

H10616

NOAA FORM 76-35A

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

## DESCRIPTIVE REPORT

Type of Survey Hydrographic/Side Scan Sonar

Field No. RU-10-3-95

Registry No. H-10616

### LOCALITY

State Rhode Island

General Locality Narragansett Bay

Sublocality 0.45 NM East of Conanicut

Island

19 95

### CHIEF OF PARTY

CDR S. P. De Bow

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

REGISTER NO.

**HYDROGRAPHIC TITLE SHEET**

H-10616

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

RU-10-3-95

State Rhode Island

General locality Narragansett Bay

Locality 0.45nm East of Conanicut Island

Scale 1:10,000 Date of survey June 8-September 29, 1995

Instructions dated February 16, 1995 Project No. OPR-B302-RU-95

Vessel NOAA Ship RUDE S590 (UES NO 9040)

Chief of party CDR S.P. De Bow

Surveyed by CDR S.P. De Bow, LT C.L. Callahan, ENS T.A. Haupt, ENS J.J. Walker, ST M.T. Lathrop

Soundings taken by:(echo sounder, hand lead, pole) Raytheon DSF-6000N Echosounder, RESON SEABAT 9001

Graphic record scaled by SPD, CLC, TAH, JJW, & MTL

Graphic record checked by SPD, CLC, TAH, JJW, & MTL

Protracted by \_\_\_\_\_ Automated plot by ENCAD NOVAJET III (AHB)

Verification by ATLANTIC HYDROGRAPHIC BRANCH PERSONNEL

Soundings in (fathoms, feet, or meters at MLW or MLLW) FEET Meters at MLLW

REMARKS: All times recorded in UTC.

The DSF-6000N was used as the primary sounding instrument; however, as warranted, the SEABAT 9001 shallow-water multibeam sonar system was employed for distinct item investigations and is documented as such.

NOTES IN THE DESCRIPTIVE REPORT WERE MADE IN RED DURING OFFICE PROCESSING.

SURF & AMOIS 11/25/96 MGR

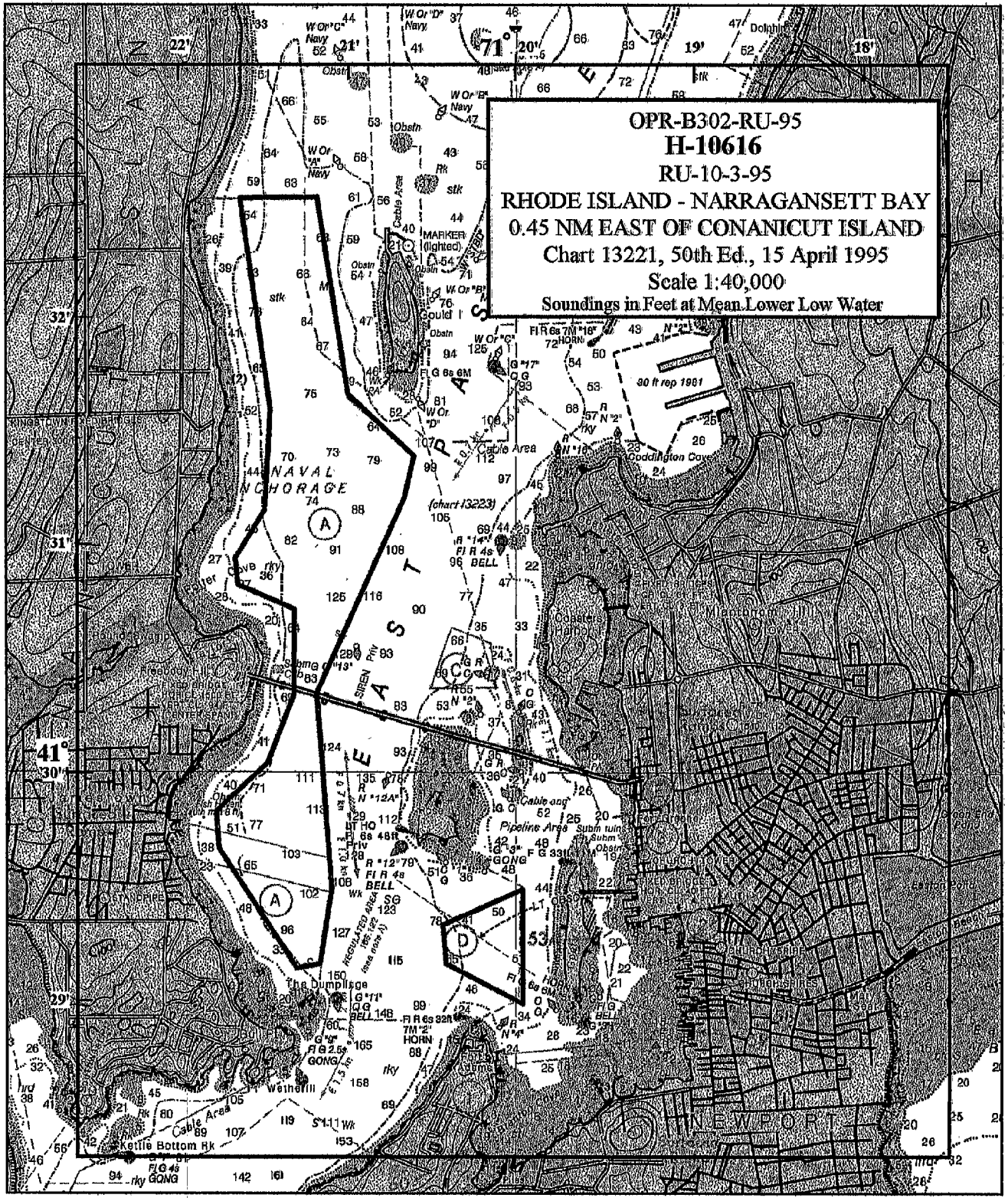
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\* SEPARATES

