89.4351251° W.



There is significant shoaling of a charted 22-foot deep at 30.253782° N, 89.403295° W. Survey depths are 7-8 feet at this location. The following image displays this area of shoaling.



#### 11371

Charted soundings generally agree with the surveyed depths throughout the survey area. All of the discrepancies noted for chart 11367 were also found in this chart.

#### 11372

Charted soundings generally agree with the surveyed depths throughout the survey area.

### D.1.3 SHOALS AND HAZARDOUS FEATURES

The purpose of this survey was to identify hazardous debris deposited in the Mississippi Sound following Hurricane Katrina as part of a coast wide 100% side scan survey. The positions of these contacts were reported on a weekly basis. A



---

copy of the complete list of side scan contacts can be found in Separates II. Twenty-four contacts were identified and reported, they can be seen in the Investigations Item section of this report.

#### D.1.4 CHARTED FEATURES

It was required that all charted features be covered by 200% side scan sonar coverage. Following is a list of charted features, and the survey findings.

##### Obstn PD

Charted Position: 30.154493° N, 89.512323° W

Investigation Summary: No evidence of this obstruction was seen. It is recommended that this obstruction be removed from the chart.

##### Wreck PA

Charted Position: 30.166961°N, 89.491625°W

Investigation Summary: No evidence of this wreck was seen. It is recommended that this wreck be removed from the chart.

##### Obstn PD

Charted Position: 30.167034°N, 89.476632°W

Investigation Summary: No evidence of this obstruction was seen. It is recommended that this obstruction be removed from the chart.

##### Visible Wreck

Charted Position: 30.158387°N, 89.458282°W

Investigation Summary: No evidence of this wreck was seen. It is recommended that this wreck be removed from the chart.



---

Obstn PD

Charted Position: 30.185274°N, 89.425554°W

Investigation Summary: No evidence of this obstruction was seen. It is recommended that this obstruction be removed from the chart.

Wreck PD

Charted Position: 30.156913°N, 89.418421°W

Investigation Summary: No evidence of this wreck was seen. It is recommended that this wreck be removed from the chart.

Wreck PA

Charted Position: 30.193537°N, 89.401676°W

Investigation Summary: No evidence of this wreck was seen. It is recommended that this wreck be removed from the chart.

Obstn PD

Charted Position: 30.214049°N, 89.409149°W

Investigation Summary: No evidence of this obstruction was seen. It is recommended that this obstruction be removed from the chart.

Wreck PA

Charted Position: 30.222245°N, 89.416535°W

Investigation Summary: No evidence of this wreck was seen. It is recommended that this wreck be removed from the chart.

Wreck PD

Charted Position: 30.222849°N, 89.413403°W

Investigation Summary: No evidence of this wreck was seen. It is recommended that this wreck be removed from the chart.



---

Wreck PA

Charted Position: 30.234223°N, 89.383988°W

Investigation Summary: No evidence of this wreck was seen. It is recommended that this wreck be removed from the chart.

Obstn PA

Charted Position: 30.238558°N, 89.40833°W

Investigation Summary: No evidence of this obstruction was seen. It is recommended that this obstruction be removed from the chart.

Wreck PA

Charted Position: 30.240382°N, 89.383245°W

Investigation Summary: No evidence of this wreck was seen. It is recommended that this wreck be removed from the chart.

Visible Wreck

Charted Position: 30.242051°N, 89.381607°W

Investigation Summary: No evidence of this wreck was seen. It is recommended that this wreck be removed from the chart.

Visible Wreck

Charted Position: 30.243113°N, 89.398264°W

Investigation Summary: No evidence of this wreck was seen. It is recommended that this wreck be removed from the chart.

Wreck ED

Charted Position: 30.245536°N, 89.396731°W

Investigation Summary: No evidence of this wreck was seen. It is recommended that this wreck be removed from the chart.



---

Wreck PA

Charted Position: 30.24683°N, 89.398126°W

Investigation Summary: No evidence of this wreck was seen. It is recommended that this wreck be removed from the chart.

Visible Wreck

Charted Position: 30.247149°N, 89.383181°W

Investigation Summary: No evidence of this wreck was seen. It is recommended that this wreck be removed from the chart.

D.1.5 INVESTIGATION ITEMS

All twenty-four of the reported contacts were investigated. A set of three or more additional single beam and side scan lines were run over each of these locations in order to verify their position and determine their least depth. Of the twenty-four items investigated, twelve were verified.



# Descriptive Report to Accompany Hydrographic Survey H11616



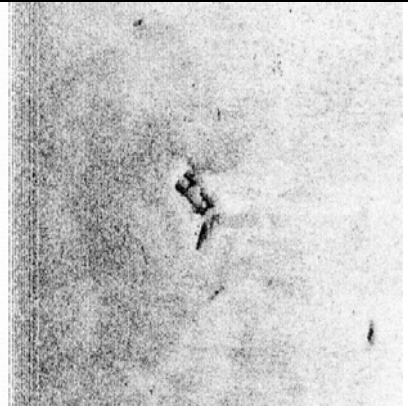
## Contact 1000

Least Depth: 6.250ft (A-1000-3)

Position: 30.2410155° N, 89.4142113°W (WGS84)

Time Stamp: 2007-03-09 10:50:25.640

Hydrographer's recommendations: This contact has been marked as a designated sounding within the H11616 Caris project submitted in conjunction with this report. It is recommended that this contact be charted as a 6-foot submerged obstruction at 30.2410155° N, 89.4142113°W (WGS84). This position was taken from single beam line A-1000-3.

	<p><b>1000_inv</b></p> <ul style="list-style-type: none"><li>• Sonar Time at Target: 03/09/2007 15:03:02</li><li>• Click Position (Lat WGS84): 30.241042893</li><li>• Click Position (Lon WGS84): -89.414198529</li><li>• Map Proj: WGS 1984 UTM, Zone 16 North, Meter</li><li>• Click Position (X): 267,686.79</li><li>• Click Position (Y): 3,347,961.25</li><li>• Acoustic Source File: E:\H11616_HighRoller\H11616hr\XTFVA-1000-1.xtf</li><li>• Ping Number: 956</li><li>• Range to Target: 24.40 Meters</li><li>• Fish Height: 4.13 Meters</li><li>• Event Number: 1</li><li>• Line Name: A-1000-1</li><li>• Area / Block:</li></ul>	<p><b>Dimensions</b></p> <p>Target Height = 0.59 Meters Target Length: 10.04 Meters Target Shadow: 4.19 Meters Target Width: 3.35 Meters</p> <p>Description: Investigated contact found with SSS</p>
--	---	--

Contact 1001

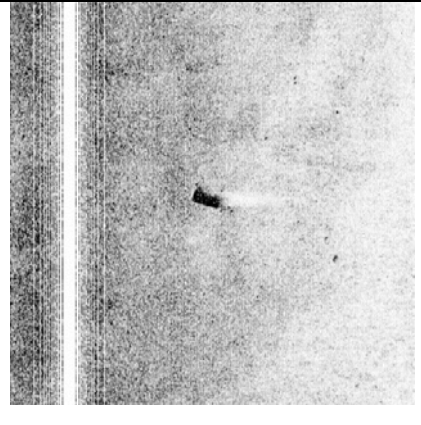
\* This contact correlates to contact 1014. As a result of a software error, the contact was renamed from 1001 to 1014.

Least Depth: 5.679ft (LINE 1001-3)

Position: 30. 2410926° N, 89. 4142628° W (WGS84)

Timestamp: 2007-03-09 11:18:35.64

Hydrographer's recommendations: The position and least depth of this contact were determined using side scan sonar data. Based upon the surrounding survey depths and the target height calculated from the side scan data, it is recommended that this contact be charted as a 5-foot submerged obstruction at 30. 2410926° N, 89. 4142628° W (WGS84). This position was taken from side scan line A-1001-3.

	<p><b>1001_inv</b></p> <ul style="list-style-type: none"> <li>• Sonar Time at Target: 03/09/2007 14:50:41</li> <li>• Click Position (Lat WGS84): 30.241124128</li> <li>• Click Position (Lon WGS84): -89.413685424</li> <li>• Map Proj: WGS 1984 UTM, Zone 16 North, Meter</li> <li>• Click Position (X): 267,736.37</li> <li>• Click Position (Y): 3,347,969.21</li> <li>• Acoustic Source File: E:\H11616_HighRoller\H11616hr\XTFVA-1001-1.xtf</li> <li>• Ping Number: 949</li> <li>• Range to Target: 17.70 Meters</li> <li>• Fish Height: 4.13 Meters</li> <li>• Event Number: 1</li> <li>• Line Name: A-1001-1</li> <li>• Area / Block:</li> </ul>	<p><b>Dimensions</b></p> <p>Target Height = 0.79 Meters          Target Length: 3.96 Meters          Target Shadow: 4.33 Meters          Target Width: 1.48 Meters</p> <p>Description: Investigated contact found</p>
---	---	---

Descriptive Report to Accompany Hydrographic Survey H11616



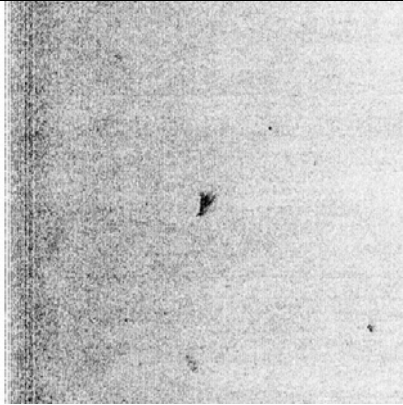
Contact 1002

Estimated Least Depth: 5.085ft

Position: 30.239676500° N, 89.407387522° W (WGS84)

Timestamp: 2007-03-08 16:44:20

Hydrographer's recommendations: The position and least depth of this contact were determined using side scan sonar data. Based upon the surrounding survey depths and the target height calculated from the side scan data, it is recommended that this contact be charted as a 5-foot submerged obstruction at 30.239676500° N, 89.407387522° W (WGS84). This position was taken from side scan line A-1002-2.

	<p><b>1002_inv</b></p> <ul style="list-style-type: none"><li>• Sonar Time at Target: 03/09/2007 16:44:20</li><li>• Click Position (Lat WGS84): 30.239676500</li><li>• Click Position (Lon WGS84): -89.407387522</li><li>• Map Proj: WGS 1984 UTM, Zone 16 North, Meter</li><li>• Click Position (X): 268,339.18</li><li>• Click Position (Y): 3,347,795.87</li><li>• Acoustic Source File: E:\H11616_HighRoller\H11616hr\XTF\A-1002-2.xtf</li><li>• Ping Number: 1355</li><li>• Range to Target: 25.28 Meters</li><li>• Fish Height: 4.13 Meters</li><li>• Event Number: 1</li><li>• Line Name: A-1002-2</li><li>• Area / Block:</li></ul>	<p><b>Dimensions</b></p> <p>Target Height = 0.25 Meters Target Length: 2.79 Meters Target Shadow: 1.66 Meters Target Width: 1.91 Meters</p> <p>Description: Investigated contact 1002 found.</p>
--	--	--

Descriptive Report to Accompany Hydrographic Survey H11616



Contact 1005

Least Depth: 6.503ft (A-1005-3a)

Position: 30.2314423° N, 89.4064935° W (WGS84)

Timestamp: 2007-03-09 13:27:59.47

Hydrographer’s recommendations: This contact has been marked as a designated sounding within the H11616 Caris project submitted in conjunction with this report. It is recommended that this contact be charted as a 6-foot submerged obstruction at 30.2314423° N, 89.4064935° W (WGS84). This position was taken from single beam line A-1005-3a.

	<p><b>1005_inv</b></p> <ul style="list-style-type: none"> <li>• Sonar Time at Target: 03/09/2007 17:40:00</li> <li>• Click Position (Lat WGS84): 30.231481967</li> <li>• Click Position (Lon WGS84): -89.406493544</li> <li>• Map Proj: WGS 1984 UTM, Zone 16 North, Meter</li> <li>• Click Position (X): 268,406.01</li> <li>• Click Position (Y): 3,346,885.59</li> <li>• Acoustic Source File: E:\H11616_HighRoller\H11616hr\XTFVA-1005-2.xtf</li> <li>• Ping Number: 2597</li> <li>• Range to Target: 23.24 Meters</li> <li>• Fish Height: 4.13 Meters</li> <li>• Event Number: 3</li> <li>• Line Name: A-1005-2</li> <li>• Area / Block:</li> </ul>	<p><b>Dimensions</b></p> <p>Target Height = 0.37 Meters          Target Length: 11.52 Meters          Target Shadow: 2.29 Meters          Target Width: 0.98 Meters</p> <p>Description: Investigated contact 1005 found.</p>
--	--	--

Descriptive Report to Accompany Hydrographic Survey H11616



Contact 1007

Least Depth: 10.098ft (A-1007-3b)

Position: 30.2213213° N, 89.4111941° W (WGS84)

Timestamp: 2007-03-09 14:01:44.780

Hydrographer’s recommendations: This contact has been marked as a designated sounding within the H11616 Caris project submitted in conjunction with this report. It is recommended that this contact be charted as a 10-foot submerged obstruction at 30.2213213° N, 89.4111941° W (WGS84). This position was taken from single beam line A-1007-3b.

	<p><b>1007_inv</b></p> <ul style="list-style-type: none"> <li>• Sonar Time at Target: 03/09/2007 18:36:58</li> <li>• Click Position (Lat WGS84): 30.221337771</li> <li>• Click Position (Lon WGS84): -89.411113255</li> <li>• Map Proj: WGS 1984 UTM, Zone 16 North, Meter</li> <li>• Click Position (X): 267,937.45</li> <li>• Click Position (Y): 3,345,770.42</li> <li>• Acoustic Source File: E:\H11616_HighRoller\H11616hr\XTF\A-1007-2.xtf</li> <li>• Ping Number: 1504</li> <li>• Range to Target: 27.32 Meters</li> <li>• Fish Height: 4.13 Meters</li> <li>• Event Number: 1</li> <li>• Line Name: A-1007-2</li> <li>• Area / Block:</li> </ul>	<p><b>Dimensions</b></p> <p>Target Height = 0.33 Meters          Target Length: 3.80 Meters          Target Shadow: 2.38 Meters          Target Width: 1.38 Meters</p> <p>Description: Investigated contact 1007 found.</p>
--	--	---


Contact 1008

Least Depth: 15.174ft (A-1009-3a)

Position: 30.1840994° N, 89.4085682° W (WGS84)

Timestamp: 2007-03-11 09:56:30.16

Hydrographer’s recommendations: This contact has been marked as a designated sounding within the H11616 Caris project submitted in conjunction with this report. It is recommended that this contact be charted as a 15-foot submerged obstruction at 30.1840994° N, 89.4085682° W (WGS84). This position was taken from single beam line A-1009-3a.