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OPR-B302-RU-95  
H-10616  
RU-10-3-95  
RHODE ISLAND - NARRAGANSETT BAY  
0.45 NM EAST OF CONANICUT ISLAND  
Chart 13221, 50th Ed., 15 April 1995  
Scale 1:40,000  
Soundings in Feet at Mean Lower Low Water

**A. PROJECT**

A.1 This survey was conducted in accordance with Hydrographic Project Instructions OPR-B302-RU, Rhode Island Sound Corridor, Rhode Island and Massachusetts.

A.2 The original instructions are dated February 16, 1995.

A.3 There have been two changes to the original instructions, both of which affect this survey: Change No. 1, dated ~~May 10~~, 1995, and Change No. 2, dated ~~July 13~~, 1995. *APRIL 27,*  
*JUNE 26*

A.4 This Descriptive Report covers the navigable area survey conducted on sheet "F" of project OPR-B302-RU in Narragansett Bay as specified in the Project Instructions.

A.5 This portion of OPR-B302-RU responds to requests from the Northeast Marine Pilots to survey anchorage areas and non-maintained channels in Narragansett Bay. The areas have been deemed critical by the Pilots for the safe navigation of a variety of deep-draft vessels, including PANAMAX-size ships that deliver coal and oil to the New England Power Authority at Fall River, Massachusetts.

The area was last surveyed by the Coast and Geodetic Survey between 1957 and the mid-1960's.

**B. AREA SURVEYED**

B.1 Two naval anchorages comprised the survey area: anchorages "A" and "D", located in the southern half of the East Passage in Narragansett Bay, RI. Anchorage "A" is located along the eastern side of Conanicut Island in the vicinity of the Newport Bridge, and anchorage "D" is located just to the west of Goat Island in Newport, RI.