	<p><b>1008_inv</b></p> <ul style="list-style-type: none"> <li>• Sonar Time at Target: 03/11/2007 14:37:18</li> <li>• Click Position (Lat WGS84): 30.184171485</li> <li>• Click Position (Lon WGS84): -89.408530258</li> <li>• Map Proj: WGS 1984 UTM, Zone 16 North, Meter</li> <li>• Click Position (X): 268,098.95</li> <li>• Click Position (Y): 3,341,644.89</li> <li>• Acoustic Source File: E:\H11616_HighRoller\H11616hr\XTF\A-1008-2a.xtf</li> <li>• Ping Number: 2039</li> <li>• Range to Target: 19.12 Meters</li> <li>• Fish Height: 4.95 Meters</li> <li>• Event Number: 2</li> <li>• Line Name: A-1008-2a</li> <li>• Area / Block:</li> </ul>	<p><b>Dimensions</b></p> <p>Target Height = 0.53 Meters          Target Length: 14.13 Meters          Target Shadow: 2.40 Meters          Target Width: 0.38 Meters</p> <p>Description: Investigated contact found with SSS.</p>
--	--	--

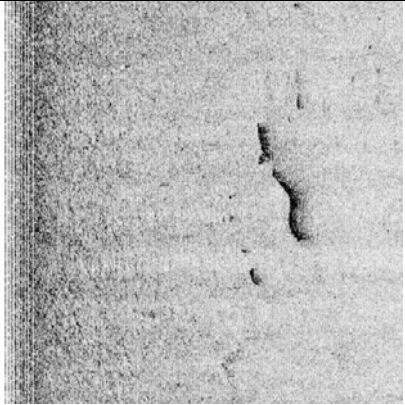
Contact 1011

Estimated Least Depth: 7.934

Position: 30.188466617° N, 89.423542386° W (WGS84)

Timestamp: 2007-03-11 15:12:36

Hydrographer's recommendations: The position and least depth of this contact were determined using side scan sonar data. Based upon the surrounding survey depths and the target height calculated from the side scan data, it is recommended that this contact be charted as an 8-foot submerged obstruction at 30.188466617° N, 89.423542386° W (WGS84). This position was taken from side scan line A-1011-1.

	<p><b>1011_inv</b></p> <ul style="list-style-type: none"> <li>• Sonar Time at Target: 03/11/2007 15:12:36</li> <li>• Click Position (Lat WGS84): 30.188466617</li> <li>• Click Position (Lon WGS84): -89.423542386</li> <li>• Map Proj: WGS 1984 UTM, Zone 16 North, Meter</li> <li>• Click Position (X): 266,663.24</li> <li>• Click Position (Y): 3,342,151.72</li> <li>• Acoustic Source File: E:\H11616_HighRoller\H11616hr\XTF\A-1011-1.xtf</li> <li>• Ping Number: 1501</li> <li>• Range to Target: 35.76 Meters</li> <li>• Fish Height: 4.43 Meters</li> <li>• Event Number: 2</li> <li>• Line Name: A-1011-1</li> <li>• Area / Block:</li> </ul>	<p><b>Dimensions</b></p> <p>Target Height = 0.02 Meters          Target Length: 15.53 Meters          Target Shadow: 0.20 Meters          Target Width: 1.70 Meters</p> <p>Description: unknown contact found showing no shadow</p>
--	--	---

## Descriptive Report to Accompany Hydrographic Survey H11616



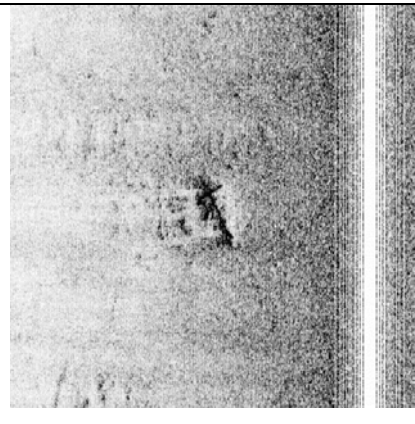
### Contact 1013

Least Depth: 9.326ft (A-1013-3b)

Position: 30.2027666° N, 89.3853603° W (WGS84)

Timestamp: 2007-03-11 08:32:16.58

Hydrographer's recommendations: This contact has been marked as a designated sounding within the H11616 Caris project submitted in conjunction with this report. It is recommended that this contact be charted as a 9-foot submerged obstruction at 30.1840994° N, 89.4085682° W (WGS84). This position was taken from single beam line A-1013-3b.

	<p><b>1013_inv</b></p> <ul style="list-style-type: none"><li>• Sonar Time at Target: 03/11/2007 13:04:32</li><li>• Click Position (Lat WGS84): 30.202798200</li><li>• Click Position (Lon WGS84): -89.385354073</li><li>• Map Proj: WGS 1984 UTM, Zone 16 North, Meter</li><li>• Click Position (X): 270,374.33</li><li>• Click Position (Y): 3,343,662.86</li><li>• Acoustic Source File: E:\H11616_HighRoller\H11616hr\XTF\A-1013-1.xtf</li><li>• Ping Number: 902</li><li>• Range to Target: 19.44 Meters</li><li>• Fish Height: 4.43 Meters</li><li>• Event Number: 2</li><li>• Line Name: A-1013-1</li><li>• Area / Block:</li></ul>	<p><b>Dimensions</b></p> <p>Target Height = 0.50 Meters Target Length: 8.38 Meters Target Shadow: 2.59 Meters Target Width: 1.85 Meters</p> <p>Description: 1013_inv unknown contact</p>
--	---	--



Descriptive Report to Accompany Hydrographic Survey H11616



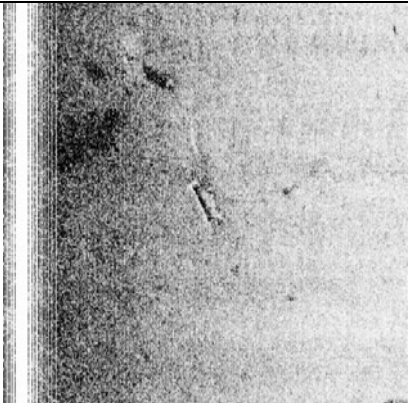
Contact 1017

Least Depth: 11.443ft (A-1017-3a)

Position: 30.1883048° N, 89.435848° W (WGS84)

Timestamp: 2007-03-11 11:16:28.580

Hydrographer's recommendations: This contact has been marked as a designated sounding within the H11616 Caris project submitted in conjunction with this report. It is recommended that this contact be charted as an 11-foot submerged obstruction at 30.1883048° N, 89.435848° W (WGS84). This position was taken from single beam line A-1017-3a.

	<p><b>1017_inv</b></p> <ul style="list-style-type: none"><li>• Sonar Time at Target: 03/11/2007 16:03:17</li><li>• Click Position (Lat WGS84): 30.188320795</li><li>• Click Position (Lon WGS84): -89.435856742</li><li>• Map Proj: WGS 1984 UTM, Zone 16 North, Meter</li><li>• Click Position (X): 265,476.92</li><li>• Click Position (Y): 3,342,160.86</li><li>• Acoustic Source File: E:\H11616_HighRoller\H11616hr\XTF\A-1017-2.xtf</li><li>• Ping Number: 1069</li><li>• Range to Target: 22.64 Meters</li><li>• Fish Height: 4.43 Meters</li><li>• Event Number: 1</li><li>• Line Name: A-1017-2</li><li>• Area / Block:</li></ul>	<p><b>Dimensions</b></p> <p>Target Height = 0.23 Meters Target Length: 5.13 Meters Target Shadow: 1.29 Meters Target Width: 0.79 Meters</p> <p>Description: 1017-inv unknown contact</p>
--	--	--

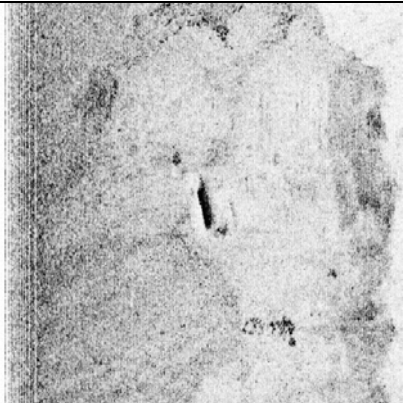
Contact 1018

Least Depth: 9.740ft (A-1018-3b)

Position: 30.1776798° N, 89.5221313° W

Timestamp: 2007-03-10 08:14:53.20

Hydrographer's recommendations: This contact has been marked as a designated sounding within the H11616 Caris project submitted in conjunction with this report. It is recommended that this contact be charted as a 10-foot submerged obstruction at 30.1776798° N, 89.5221313° W (WGS84). This position was taken from single beam line A-1018-3b.

	<p><b>1018_inv</b></p> <ul style="list-style-type: none"> <li>• Sonar Time at Target: 03/10/2007 12:49:35</li> <li>• Click Position (Lat WGS84): 30.177700741</li> <li>• Click Position (Lon WGS84): -89.522121450</li> <li>• Map Proj: WGS 1984 UTM, Zone 16 North, Meter</li> <li>• Click Position (X): 257,142.70</li> <li>• Click Position (Y): 3,341,164.34</li> <li>• Acoustic Source File: E:\H11616_HighRoller\H11616hr\XTF\A-1018-1.xtf</li> <li>• Ping Number: 1090</li> <li>• Range to Target: 24.98 Meters</li> <li>• Fish Height: 4.35 Meters</li> <li>• Event Number: 1</li> <li>• Line Name: A-1018-1</li> <li>• Area / Block:</li> </ul>	<p><b>Dimensions</b></p> <p>Target Height = 0.13 Meters          Target Length: 5.88 Meters          Target Shadow: 0.79 Meters          Target Width: 1.66 Meters</p> <p>Description: Investigated contact located.</p>
--	--	--

## Descriptive Report to Accompany Hydrographic Survey H11616



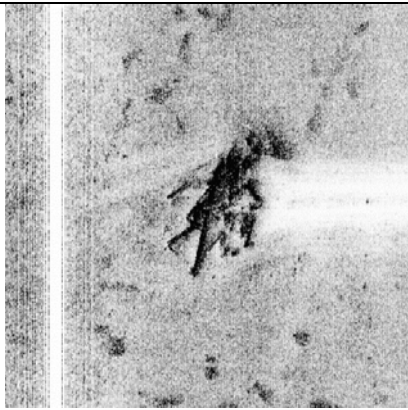
### Contact 1019

Least Depth: Exposed 4ft

Position: 30.17872117° N, 89.51776500° W

Timestamp: 2007-02-10 13:31:54

Hydrographer's recommendations: This contact was submitted previously as DTON7. It is an exposed wreck. Further investigation was conducted to determine the extent of any additional submerged debris associated with the wreck. It is recommended that this exposed wreck be charted as a dangerous visible wreck at 30.17872117° N, 89.51776500° W.

 A grayscale sonar image showing a dark, irregularly shaped object on a light-colored seabed. The object appears to be a wreck or debris, with some internal structure visible. The surrounding seabed is relatively flat with some minor texture.	<p><b>1019_inv</b></p> <ul style="list-style-type: none"><li>• Sonar Time at Target: 03/10/2007 13:31:54</li><li>• Click Position (Lat WGS84): 30.178779837</li><li>• Click Position (Lon WGS84): -89.517768773</li><li>• Map Proj: WGS 1984 UTM, Zone 16 North, Meter</li><li>• Click Position (X): 257,564.60</li><li>• Click Position (Y): 3,341,274.70</li><li>• Acoustic Source File: E:\H11616_HighRoller\H11616hr\XTFA-1019-2.xtf</li><li>• Ping Number: 789</li><li>• Range to Target: 18.76 Meters</li><li>• Fish Height: 4.35 Meters</li><li>• Event Number: 1</li><li>• Line Name: A-1019-2</li><li>• Area / Block:</li></ul>	<p><b>Dimensions</b></p> <p>Target Height = 2.42 Meters Target Length: 19.44 Meters Target Shadow: 24.30 Meters Target Width: 10.66 Meters</p> <p>Description: Danger to Navigation investigated and reported.</p>
--	--	--

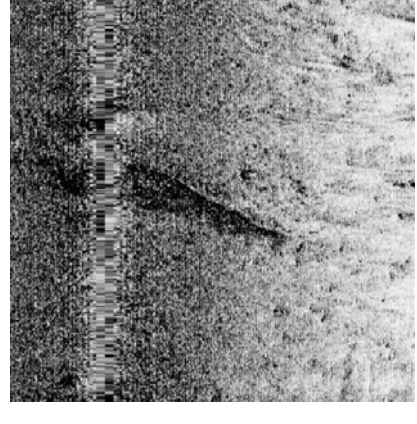
Contact 1020

Least Depth: 15.006ft (A-1020-3)

Position: 30.1813495° N, 89.4042056° W (WGS84)

Timestamp: 2007-03-11 8:55:38.39

Hydrographer's recommendations: This contact has been marked as a designated sounding within the H11616 Caris project submitted in conjunction with this report. It is recommended that this contact be charted as a 15-foot submerged obstruction at 30.1813495° N, 89.4042056° W (WGS84). This position was taken from single beam line A-1020-3.

	<p><b>1020_inv</b></p> <ul style="list-style-type: none"> <li>• Sonar Time at Target: 03/11/2007 13:49:00</li> <li>• Click Position (Lat WGS84): 30.181334582</li> <li>• Click Position (Lon WGS84): -89.404213723</li> <li>• Map Proj: WGS 1984 UTM, Zone 16 North, Meter</li> <li>• Click Position (X): 268,508.04</li> <li>• Click Position (Y): 3,341,321.61</li> <li>• Acoustic Source File: E:\H11616_HighRoller\H11616hr\XTF\A-1020-1.xtf</li> <li>• Ping Number: 805</li> <li>• Range to Target: 13.29 Meters</li> <li>• Fish Height: 5.27 Meters</li> <li>• Event Number: 1</li> <li>• Line Name: A-1020-1</li> <li>• Area / Block:</li> </ul>	<p><b>Dimensions</b></p> <p>Target Height = 0.00 Meters Target Length: 17.76 Meters Target Shadow: 0.00 Meters Target Width: 1.21 Meters</p> <p>Description: Investigation target 1020</p>
--	---	--

## Descriptive Report to Accompany Hydrographic Survey H11616



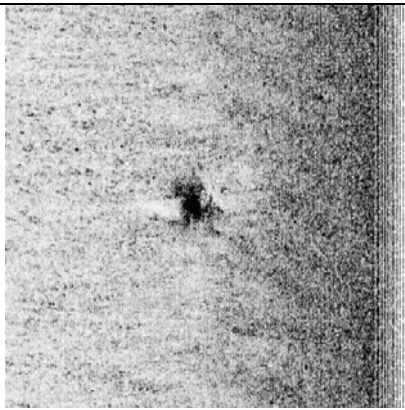
### Contact 1026

Least Depth: 9.570 (A-1026-3)

Position: 30.1521941° N, 89.5065827° W (WGS84)

Timestamp: 2007-03-10 08:58:46.82

Hydrographer's recommendations: This contact has been marked as a designated sounding within the H11616 Caris project submitted in conjunction with this report. It is recommended that this contact be charted as a 9-foot submerged obstruction at 30.1521941° N, 89.5065827° W (WGS84). This position was taken from single beam line A-1026-3.

	<p><b>1026_inv</b></p> <ul style="list-style-type: none"> <li>• Sonar Time at Target: 03/10/2007 13:44:38</li> <li>• Click Position (Lat WGS84): 30.152172359</li> <li>• Click Position (Lon WGS84): -89.506461223</li> <li>• Map Proj: WGS 1984 UTM, Zone 16 North, Meter</li> <li>• Click Position (X): 258,588.86</li> <li>• Click Position (Y): 3,338,300.87</li> <li>• Acoustic Source File: E:\H11616_HighRoller\H11616hr\XTF\A-1026-1.xtf</li> <li>• Ping Number: 1465</li> <li>• Range to Target: 26.92 Meters</li> <li>• Fish Height: 4.43 Meters</li> <li>• Event Number: 2</li> <li>• Line Name: A-1026-1</li> <li>• Area / Block:</li> </ul>	<p><b>Dimensions</b></p> <p>Target Height = 0.63 Meters          Target Length: 4.55 Meters          Target Shadow: 4.50 Meters          Target Width: 3.45 Meters</p> <p>Description: Investigated contact found</p>
--	--	---

### D.1.6 DANGER TO NAVIGATION REPORTS

One DTON report was issued in conjunction with this survey, reporting the location of a visible wreck at the following location. The DTON report was called DTON7. This DTON was originally reported as contact 1019. A duplicate copy of the DTON7 report has been submitted in conjunction with this descriptive report.

Description	Latitude	Longitude
DTON7	30.17872° N	089.517765°



## D.2 ADDITIONAL RESULTS

### D.2.1 PRIOR SURVEYS

Comparison with prior surveys was not required under this Task Order. See Section D.1 for comparison to nautical charts.

### D.2.2 AIDS TO NAVIGATION

The following Aids to Navigation were present in the survey area at the completion of the fieldwork in February 2007. All were found as charted.

Description	Latitude	Longitude
Green "5"	30.1557215526°	89.5025709938°
Green "3"	30.1582930338°	89.4729682634°
Red "2"	30.1722029593°	89.453044878°
Green "15"	30.1792067806°	89.4023393744°
Red "22"	30.1845782748°	89.4258195856°
Green "3"	30.2361712177°	89.4114313034°
Red "2"	30.2342311557°	89.4063169289°
Green "1"	30.2310558333°	89.4019836667°

### D.2.3 EXISTING INFRASTRUCTURE

No other charted infrastructure exists within the survey area.

### D.2.4 OTHER PERTINENT INFORMATION

The primary purpose of this survey was to provide information concerning the location of hurricane debris along the coast of Mississippi to fisherman, recreational boaters, and others operating vessels in these waters following Hurricane Katrina.

In order to properly create a BASE surface in Caris using the data collected for this survey, alterations had to be made to the standard Caris HIPKernel.dll, and the standard Caris DeviceModels.xml.

## Descriptive Report to Accompany Hydrographic Survey H11616



---

A revised version of the HIPSKernel.dll was provided to C&C Technologies by Caris that would allow for proper conversion of .RAW Winnfrog single beam files. Prior to installed this updated .dll, Caris conversions did not properly account for raw sound velocity values, preventing the software from calculating the correct TPE value.

The DeviceModels.xml had to be edited to include the Odom Hydrotrac sounder that was used by all survey vessels throughout the survey.

A copy of both the revised .dll and .xml are included in Caris folder on the USB hard drive submitted in conjunction with this report.



---

**LETTER OF APPROVAL**

REGISTRY NUMBER H11616

This report and the accompanying smooth sheet are respectfully submitted.

Field operations contributing to the accomplishment of the survey H11616 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report and accompanying survey data have been closely reviewed and are considered complete and adequate as per the Statement of Work.

This report is meant to be accompanied by the Data Acquisition and Processing Report for project S-J977-KR-CC revised and submitted in June 2007.

---

Joseph Burke  
Project Manager  
C&C Technologies  
June 2007



**APPENDIX I**  
**DANGER TO NAVIGATION REPORTS**

## Report of Danger to Navigation

State: Mississippi  
General Locality: Mississippi Sound  
Sublocality: Pearl River Delta, MS  
Date: 01/23/07  
NOAA Survey: S-J977-KR-06

### Charts Affected

Number	Edition	Date	Scale
11367_1	34	07/2006	1:40,000

### Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1	Visible Wreck	Visible Wreck	Exposed 4 ft	30° 10.72327' N (WGS84)	089° 31.06590' W (WGS84)	-----

# 1 – Dangers to Navigation

## 1) Dangerous Visible Wreck – Pearl River Delta, MS.

### Danger to Navigation

#### Survey Summary

Survey Position: 30° 10.72327' N, 089° 31.06590' W (WGS84)  
30° 10' 43.3962" N, 089° 31' 03.954" W (WGS84)  
30.17872° N, 089.517765° W (WGS84)

Least Depth: Exposed approx. 5ft mllw

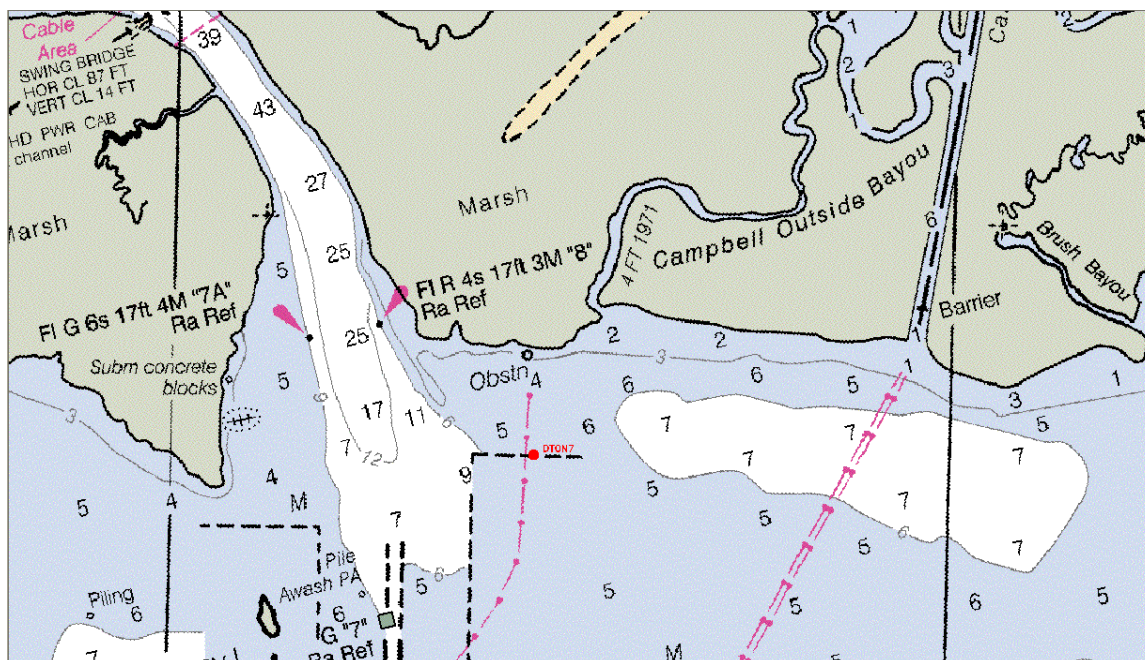
Timestamp: 15:08:06

Chart Affected: 11367\_1

Remarks:

This feature is an uncharted dangerous visible wreck. The position listed above was taken from a side scan sonar data.

#### Feature Correlation



#### Hydrographer Recommendations

The Hydrographer recommends that this feature be charted as a dangerous visible wreck at 30° 10.72327' N, 089° 31.06590' W (WGS84).

### **Cartographically-Rounded depth (Affected charts)**

### **S-57 attributes**

Geo Object 1: Dangerous Visible Wreck

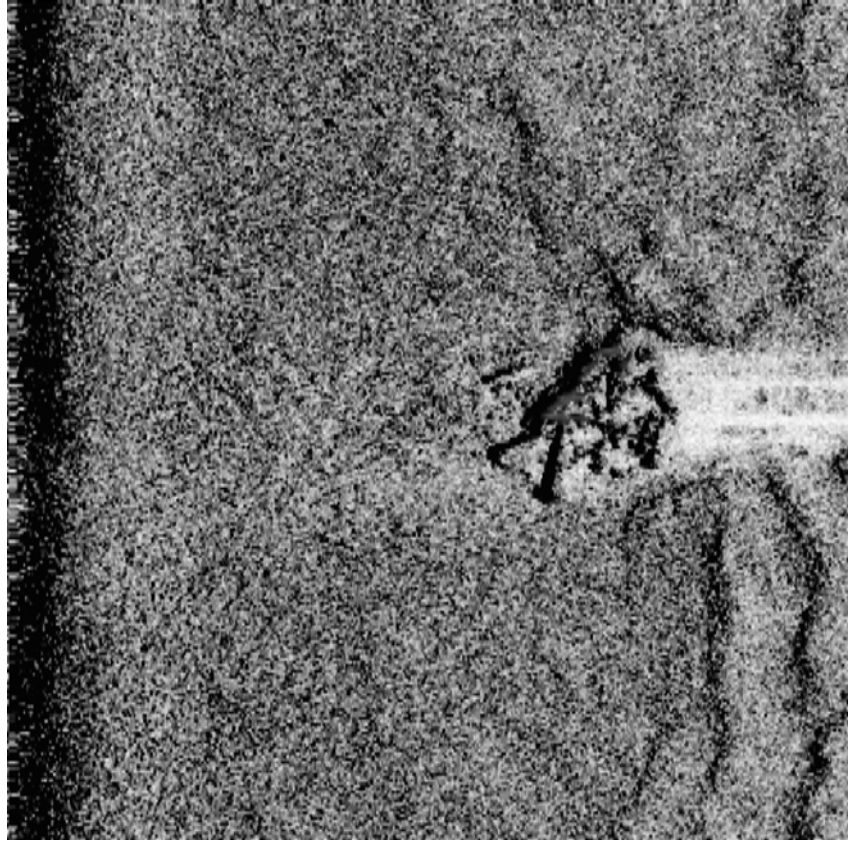
Attributes: INFORM: This feature is an uncharted dangerous visible wreck.

Valsou:

WATLEV:

### **Feature Images**





**APPENDIX II**  
**LIST OF GEOGRAPHIC NAMES**

No new geographic names were found within the survey area. No corrections to the currently charted geographic names within the survey area are needed.

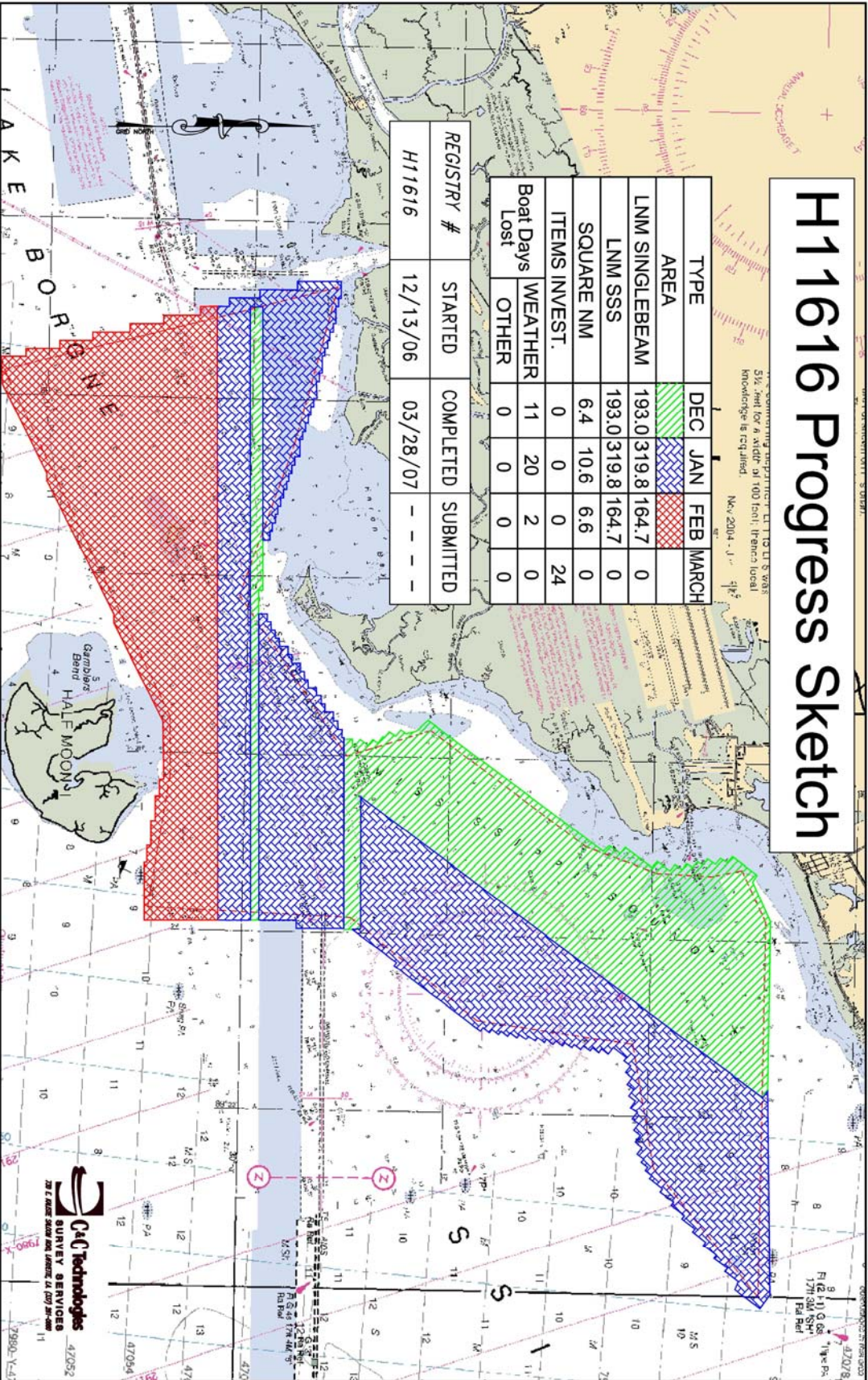
**APPENDIX III**  
**PROGRESS SKETCH**



# H11616 Progress Sketch

TYPE	DEC	JAN	FEB	MARCH
AREA				
LNM SINGLEBEAM	193.0	319.8	164.7	0
LNM SSS	193.0	319.8	164.7	0
SQUARE NM	6.4	10.6	6.6	0
ITEMS INVEST.	0	0	0	24
Boat Days				
WEATHER	11	20	2	0
Lost	0	0	0	0

REGISTRY #	STARTED	COMPLETED	SUBMITTED
H11616	12/13/06	03/28/07	---



**C&I Technologies**  
SURVEY SERVICES  
707 E. BROAD STREET, SUITE 200, DENVER, CO 80202  
303.733.1111

4/20/07

**APPENDIX IV**  
**TIDES AND WATER LEVELS**

The tidal data applied to all single beam echosounder data was downloaded from the following website:

[http://www.tidesandcurrents.noaa.gov/olddata/data\\_retrieve.shtml?input\\_code=100111111vwl](http://www.tidesandcurrents.noaa.gov/olddata/data_retrieve.shtml?input_code=100111111vwl)

All tidal corrections were performed in Caris Hips and Sips 6.1. The tide (.tid) files applied to the data can be found in the TIDE folder located within the Caris project that accompanies this report. In addition to the .tid file, the zone definition file(.zdf), supplied by Co-Ops, can also be found in the TIDE folder.

**APPENDIX V**  
**SUPPLEMENTAL SURVEY RECORDS**  
**AND CORRESPONDANCE**

There are no supplemental survey records or correspondence accompanying this report.

**APPENDIX V**

**AWOIS**

No AWOIS items were required for investigation as a part of this survey.

## TABLE OF CONTENTS

A. EQUIPMENT .....	2
A.1 SURVEY VESSELS.....	2
A.2 SINGLE BEAM SONAR OPERATIONS .....	4
A.3 SIDE SCAN SONAR OPERATIONS.....	4
B. QUALITY CONTROL .....	5
B.1 SINGLE BEAM.....	5
B.2 SIDE SCAN .....	5
B.2.1 REVIEW PROCESS .....	5
B.2.2 CONTACT SELECTION .....	5
B.2.3 PROOF OF COVERAGE .....	5
C. CORRECTIONS TO ECHO SOUNDINGS.....	6
C.1 INSTRUMENT CORRECTIONS .....	6
C.2 VESSEL CONFIGURATION CORRECTIONS .....	6
C.3 STATIC AND DYNAMIC DRAFT CORRECTIONS .....	6
C.4 VESSEL MOTION CORRECTIONS .....	7
C.5 SOUND VELOCITY CORRECTIONS .....	7
C.6 TIDE AND WATER LEVEL CORRECTIONS .....	7
APPENDIX A - VESSEL DESCRIPTIONS.....	9
APPENDIX B – EQUIPMENT DESCRIPTIONS.....	20
APPENDIX C – CALIBRATION RECORDS .....	36
LETTER OF APPROVAL .....	37





## A. EQUIPMENT

The major operational systems used to acquire hydrographic data include the Odom 200 kHz Hydrotrac single beam echosounder, GeoAcoustics side scan sonar systems, and Imaganex shark side scan sonars. PCs were used to collect onboard all vessels, as well as process all data at our Lafayette, LA office.

### A.1 SURVEY VESSELS

Five separate survey vessels were used for data collection during this survey, the *Arlen*, *Beach Surveyor*, *High Roller*, *Hydro Surveyor*, and the *Inland Surveyor*.

The *Arlen* worked in the shallower sections of H11617 (sheet B), H11619 (sheet D), and H11638 (sheet F). The dates of survey for the *Arlen* are as follows:

<b>Survey</b>	<b>Dates</b>
H11617	Oct. 19 – Jan. 19
H11619	May 15 – Oct. 10
H11638	Jan. 24 – Feb. 3

The *Beach Surveyor* worked in the middle section of H11617 (sheet B). The dates of survey for the *Beach Surveyor* are as follows:

<b>Survey</b>	<b>Dates</b>
H11617	Nov. 10 – Dec. 6

The *High Roller* collected all of H11616 (sheet A), as well as large sections of H11617 (sheet B), H11618, (sheet C), H11619 (sheet D), and H11620 (sheet E). The dates of survey for the High Roller are as follows:

Data Acquisition and Processing Report  
OPR-K379-KR



---

<b>Survey</b>	<b>Dates</b>
H11616	Dec. 14 – Feb. 7
H11617	Nov. 17 – Dec. 6
H11618	Oct. 14 – Nov. 14
H11619	Sept. 29 – Oct. 25
H11620	Feb. 8 – Feb. 27

The Hydro Surveyor worked in H11617 (sheet B), H11620 (sheet E), and H11638 (sheet F), as well as collecting investigation lines in all of the survey areas. The dates of survey for the Hydro Surveyor are as follows:

<b>Survey</b>	<b>Dates</b>
H11617	July 23 – Mar. 5
H11620	Feb. 26 – Feb. 27
H11638	Feb. 14 – Feb. 20

The *Inland Surveyor* worked in the eastern section of H11618 (sheet C). The dates of survey for the *Inland Surveyor* are as follows:

<b>Survey</b>	<b>Dates</b>
H11618	Oct. 14 – Nov. 14

Vessel diagrams and specifications are included in Appendix A. The diagrams show all offsets from the vessel center reference point to the antennas and to all survey equipment. The details of the vessels include registration numbers, capacity, and equipment.



---

## A.2 SINGLE BEAM SONAR OPERATIONS

A hull mounted 200 kHz Hydrotrac single beam echosounder was installed on board all five survey vessels. Data from the Hydrotrac was continuously recorded and monitored in real-time. If any data displayed navigation or motion correction problems, that line was rerun.

## A.3 SIDE SCAN SONAR OPERATIONS

The Imagenex Shark side scan sonar was in used in shallow water survey on board the *Arlen*. The side scan sonar was towed from the bow of the boat, such that the transducers were positioned directly beneath the GPS antennae.

A GeoAcoustics side scan sonar system was used to collect survey data on board the *Beach Surveyor*, *High Roller*, *Hydro Surveyor*, and the *Inland Surveyor*. On board the *Beach Surveyor*, *High Roller*, *Hydro Surveyor*, the towfish was towed from the bow of the vessel resulting in a negligible layback, with the exception of the *High Roller*, which has a  $-2.5$  meter layback from the GPS antennae. The *Inland Surveyor* had both a towed and bow mounted configuration.

Depending upon the local conditions, survey operations were conducted at speeds averaging between 3 and 5.5 knots. The side scan sonars were operated at various range scales, with line spacing set between 30 and 65 meters depending upon the depth of the water. Confidence checks were performed a minimum of once a day.

Imagenex side scan collection software was used when collecting data with the Shark. Side Scan Sonar Chesapeake Technologies SonarWiz.MAP software was used when collecting with the GeoAcoustics. SonarWiz.MAP was also used for the processing and target selection of the all side scan sonar data.



---

## B. QUALITY CONTROL

### B.1 SINGLE BEAM

Single beam data was monitored real time at all times during data collection. In addition, data was reviewed in Caris within 24 hours of its collection. If it was determined that any data quality issues were present, all lines affected would be noted and rerun.

### B.2 SIDE SCAN

#### B.2.1 REVIEW PROCESS

All data was reviewed at least twice in the field. The side scan operator reviewed all data during collection and noted in the survey logs any significant features or surface/water column effects. Within hours of collection the data was reviewed for a second time by a geoscientist.

#### B.2.2 CONTACT SELECTION

As each line was reviewed sonar contacts were tagged and recorded. All contacts with shadows, or appeared to potentially be marine debris, were recorded. Numerous crab traps were seen in the data. In order to separate working crab traps from debris, the time a crab trap was seen and its range from nadir was logged by the side scan operator. All other existing infrastructure, such as aids to navigation and piers were noted in the logs, and only marked in the instance that they represented hurricane debris.

#### B.2.3 PROOF OF COVERAGE

As the geoscientist reviewed the data a mosaic was produced. Any gaps in coverage were noted, logged in the rerun log, and brought to the attention of the party chief.

For the coverage map requirement of the interim and final deliverables we submitted side scan sonar mosaics. These mosaics were generated in the field and served as another quality control tool. The mosaics were not only used for coverage but could be used to correlate contacts seen on adjacent lines. The mosaic images were also overlain with the



---

nautical charts, sonar contact plot and bathymetry data to give a full picture of the survey area.

## C. CORRECTIONS TO ECHO SOUNDINGS

### C.1 INSTRUMENT CORRECTIONS

No instrument corrections were necessary.

### C.2 VESSEL CONFIGURATION CORRECTIONS

Prior to survey operations, offsets to the antennas and other survey equipment were measured on board each survey vessel. Offsets were measured from the Central Reference Point (CRP) to all relevant points on the survey vessel (bow, stern, antennas, transducers, etc.) using traditional survey techniques incorporating plumb bobs, tape measures, and digital levels. On board the *High Roller* and the *Inland Surveyor*, the CRP was established as an arbitrary point along the central along track axis of the boat. On board the *Arlen*, *Beach Surveyor*, and *Hydro Surveyor*, the GPS antennae were used as the reference point.

The results of the vessel surveys are shown in diagram form in Appendix A.

### C.3 STATIC AND DYNAMIC DRAFT CORRECTIONS

Frequent lead line comparisons to the measured single beam depth were used to verify, or correct as needed, the draft of all five survey vessels. Draft corrections were applied during collection of the data. The original lead line draft corrections, as well as any subsequent changes to the draft offset, are recorded in the boats survey logs. A Caris vessel file is provided for each survey vessel within the Caris project submitted in conjunction with this report. All vessel files contain a waterline of 0.0m, with the exception of the Beach and Hydro Surveyors. Due to errors applying draft corrections at the time of collection, the following waterline heights were applied in Caris:



---

Vessel	Date	Waterline Height
Beach Surveyor	Oct. 27, 2006 (2006-300)	0.2m
Hydro Surveyor	March 9, 2007 (2007-068)	0.15m (Applied only until 14:30 of this day)

#### C.4 VESSEL MOTION CORRECTIONS

TSS 335B motion compensators were utilized on board the *High Roller* and *Inland Surveyor*. TSS 320 heave compensators were used on board the *Beach Surveyor* and *Hydro Surveyor*. The *Arlen* did not have any motion correction applied to its single beam data.

#### C.5 SOUND VELOCITY CORRECTIONS

Sound velocity was measured and applied on a daily basis on board the *High Roller* and *Inland Surveyor* using Seabird SBE-19 CTD profiler serial number 1174. A sound velocity correction of 1500 m/s was applied to data collected on board all other vessels.

#### C.6 TIDE AND WATER LEVEL CORRECTIONS

Tidal correction data was downloaded from the NOAA website. NOAA CO-OPS supplied tidal zoning for the entire survey area. Three tidal gauges were used, gauge 8747437 at Bay Waveland Yacht Club, gauge 8745557 at Gulfport Harbor, and gauge 8741533 at the Pascagoula NOAA Lab.

No tidal zoning was provided for Bay St. Louis, in the Northern half of H11617. C&C Technologies created a new tidal zone, named CGM600, in order to correct for tidal offsets in Bay St. Louis. A time corrector of zero and range correction of one were applied in this zone. This zone was incorporated into a new .zdf file, named J977KR2007CC\_CORP\_rev, which can be found in the Caris project submitted in conjunction with the separate project reports.

Data Acquisition and Processing Report  
OPR-K379-KR



---

Least depths in Biloxi Back Bay (H11638) were corrected using the Gulfport Harbor tidal gauge, with zero time or range corrections. It is the opinion of C&C Technologies that the application of this tidal corrector results in erroneous least depths of submerged features, and that these depths can not be considered reliable for navigation purposes.



---

APPENDIX A - VESSEL DESCRIPTIONS



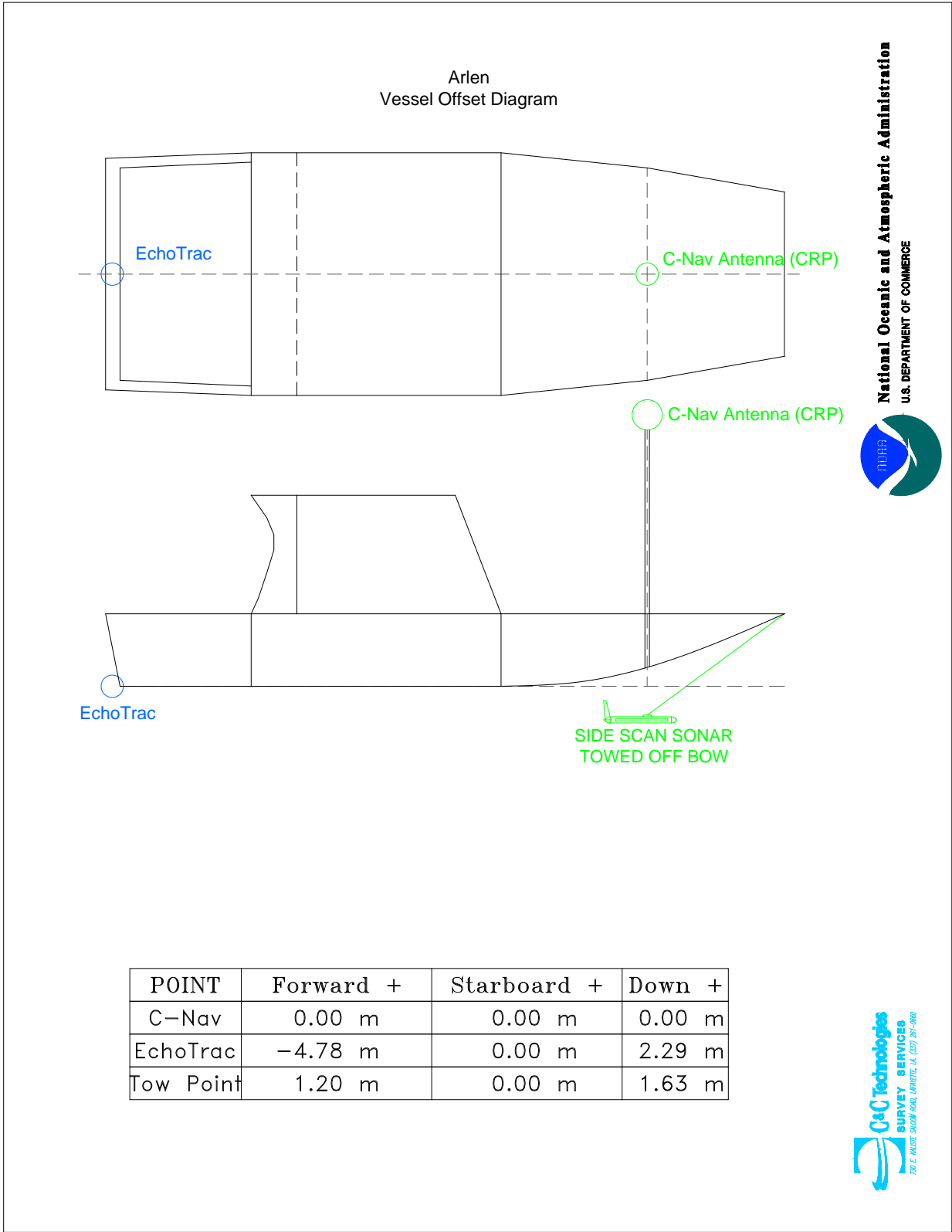


The *Arlen* is a 20-foot survey vessel. The vessel is 7 feet wide and has an approximate draft of 1.5 feet. The CNAV antennae were used as the central reference point for this vessel. A cleat on the forward deck of the boat was used as the side scan tow point. The relevant offsets are presented in the following table where X is positive forward, Y is positive starboard, and Z is positive down.

A Caris Hips vessel file with all of the correct offsets needed for importing single beam data collected by the *Arlen* has been included in the Caris projects submitted in conjunction with the separate surveys reports. All TPE values applied are also included in the vessels file.

	Hydrotrac Head	Side Scan Sonar Towpoint	CNAV Antennae
X Offset	-4.78 m	1.20 m	0.00 m
Y Offset	0.00 m	0.00 m	0.00 m
Z Offset	2.29 m	2.29 m	0.00 m

Data Acquisition and Processing Report  
OPR-K379-KR



National Oceanic and Atmospheric Administration  
U.S. DEPARTMENT OF COMMERCE



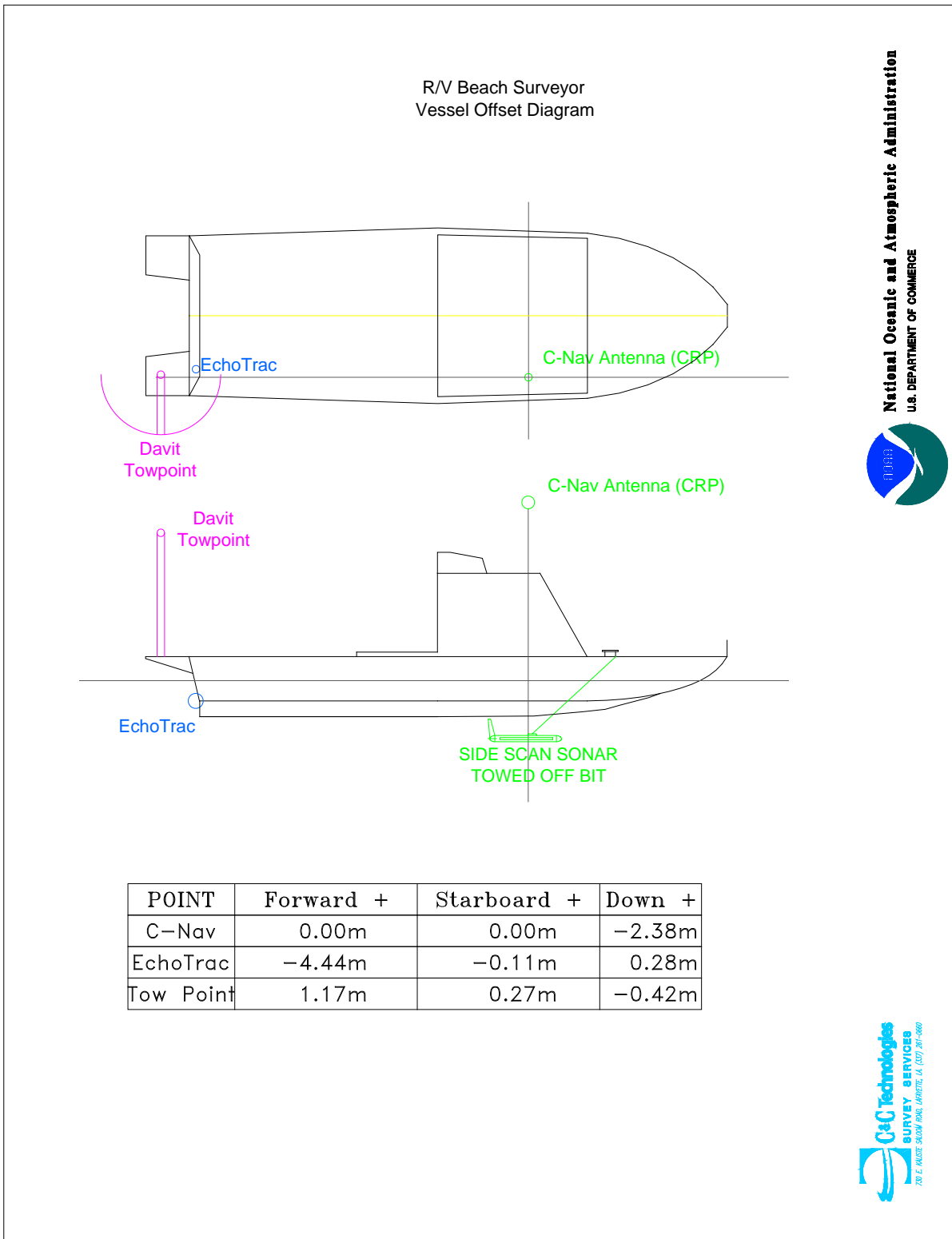


The *Beach Surveyor* is a 25-foot survey vessel. The vessel is 7.6 feet wide and has an approximate draft of 1.5 feet. A central reference point (CRP) was established from which offsets to all equipment were measured. The relevant offsets are presented in the following table where X is positive forward, Y is positive starboard, and Z is positive down.

A Caris Hips vessel file with all of the correct offsets needed for importing single beam data collected by the *Beach Surveyor* has been included in the Caris projects submitted in conjunction with the separate surveys reports. All TPE values applied are also included in the vessels file.

	Hydrotrac Head	Side Scan Sonar Towpoint	CNAV Antennae
X Offset	-4.78 m	1.20 m	0.00 m
Y Offset	0.00 m	0.00 m	0.00 m
Z Offset	2.29 m	2.29 m	-2.38 m

Data Acquisition and Processing Report  
 OPR-K379-KR



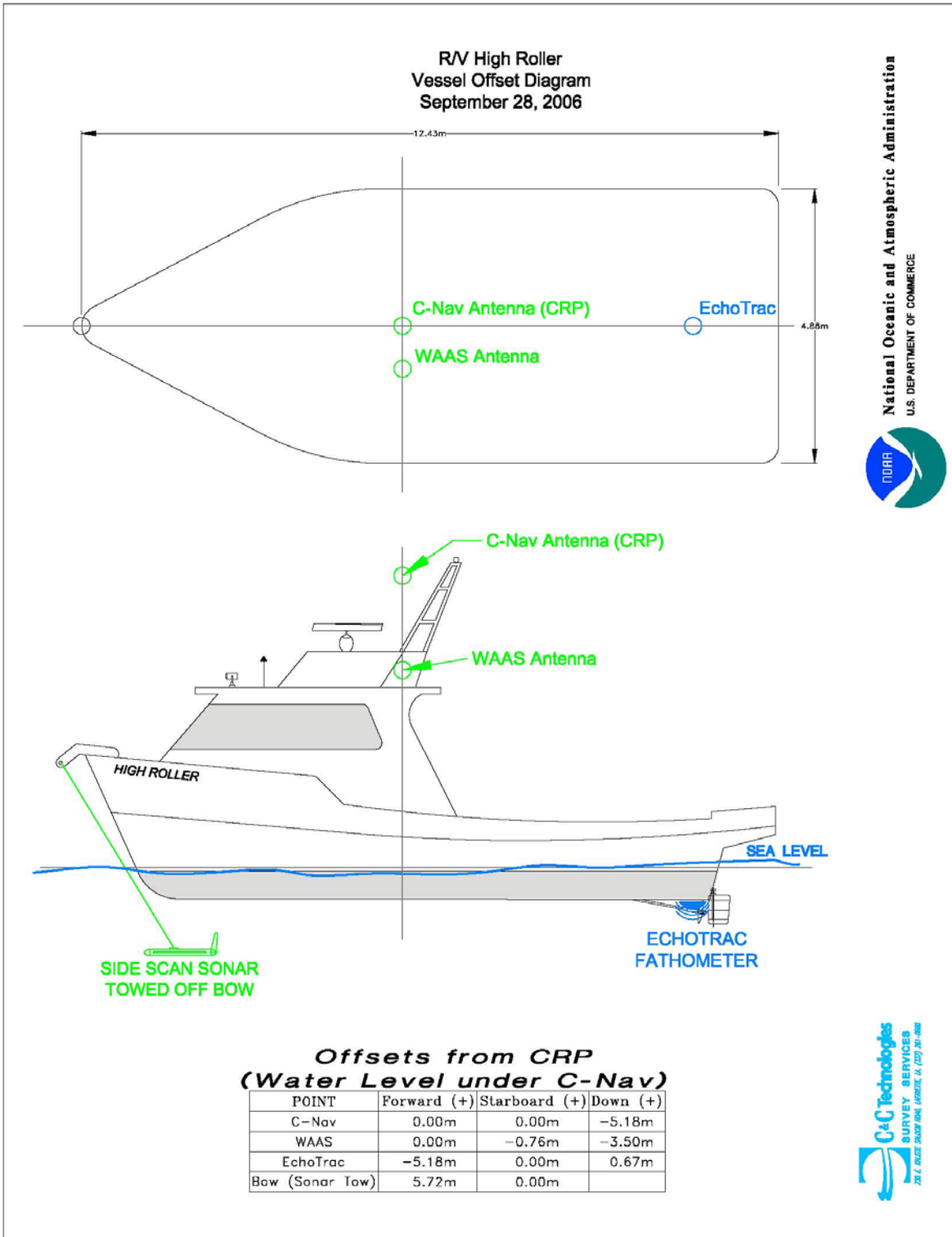


The *High Roller*, a 41-foot Lafitte skiff, was used for hydrographic operations in Sheet A. The vessel is 16 feet wide and has an approximate draft of 2.6 feet. The CNAV antennae were used as the central reference point for this vessel. A cleat on the forward deck of the boat was used as the side scan tow point. The relevant offsets are presented in the following table where X is positive forward, Y is positive starboard, and Z is positive down.

A Caris Hips vessel file with all of the correct offsets needed for importing single beam data collected by the *High Roller* has been included in the Caris projects submitted in conjunction with the separate surveys reports. All TPE values applied are also included in the vessels file.

	Hydrotrac Head	Side Scan Sonar Towpoint	CNAV Antennae
X Offset	-5.18 m	5.72 m	0.00 m
Y Offset	0.00 m	0.00 m	0.00 m
Z Offset	0.67 m	3.34 m	-5.18 m

Data Acquisition and Processing Report  
 OPR-K379-KR

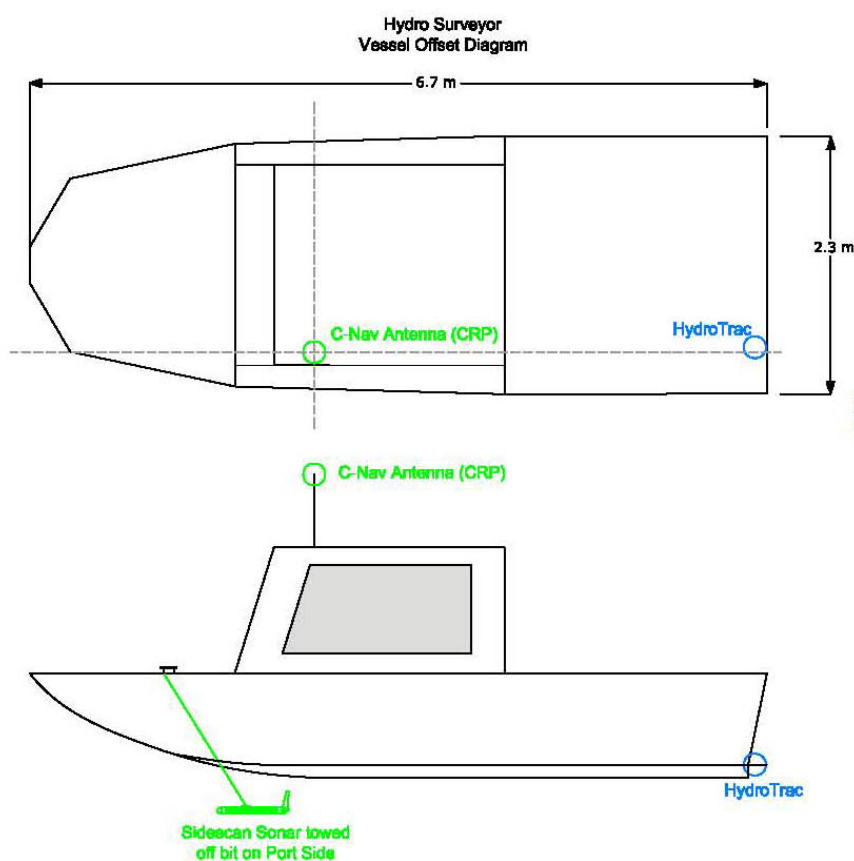





The *Hydro Surveyor* is a 22-foot survey vessel. The vessel is 7.5 feet wide, and has a draft of approximately 1.2 feet. The CNAV antennae were used as the central reference point for this vessel. A cleat on the forward deck of the boat was used as the side scan tow point. The relevant offsets are presented in the following table where X is positive forward, Y is positive starboard, and Z is positive down.

A Caris Hips vessel file with all of the correct offsets needed for importing single beam data collected by the *Hydro Surveyor* has been included in the Caris projects submitted in conjunction with the separate surveys reports. All TPE values applied are also included in the vessels file.

	Hydrotrac Head	Side Scan Sonar Towpoint	CNAV Antennae
X Offset	-4.00 m	1.37 m	0 m
Y Offset	0.00 m	0.00 m	0 m
Z Offset	2.61 m	1.78 m	0 m



National Oceanic and Atmospheric Administration  
 U.S. DEPARTMENT OF COMMERCE



**Offsets from CRP**

POINT	Forward (+)	Starboard (+)	Down (+)
C-Nav	0.00 m	0.00 m	0.00 m
EchoTrac	-4 m	0.00 m	2.6 m
Sonar Tow	1.4 m	1.8 m	1.8 m



Data Acquisition and Processing Report  
OPR-K379-KR

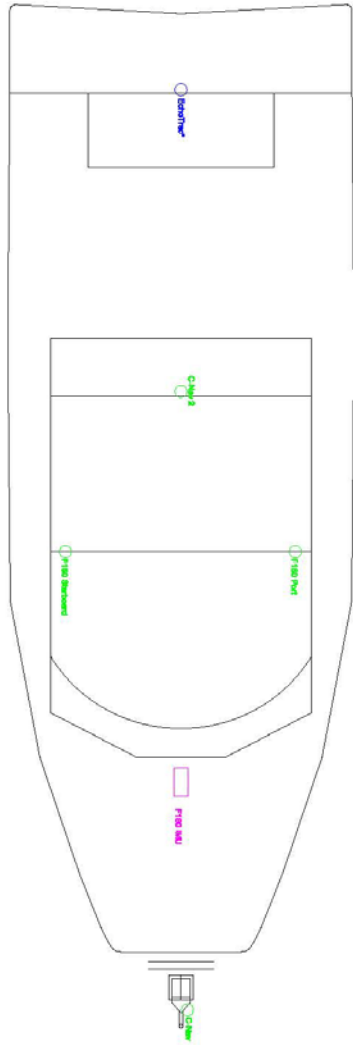


The *Inland Surveyor* is a 26-foot survey vessel. The vessel is 9.6 feet wide and has an approximate draft of 1.5 feet. A central reference point (CRP) from which offsets to all equipment were measured was established at the waterline below the primary CNAV GPS. In an effort to minimize motion errors, the transducer was moved from the bow of the boat to its stern on October 20, 2006. The relevant offsets are presented in the following table where X is positive forward, Y is positive starboard, and Z is positive down.

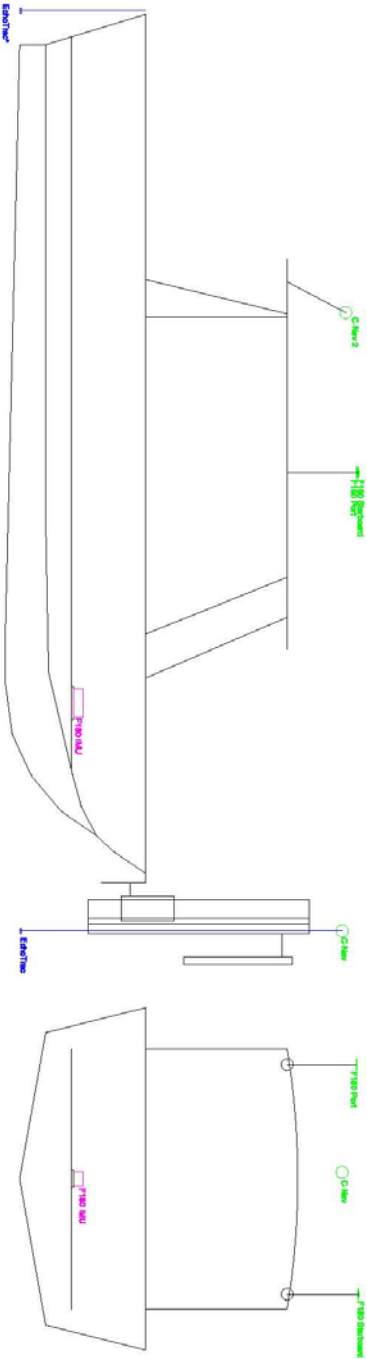
A Caris Hips vessel file with all of the correct offsets needed for importing single beam data collected by the *Inland Surveyor* has been included in the Caris projects submitted in conjunction with the separate surveys reports. All TPE values applied are also included in the vessels file.

	Hydrotrac Head Pre Oct. 20	Hydrotrac Head Post Oct. 20	Side Scan Sonar Towpoint	CNAV DGPS Antennae
X Offset	0 m	-7.75 m	5.72 m	0 m
Y Offset	0 m	0.055 m	0m	0 m
Z Offset	Variable	Variable	N/A	

Data Acquisition and Processing Report  
 OPR-K379-KR



M/V Inland Surveyor



POINT	Forward +	Starboard +	Down +
C-Nav	0.00m	0.00m	
C-Nav 2	-5.18m	0.00m	
EchoTrac	0.00m	0.00m	Variable
EchoTrac*	-7.75m	0.055m	Variable

\*EchoTrac moved to stern on Oct 20, 2006.  
 CRP is at water level under Primary C-Nav on Bow Ram.



National Oceanic and Atmospheric Administration  
 U.S. DEPARTMENT OF COMMERCE



---

APPENDIX B – EQUIPMENT DESCRIPTIONS

## ODOM HYDROTRAC ECHOSOUNDER

The HYDROTRAC echo sounder by ODOM Hydrographic Systems, Inc. can collect analog paper records as well as digitized depth information for output to a data logger. Digital depth data can be logged directly to the navigation computer along with date, time, and position for later post processing and mapping. The system includes a recording unit with built in digitizer and transceiver, and a side mountable transducer. The unit utilizes a combination of dynamic gating and velocity fit to track the true bottom through advanced microprocessor technology, solving the normal problems associated with conventional depth sounders. For example, if the "fixed gate" mode is activated, signal digitizing can be restricted to a user-defined range, rejecting unwanted returns during bar-check calibrations.

The acoustic pulse is generated with the Model OHS 200/9 transducer, which operates at single frequency of 200 kHz with a beam width of 9°. This system is very much similar to ODOM ECHOTRAC SF3200, except that ECHOTRAC has capabilities of operating on dual frequencies of 24 and 200 kHz. The shipboard transceiver automatically adjusts power output in proportion to the return signal



yielding a clear, unambiguous record in shallow as well as deep water. The self-adjusting power varies from 1 to 225 watts at 200 kHz. Return signals are optimized by Time Varied Gain (TVG) and Automatic Gain Control.

A thermal paper recording is printed in real-time where automated scale changes prevent the bottom from "running" off the chart. Scale widths are selectable in meters, 2 to 1,000, or feet, 10 to 3,000; however, routine operating scales are 10 to 100 feet. Key system parameters, i.e. velocity of sound, draft, and time, are input from the recorder's front panel. A tide correction may be introduced without altering the analog record in any way. A line is added to the chart to indicate where the bottom would be if corrected for water level.



---

Recording resolutions of the HYDROTRAC, ranging from 8 mm to 4 meters dependent upon the selected scale width, permit detailed assessments of local water depths. Reference to a tidal datum permits the evaluation of navigable waterways, subsidence and scour features around seafloor based structures, and pre/post dredging or construction water bottom conditions.

**Specifications:**

Frequency	200 kHz
Output Power	500 Watts
Power Requirement	11-28 VDC 110/220 VAC (Optional)
Ports	RS 232

---

## GEOACOUSTICS SIDE SCAN SONAR

The GeoAcoustics Side Scan Sonar System is an industry standard high-resolution search and survey instrument designed both object location and the study of sea floor geology. The GeoAcoustics Side Scan Sonar System employs a surface based Model SS981 Transceiver and Model 159 Tow Vehicle with two Model 196D Transducers and a Model SS982 Sub-surface Electronic bottle. A real time data acquisition and processing system can be used to provide high-resolution graphics, digital data storage, and imaging processing. The system offers frequency operation modes of low frequency (114 kHz) and a high frequency (410 kHz).

The GeoAcoustics dual frequency Side Scan Sonar system is a multiplexed system. All power, control signals and received sonar signals as well as optional data telemetry are multiplexed onto a standard armored single coaxial cable, which also act as the tow-cable. This simplified tow-cable configuration virtually eliminates cross talk between channels.



The Deck Unit is used to control and condition the signals from the tow-fish. With the addition of a thermal paper recorder the data can be printed out in real time.

The compact subsea electronic pressure vessel (GeoAcoustics Model No. SS982) contains side scan sonar transmitter and receiver modules. It can be fit onto the standard GeoAcoustic 159 side scan tow-fish or on a standard profiler tow-fish when used as part of a combined side scan and profiler system. The port and starboard side scan transducer units are fitted on either side of the tow-fish. Each tow-fish contains two arrays operating at either 114 kHz or 410 kHz. These side scan transducers convert electronic energy to acoustic signals of high intensity. These acoustic signals travel through the water at approximately 1500 ms<sup>-1</sup> until



they reach the seabed, where some of the energy is returned back to the transducers. This acoustic return energy is converted by the same transducer to a much lower voltage electronic signal which is accepted by the receiver electronics and processed using time varied gain (TVG) and then converted to separate frequencies and transmitted back to the surface unit.

## Specifications:

### Transceiver – Model SS981:

#### *General*

Power requirements	110/240 VAC switchable, 40-60 Hz, 50 W, optional 24 VDC.
Size	43.2 cm W x 45.7 cm D x 18.7 cm H.
Weight	16 kg.
Temperature Storage:	-20 to 75 °C Operating: -5 to 50 °C.
Humidity	10% to 95% RH, non-condensing.
Mounting	The unit is suitable for either bench or rack mounting.

#### *Operating Specification*

Power output to tow vehicle	150 VDC $\pm$ 3 VDC, 100 mA average, 320 mA peak.
Key burst out	455 kHz, pulse width selectable 16 Vpp, PRR determined by key source.
Key input	Positive CMOS or TTL, 10 kW input impedance.

#### *Receivers*

Modulation frequency	Port 135 kHz, Starboard 65 kHz.
Bandwidth	15 kHz.
Sensitivity	6 mV rms input produces 800 mV rms output with a 20 dB signal-to-noise ratio (all gain maximum).
Input impedance	5 k W .
Output impedance	600 W on all outputs.
Dynamic range Gain:	adjustable over 60 dB range. TVG: -20 to +20 dB maximum AGC: -34 dB maximum.
Output	Selectable signal envelope or amplitude modulated 12 kHz.
TVG delay	3.3 ms minimum, 330 ms maximum.
Event mark	5 Vpp, 12 kHz, front panel push button or BNC input requiring CMOS or TTL level pulse. Produces visual mark on recording media.

Data Acquisition and Processing Report  
OPR-K379-KR



---

Key out  
Modes

0.6 ms CMOS/TTL compatible.  
100 kHz and 500 kHz operation. Raw signal and processed signal.



## Imagenex Side Scan Sonar

### Product Specifications



### SportScan Side-scan Sonar

Never before have so many high-end features in a high resolution digital Side-Scan Sonar been offered at such an affordable price. This system, designed by one of the worlds leaders in high-resolution sonar imaging rivals systems costing many times the price. The quality, detail and ease of use of this Side-Scan Sonar truly has to be seen to be appreciated. This side-scan sonar is available in single Frequency (330 kHz), and dual frequency (330 and 800 kHz), The small size of this system provides the utmost in portability.

### Specifications:

Towfish Construction:	Molded Polyurethane and anodized aluminum	
Ballast:	Standard diver belt weights (available at dive stores)	
Balance:	By moving the tow yoke to a balance point.	
Transducers:	Single Frequency:	Dual Frequency:
	2x330 kHz -Beam 1.8x60	2x330kHz -Beam 1.8x60 2x800 kHz - Beam .7 x 30
Range:	15,30,60,90,120 metre (50,100,200,300,400 feet)	
Towfish Depth:	30 metre (100 feet) Maximum	
Power:	12 Volts DC at 500 mA	
Communication:	RS-232C serial interface	
Software:	Included for Windows 95/98/ME/XP/2000	
Dimensions:	11.4 cm (4.5") diameter X 83.3 cm (32.8") long	

Data Acquisition and Processing Report  
OPR-K379-KR



---

Cable:	7mm (.3") diameter x 22.8m (75ft) standard 60 m (200ft) optional. 45 kg (1000) lb break strength
Weight:	Towfish: 4.5 kg (10 lb.) without weights Standard Cable: 1.7 kg (3.8lb.)
Computer:	Pentium 100MHz or better (not included)
Display Colours:	Colour, Grayscale, Reverse Grey, Yellow/Brown



## TSS 335B Compensator

The TSS 335 is a stand-alone sensor providing accurate real-time measurement of heave, roll and pitch. Designed originally to compensate soundings and profiling, it has found many other applications: compensation for fansweep sounders, vertical reference for positioning systems, flight deck motion indication, input for compensated winches and cranes, analysis of vessel/platform motion and deck movement, indication to subsea vehicles and correction for GPS antenna movement.

Additional features allow the TSS 335 sensors to: calculate motion data in remote positions (keel, stern, bridge etc), provide delayed data and a quality control facility, present heave-roll-pitch data on a simple computer generated graphical display and measure roll-pitch mount angles. The TSS 335 incorporates its own processing capabilities. However, the addition of angular accelerometers gives improved performance in the presence of large horizontal accelerations. This makes it suitable for small vessel and rough water operations. It is enabled to be utilized across a wide range of applications.

<b>TSS 335B HEAVE COMPENSATOR - SPECIFICATIONS</b>	
<b>Size</b>	160 x 370 mm
<b>Weight</b>	8.0 kg
<b>Finish</b>	HAM
<b>Real-Time Operation</b>	Yes
<b>I / F with any Echosounder</b>	Yes
<b>Internal Digitizer</b>	Yes
<b>BCD Input / Output</b>	Yes
<b>IEEE-488 (GP-IB)</b>	Yes
<b>Analogue Output</b>	Yes
<b>Trigger Input / Output</b>	Yes
<b>Digital 20mA I.Current Loop</b>	Optional
<b>Heave Output</b>	Yes
<b>Roll and Pitch Outputs</b>	Yes
<b>Surge and Sway Outputs</b>	Yes
<b>Small Boat Compatible (&lt; 10m)</b>	Yes

Data Acquisition and Processing Report  
OPR-K379-KR



---

<b>Horizontal Acceleration Immunity</b>	Yes
<b>Heave:</b> <b>Range</b> <b>Period</b> <b>Accuracy</b>	$\pm 10$ m 1-20 sec 5% / 5 cm
<b>Roll/Pitch:</b> <b>Range</b> <b>Dynamic Accuracy</b> <b>Static Repeatability</b>	$\pm 30^\circ$ 0.15° 0.01°
<b>Day Rate</b>	21 / sec

---

## SEABIRD SEACAT 19 CTD PROFILER

The Seacat SBE 19-01 Profiler, from Sea-Bird Electronics, Inc., measures electrical conductivity and temperature versus pressure (depth) in marine environments to depths up to 6,800 meters (22,309 feet). The maximum sampling rate is 2 scans per second. Self-powered and self-contained, the SBE 19 features proven Sea-Bird conductivity and temperature sensors and a precision semiconductor strain-gauge pressure transducer. A 64-kilobyte solid-state memory allows 1.5 hours of recording (6 hours with optional 256-kilobyte memory) while sampling at two scans per second. Set-up, checkout, and data extraction are performed without opening the housing. Simultaneous real time monitoring is possible using the Seacat Profiler's two wire RS-232C transmit capability. Sea-Bird's powerful Seasoft CTD software derives salinity, density, sound velocity, and other ocean parameters from stored CTD (conductivity, temperature, depth) and may be used for data analysis, plotting and archival. Small external sensors may be powered and their frequency or voltage outputs acquired by the SBE 19.

Seacat Profiler options include 1) aluminum housings for use to 3,400 or 6,800 meters; 2) 256 kilobyte memory; 3) an extra bulkhead connector for auxiliary inputs; 4) SBE 5 submersible pump for pumped conductivity; 5) an opto-isolated junction box for supplying power and interconnecting Seacat Profiler and a companion computer which is necessary when using the Profiler in real-time mode.

Data Acquisition and Processing Report  
OPR-K379-KR



---

Use of conductivity, temperature, and depth measurement for determination of sound velocity is appealing because these instruments are simpler and more rugged and because resolution, accuracy, and stability lead to better precision than can be obtained with direct sound velocity measuring devices. Three equations are widely used for deriving sound velocity from CTD data (Wilson, 1959; Del Grosso, 1972; Millero and Chen, 1977). Absolute sound velocities derived from these equations differ on the order of .5 meter/second for various combinations of water temperature, salinity, and pressure. The work of Millero and Chen is the most modern and builds upon and attempts to incorporate the work of the earlier investigators. Millero and Chen's 1977 equation is used in the Sea-Bird Seasoft software, and is the one which is endorsed by the Unesco/SCOR/ICES/IASPO Joint Panel on Oceanographic Tables and Standards which comprises the internationally recognized authority for measurements of ocean parameters.

## C-NAV DIFFERENTIAL GPS

C-Nav is a globally corrected differential GPS system owned and operated by C & C Technologies, Inc. The C-Nav GPS Receiver combines a dual-frequency, geodetic grade, GPS Receiver with an integrated L-BAND communication RF detector and decoder all linked by an internal microprocessor. C-Nav uses monitoring stations strategically located around the globe to provide worldwide accuracies in the order of 0.10cm (1 sigma)\*.



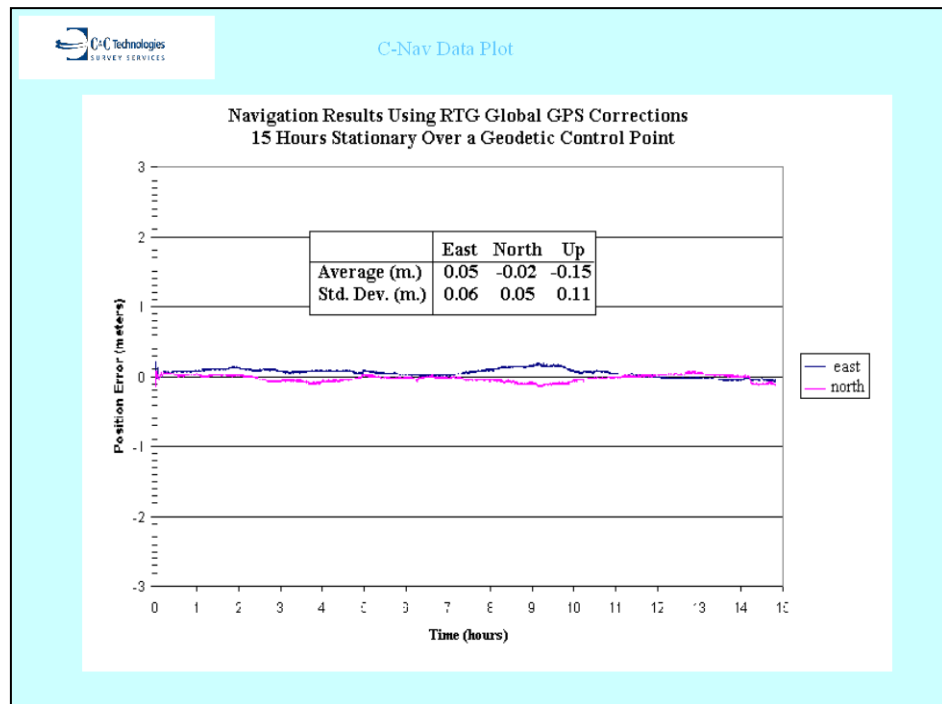
The technique, developed by the Jet Propulsion Lab for the National Aeronautics Space Administration, uses a global network of reference stations to track the entire constellation of GPS satellites. The raw GPS observations are transmitted via the Internet back to the Network Control Center where the GPS constellation satellite orbital corrections and clock-offset values are calculated and modeled in real-time. These corrections are universally valid and can be applied to GPS measurements from any location on earth.

The multi-function antenna assembly is capable of receiving the L1 and L2 GPS frequencies as well as the Inmarsat L-BAND receive frequency band. The gain pattern of this antenna is designed to be relatively constant even at lower elevations. This allows

for an efficient link budget when the unit is operated at higher latitudes where the elevation of the geo-stationary communication satellite is low and close to the horizon. Atmospheric delays are eliminated from local measurements by comparing the L1 and L2 frequencies in the internal GPS receiver.

The C-Nav GPS System provides an output of RTCM (Type 1) pseudorange differential correction messages via a second RS232 interface. Raw GPS observation information can be collected from the C-Nav GPS Receiver system for recording and analysis. The raw GPS observation information can be converted to RINEX ASCII data (observation and navigation) file format as and when required.

The C-Nav GPS Receiver requires at least four (4) usable GPS satellites to compute a three dimensional (3D) solution. The C-Nav GPS Receiver will yield an autonomous horizontal position accuracy of 2 to 5 meters (1 sigma), depending on the GPS satellite geometry configuration and tracking (DOP index values).







## Receiver Specifications:

### Features

- Real-time sub meter accuracy
- Single integrated package – simple installation
- Rugged, waterproof housing
- Wide-range (10-40VDC) power supply
- RTCM and NMEA {GGA, GSA, RMC, VTG, ZDA} outputs
- Patented multipath mitigation significantly reduces noise
- Geodetic quality dual frequency GPS virtually eliminates ionospheric effects

### Performance

- L-band receiver frequency
- Automatically selected 1525 to 1560 MHz
- GcGPS Accuracy:
  - Position (H): <10cm
  - Position (V): <30cm
  - {1-sigma and HDOP  $\leq 1$ }
  - Velocity <0.02m/s
- Time to first fix: Cold Start: 90 sec(typical)
- Reacquisition
  - Coast for 30 sec with GPS lock <2sec
  - L-band loss with less than 30 sec with GPS lock <30 sec

### Physical/Environmental

- Size: 9.8 in (H) x 7.2 in (D) (24.8 x 18.7 cm)
- Weight: 5.5 lbs (2.4 kg)
- Power: Input voltages: 10-40 VDC
  - Consumption: <10W average power
  - 1.2 A max @12 VDC
- I/O Connector 8 pin waterproof connector
- Temperature: Operating: -20°C to +70°C
  - Storage: -40°C to 85°C
- Humidity: 100% non-condensing

## Display Unit Specifications:

### Features

- 4 x 20 character LCD screen
- 12 key membrane button input pad
- Rugged, stainless steel housing
- Wide-range (20-40VDC) power supply
- RTCM and NMEA and raw data outputs



---

***Physical/Environmental***

- Size: 9.6 in (L) x 6.7 in (W) x 3.3 in (H) (24.4 x 17.0 x 3.3 cm)
- Weight: 3.8 lbs (1.75 kg)
- Power: Input voltages: 12-40 VDC  
Consumption: <1W average power  
100 mA max @28 VDC typical
- I/O Connectors: 3 db-9, 1 cat-5 and 1 8 pin waterproof connector
- Temperature: Operating: -20°C to +70°C  
Storage: -40°C to 85°C
- Humidity: 100% non-condensing

Data Acquisition and Processing Report  
OPR-K379-KR



---

APPENDIX C – CALIBRATION RECORDS

Data Acquisition and Processing Report  
OPR-K379-KR



---

**LETTER OF APPROVAL**

Data Acquisition and Processing Report  
S-J977-KR-CC

This report is respectfully submitted.

Field operations contributing to the accomplishment of this survey were conducted under my direct supervision between the dates of May 2006 – March 2007 with frequent personal checks of progress and adequacy. This report has been closely reviewed and is considered complete and adequate as per the Statement of Work.

---

Joseph Burke  
Chief of Party  
C&C Technologies  
June 2007

**ATLANTIC HYDROGRAPHIC BRANCH  
EVALUATION REPORT to ACCOMPANY  
SURVEY H11616 2009 (Compliance)**

This Evaluation Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

**A) DATA ACQUISITION AND PROCESSING**

**1 DATA PROCESSING**

The following software was used to process data at the Atlantic Hydrographic Branch:

HTSP Pydro 9.4 (r2691)  
CARIS HIPS/SIPS version 6.1 SP1 HF 1-6  
CARIS Bathy Manager version 2.1 HF 1-3  
DKART INSPECTOR, version 5.0 Build 732 SP1  
CARIS HOM version 3.3  
CARIS S57 Composer version 2.0

**2 QUALITY CONTROL**

**a) H-Cell**

The functional source depth grid for the survey's H-Cell compilation was re-created from the original data that was submitted by the field unit at a 5 meter resolution. The combined depth grid was used to generate an interpolated surface with a 5 meter resolution. This interpolated surface was used for survey scale sounding selection (H-Cell SS layer) ensuring that no interpolated soundings were used to generate the final selection for the H-Cell SS layer. The soundings that are included in the H-Cell SS layer were constructed with a resolution of 1mm at chart scale (1:80,000). The chart scale selected soundings are a subset of the survey scale selected soundings. The surface model was refaced when selecting the chart scale soundings, to ensure that the selected soundings portrayed the bathymetry within the common area.

Depth curves were created from a 5 meter interpolated surface grid. This 5 meter interpolated surface grid was generated using the natural neighbor interpolation method. The depth curves are forwarded to MCD for reference only. The curves were used in the H-cell compilation process for sounding selection and quality assurance checks at AHB. The depth curves are incorporated into the S57 SS layer deliverable.

The pre-compilation products and Stand Alone HOB files (SAHOB) are detailed in the Pre-Compile Process Log. This Pre-Compile Process Log accompanies the Evaluation Report and will be included in the submitted documentation to MCD. The SAHOB files are as follows: depth curves (DEPCNT), sounding selections (SOUNDG),

features (SBDARE), Meta Objects (M\_COVR, M\_QUAL, M\_CSCL, and cartographic Blue Notes. The individual SAHOB files were inserted into one BASE Manager feature layer and were then exported to S-57 format. The final S-57 formatted files were used to create the H-Cell deliverables.

The completed H-Cell was exported as a Base Cell File (ENC.000) in S-57 format with all values in metric units. The metric equivalent ENC.000 file was then converted to NOAA chart units (ENC\_CU.000) with all values measured in feet follow NOAA sounding rounding rules.

Chart compilation was performed by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to the Marine Chart Division, Silver Spring Maryland for further evaluation and action.

The H11616 CARIS H-Cell final deliverables include the following products:

H11616_CS.000	1: <u>40,000</u> Scale	H11616 H-Cell with Chart Scale Selected Soundings; new features; feature updates; Meta objects
H11616_SS.000	1: <u>40,000</u> Scale	H11616 Selected Soundings (Survey Scale); and depth curves

**b) Junctions**

Survey H11616 (20060925-20070311) junctions with surveys H11617. Present survey soundings compare within 1 foot of the junctional survey. Due to several significant Hurricanes that have devastated the area and the natural subsidence of the surrounding coastline, present survey depths are not in harmony with the charted hydrography in some areas.

**B) VERTICAL AND HORIZONTAL CONTROL**

Areas of Louisiana have anomalous relative sea level trends compared to most other geographic regions in the United States. This is due to a general subsidence of the land in this area, which has been occurring at a rapid rate. Because of the magnitude of the sea level trends in these areas, NOAA has adopted a procedure for computing accepted tidal datums for the National Water Level Observation Network (NWLON) using the last several years of sea level data rather than the 19-year tidal epoch. The tide ranges are still based on the 1983-2001 National Tidal Datum Epoch (NTDE) and are applied to the 5 year (2002-2006) Mean Tide Level (MTL) to compute other tidal datums. Shortly after the field unit submitted their data to the Atlantic Hydrographic Branch, a datum shift occurred in the National Tidal Datum Epoch for this geographic location. Due to this datum shift (and other secondary reasons) verified water levels were re-applied at the Atlantic Hydrographic Branch. All features and depths associated with the survey were updated with the application of water levels. Field submitted depths were compared to the depths generated after re-applying verified water levels. Depths were consistently confirmed shallower on the order of ~11 cm (0.11m). Sounding datum is Mean Lower Low Water (MLLW). Vertical datum is Mean High Water (MHW)

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83), UTM projection zone 16N. Office ENC processing of this survey required translating the datum to meet S-57 ENC requirements.

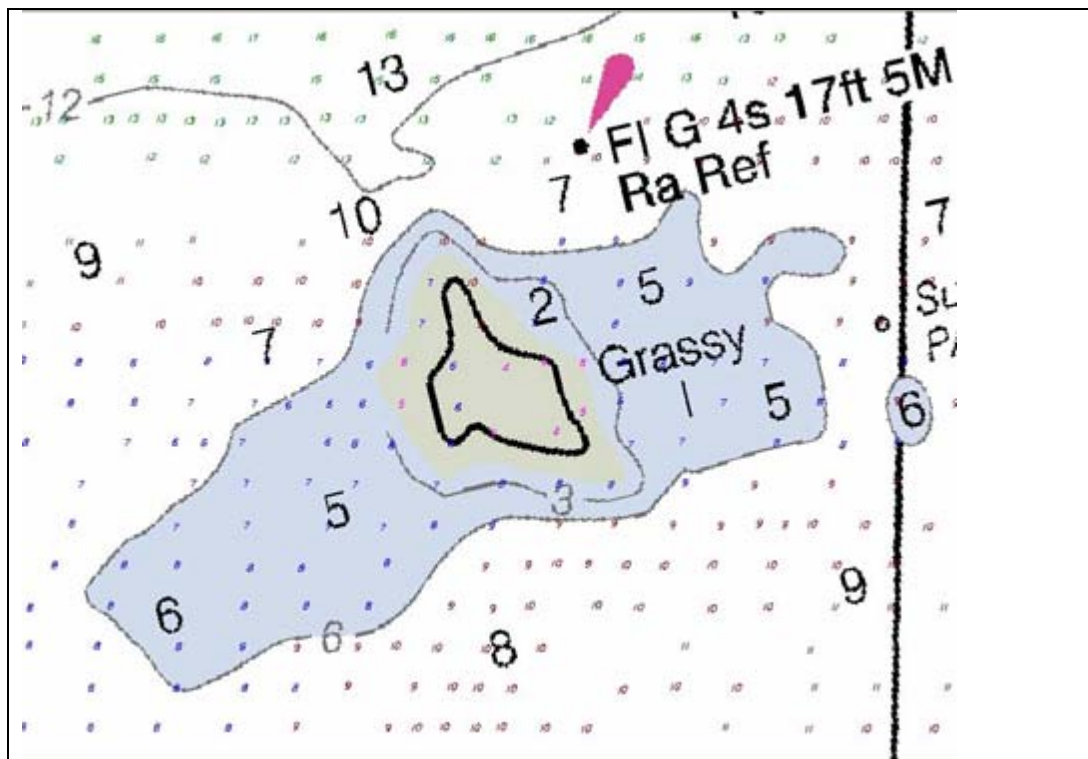
**C) RESULTS AND RECOMMENDATIONS**

- 1 CHART COMPARISON**      **11371 (38th Edition, 04/01/2007)**  
Corrected through NM 05/09/2009  
Corrected through LNM 04/29/2009  
Scale 1:80,000
- \_\_\_\_\_ **11372 (33rd Edition, 06/01/2007)**  
Corrected through NM 05/09/2009  
Corrected through LNM 04/29/2009  
Scale 1:40,000
- \_\_\_\_\_ **11367 (35<sup>th</sup> Edition, 05/01/2008)**  
Corrected through NM 05/09/2009  
Corrected through LNM 04/29/2009  
Scale 1:40,000
- 2 ENC Comparison**      **US4MS10M**  
Lake Borgne and Approaches Cat Island t  
Edition 08  
Application Date 2009-02-12  
Issue Date 2009-03-09  
Chart 11371
- US5MS11M**  
Dog Keys Pass to Waveland  
Edition 29  
Application Date 2009-01-30  
Issue Date 2009-05-27  
Chart 11372
- US5LA36M**  
Waveland to Catahoula Bay  
Edition 15  
Application Date 2008-12-03  
Issue Date 2009-03-13  
Chart 1136

**D) Hydrography**

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section "C" and Appendix 1&2 of the Descriptive Report. The following exceptions are noted:

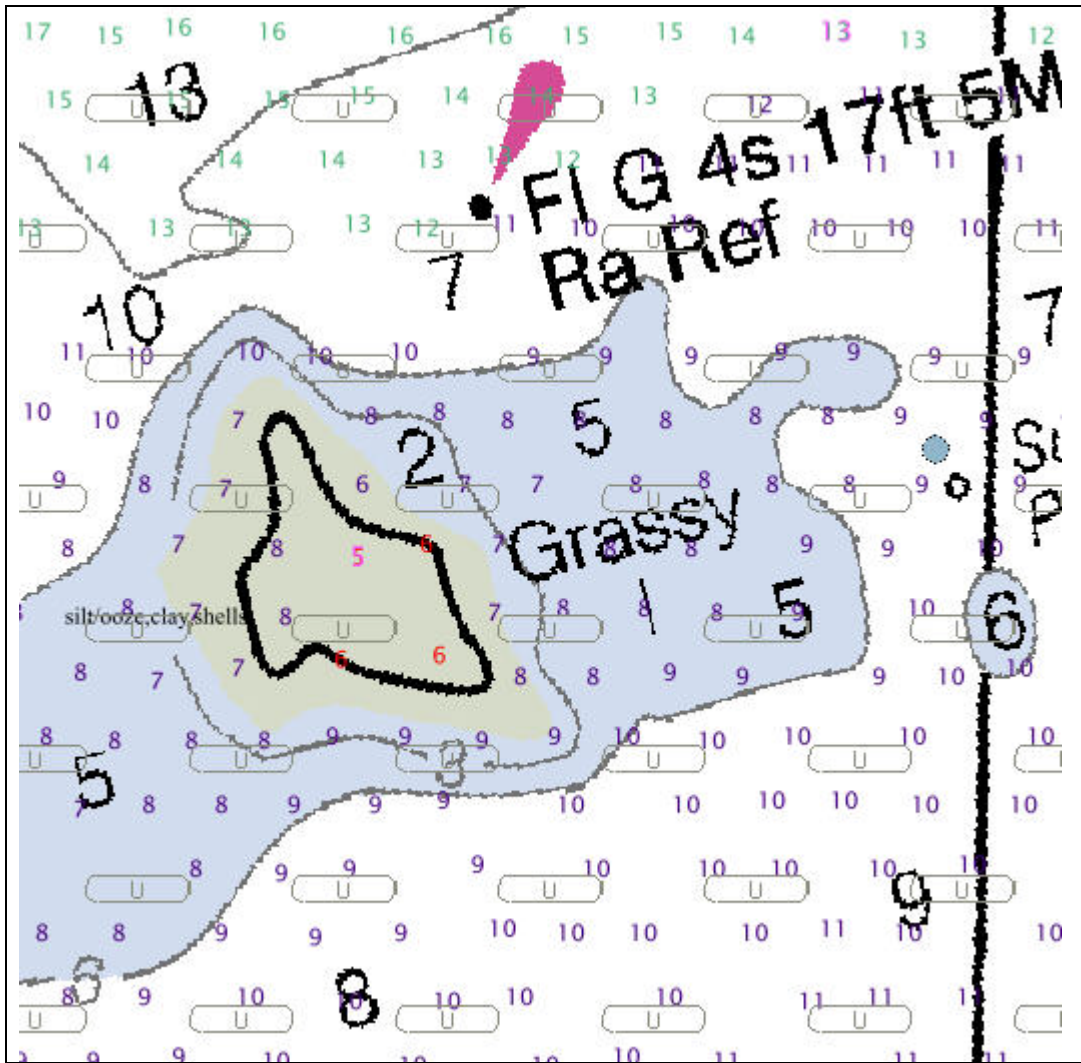
1. The field unit was obtain bottom samples during the survey, therefore all charted sea bed characteristic (SBDARE) objects are sufficient to supersede previously charted seabed areas (SBDARE).
2. A **dangerous wreck** charted in Latitude 30° 10' 43.257" N, Longitude 089° 31' 03.887"W on NOS Chart 11367, 35<sup>th</sup> edition and NOS Chart 11371, 38<sup>th</sup> edition is the result of a DTON report. Data submitted by the field unit verified the position of the wreck to be the charted position. *Delete PA.*
3. A **dangerous wreck** is chart in Latitude 30° 10' 25.277" N, Longitude 089° 27' 05.814"W on NOS Chart 11367, 35<sup>th</sup> edition and is charted on NOS Chart 11371, 38<sup>th</sup> edition in Latitude 30° 10' 28.561" N, Longitude 089° 27' 04.723 W. Data submitted by the field unit verified the position on NOS Chart 11371, 38<sup>th</sup> edition as the correct position. It is recommended that the position on NOS Chart 11367, 35<sup>th</sup> edition be updated to the surveyed position.
4. **Charted soundings** generally agree with the surveyed depths throughout the survey area. There are several isolated areas where changes in depth within the survey area have occurred. The most exceptional example can be seen in the grassy island centered in the charted Latitude 30° 09' 15.469" N, Longitude 089° 28' 27.797"W on NOS Chart 11371, 38<sup>th</sup> edition and NOS Chart 11367, 33<sup>rd</sup> edition, adjacent to the charted grassy island. The following images display the differences in depth as submitted by the field unit and the Atlantic Hydrographic Branch respectively.



**Figure 1: Chart Comparisons as submitted by the field Unit. Magenta**



*soundings are shoaler than 6 ft.*



**Figure 1: Chart Comparisons as submitted by the Atlantic Hydrographic Branch. Magenta soundings are shoaler than 6 ft.**

5. Hand drawn contours are submitted with the H11616 SS\_ layer. Shoal areas charted in Latitude 30° 14'34.388" N, Longitude 089° 24' 09.178"W on NOS Chart 11371, 38<sup>th</sup> and NOS Char 11367 have shifted significantly. Whereas deep areas charted in Latitude 30° 15'13.188" N, Longitude 089° 24' 12.028"W on NOS Chart 11371, 38<sup>th</sup> and NOS Char 11367 have become shoal.

## **E) ADDITIONAL RESULTS**

### **1 Aids to Navigation**

The field positioned eight navigational aids during the present survey. A complete listing can be found section D of the Descriptive Report as submitted by the field unit.

All aids to navigation were present and concur with NOS Chart 1131 38<sup>th</sup> edition and NOS Chart 11367 33<sup>rd</sup> edition.

## **2 MISCELLANEOUS**

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland. See Section D of this report for a list of the Raster Charts and Electronic Navigation Charts (ENC) used for compiling the present survey:

## **3 ADEQUACY OF SURVEY**

The present survey is adequate to supersede the charted bathymetry within the common area. Any features not specifically addressed either in the H-Cell BASE Cell File or the Blue Notes should be retained as charted. Refer to the Descriptive Report for further recommendations by the hydrographer.

This Document is for Office Process use only and is intended to supplement, not supersede or replace, information/recommendations in the Descriptive or Evaluation Reports

## AHB PRE-COMPILATION PROCESS

REGISTRY No.	H11616
PROJECT No.	S-J977-KR-CC
FIELD UNIT	C&C TECHNOLOGIES
PRE-COMPILER	SELF
LARGEST SCALE CHART	11367, edition 35, 20080501
CHART SCALE	1:40,000
SURVEY SCALE	1:40,000
DATE OF SURVEY	07-21-2006
CONTENT REVIEW DATE	05-29-2009

<b>Components</b>	<b>File Names</b>
<i>Interpolated Surface</i>	H11616_5m_Interpolated (Skunk Stripe Survey)
<i>Shifted Surface</i>	IN_H11616_80K_5m_Shifted.hns
<i>Contour Layer</i>	IN_H11616_80K_5m_Contours.hob
<i>Survey Scale Soundings</i>	H11616_SS_Soundings.hob
<i>Chart Scale Soundings</i>	H11616_CS_Soundings.hob
<i>ENC Retain Soundings</i>	H11616_ENC_Retain.hob
<i>Feature Layer</i>	H11616_Features.hob
<i>Meta-Objects Layer</i>	H11616_MetaObjects.hob
<i>Blue Notes</i>	H11616_BlueNotes.hob

### SPECIFICATIONS:

- I. COMBINED SURFACE:
  - a. File name:      AHB\_H11616\_5m\_bathy.hns  
\*Shoal surface was extracted from depth layer
  - b. Resolution:      5m
  - c. Final Grid Location:
  
- II. INTERPOLATED SURFACE (SS SOUNDINGS):
  - a. Resolution: 05m
  - b. Interpolation Method: Natural Neighbor
  
  - c. Depth
    - i. Minimum:      0.56 m
    - ii. Maximum:      10.41 m
  
- III. SHIFTED SURFACE:  
Single Shift Value:      -0.229 [-0.229m (feet), (≤ 10 fathoms)]  
[-1.372m (fathoms), (> 10 fathoms)]
  
- IV. CONTOUR LAYER:
  - a. Use a Depth List: Depth list used for contour production  
Depth List: H11616\_NOAA\_depth\_curves\_list.txt  
\*Hand drawn contours were used for the final H-Cell compilation
  - b. Output Options:

This Document is for Office Process use only and is intended to supplement, not supersede or replace, information/recommendations in the Descriptive or Evaluation Reports

- i. Create contour lines:
  - 1. Line Object: DEPCNT
  - 2. Value Attribute: VALDCO

V. SURVEY SOUNDING SELECTION:

- a. Selection Criteria:
  - i. Radius
  - ii. Shoal biased
  - iii. Use Single-Defined Radius: 1 mm at chart scale
  - iv. Filter: Interpolated !=1  
\*Sounding selection was made from a TIN of the combined surface

VI. CHART SOUNDING SELECTION:

- a. Selection Criteria:
  - i. Radius: Distance on the ground (m)
  - ii. Shoal biased
  - iii. Use Single-Defined Radius: 650 meters
  - iv. Filter: Interpolated !=1
  - v. Some soundings were selected manually  
\*Sounding selection was made from a TIN of the SS layer
- b. ENC Comparison
  - i. Number of ENC soundings 156
  - ii. Number of CS soundings 156

VII. FEATURES:

- a. Brought in from Survey
  - Total No. 09  
\*A total number of 19 seabed areas were included in the final H-Cell
- b. Brought in from ENC
  - ENC: #31
  - Total No. 40

VIII. META-OBJECTS:

a. M\_COVR attributes

Acronym	Value
SORDAT	20070311
CATCOV	1:coverage available
SORIND	US,US,survey,H11616

b. M\_QUAL attributes

Acronym	Value
CATZOC	Data not assessed
INFORM	H11616, C&C Technologies, High Roller
POSACC	10
SORDAT	20070311
SORIND	US,US,survey,H11616
SUREND	20070311
SURSTA	20060925
TECSOU	Found by echo-sounder

c. DEPART attributes

Acronym	Value
DRVALV 1	0.79 m

Version 1.0

This Document is for Office Process use only and is intended to supplement, not supersede or replace, information/recommendations in the Descriptive or Evaluation Reports

DRVALV2 10.64 m  
SORDAT 20070311  
SORIND

d. M\_CSCL attributes

Acronym	Value
CSCALE	1;40000
SORDAT	20070311
SORIND	US,US,survy,H11616

IX. NOTES:  
[See evaluation report.](#)

**APPROVAL SHEET**  
**H11616**

**Initial Approvals:**

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, representation of critical depths, cartographic symbolization, and verification or disproval of charted data. All revisions and additions made to the H-Cell files during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with National Ocean Service and Office of Coast Survey requirements except where noted in the Descriptive Report and the Evaluation Report.

All final products have undergone a comprehensive reviews per the Hydrographic surveys Division Office Processing Manual and are verified to be accurate and complete except where noted.

---

**Vanessa R. Self**  
Physical Scientist  
Atlantic Hydrographic Branch

I have reviewed the H-Cell files, accompanying data, and reports. This survey and accompanying Marine Chart Division deliverables meet National Ocean Service requirements and standards for products in support of nautical charting except where noted.

Approved: \_\_\_\_\_  
**Shepard Smith**  
Commander, NOAA  
Chief, Atlantic Hydrographic Branch