B.2 The survey is comprised of one sheet which covers two survey areas. The following approximate boundaries exist for each survey area:

Survey Area 1 - Anchorage "A"

NW Corner - 41°32'40"N, 071°22'00"W  
NE Corner - 41°32'40"N, 071°20'35"W  
SE Corner - 41°28'50"N, 071°20'35"W  
SW Corner - 41°28'50"N, 071°22'00"W

Survey Area 2 - Anchorage "D"

NW Corner - 41°29'20"N, 071°20'30"W  
NE Corner - 41°29'30"N, 071°19'50"W  
SE Corner - 41°28'50"N, 071°19'50"W  
SW Corner - 41°29'10"N, 071°20'30"W

Section 1.8 of the Project Instructions stipulated the inshore limit of hydrography to be the 18-foot curve. This inshore limit was achieved whenever practical. However, the operational constraints of maneuvering a 90-foot long, 7-foot draft ship in rapidly shoaling water close to shore often ruled out the possibility of surveying to that limit. Since the Command did not have a small boat acquisition platform for use on this project, discretion opted for the safety of the vessel at all times.

B.3 Data collection for this survey began on June 8, 1995 (DN 159) and ended on September 29, 1995 (DN 272).

**C. SURVEY VESSELS**

C.1 The following vessels were used during this survey:

Vessel	EDP Number	Primary Function
NOAA Ship RUDE (S590)	9040	Hydrography, Side Scan Operations and SEABAT Investigations
RUDE Launch (SISU)	1290	Diving Operations

C.2 During the ship's January 1994 dry-dock period, the RUDE was outfitted with a pivoting armature to carry the transducers for the Reson SEABAT 9001 shallow-water multibeam sonar system. This armature was mounted on the port side of the ship, approximately amidships. Since the transducers were not designed for permanent deployment, the arm was rotated into the down, or operating, position only during times of data acquisition.

**D. AUTOMATED DATA ACQUISITION AND PROCESSING**

*SEE ALSO THE  
EVALUATION REPORT*

D.1 The following HDAPS software versions were used for data acquisition and processing on this survey:

Program	Version	Program	Version
BACKUP	2.00	LSTAWOIS	3.10
BLKEDIT	2.02	MAINMENU	1.20
CARTO	2.17	MAN_DATA	3.03
CLASSIFY	2.12	NEWPOST	6.13
CONTACT	2.48	PLOTALL	2.32
CONVERT	3.65	PREDICT	2.01
DAS_SURV	6.80	PRESURV	7.11
DP	2.18	QUICK	2.07
EXCESS	4.32	RAMSAVER	1.02
FILESYS	3.31	REAPPLY	2.12
GRAFEDIT	1.06	ZOOMEDIT	2.33
INVERSE	2.02		

D.2 The SEABIRD SBE-19 sound velocity profile unit was utilized in conjunction with **SEASOFT 3.3M** and **SEACAT 2.0** software. The program **VELOCITY** (Version 2.11, September 21, 1994) was used to process the collected data and calculate velocity correctors. The **REFRACT** subroutine corrects SEABAT multiple slant range depths for sound velocity and corrects position of soundings (cross track distance) for refraction.

D.3 SEABAT multibeam data were acquired exclusively on the SEABAT 9001 data acquisition 486 personal computer using the Coastal Oceanographics **HYPACK** software package (Version 1.0, dated March 1, 1994). Gyro and predicted tide input were

received from HDAPS, heave/roll/pitch data were received directly from the Datawell HRP sensor, and positioning input was received from the Ashtech GPS receivers. SEABAT data were processed on one of two personal computers equipped with the NOAA **LSTRUD** (Version 3.0, 1995) post-processing software. A single least depth was generated for each SEABAT investigation and later entered into HDAPS via the **MANUAL DATA ENTRY** program. Three dimensional graphic plots of the SEABAT imagery were created using a commercial-off-the-shelf software package called Surfer for Windows, version 5.03.

#### E. SONAR EQUIPMENT

E.1 The RUDE conducted all side scan sonar operations, using an EG&G Model 260 image-corrected side scan sonar recorder and a 100 kHz Model 272-T towfish.

E.2 The side scan sonar towfish was configured with a 20° beam depression, which is the normal setting and yields the optimum beam correction.

E.3 The 100 kHz frequency was used throughout the survey.

E.4 a. Given the average depth of water in the survey area, the 100-meter and 75-meter range scales were used to obtain complete area coverage and provide optimal contact resolution. When using the 100 meter range scale, a line spacing of 160 meters was used. This is 10 meters less than what is specified in section 7.3.2.1 of the Field Procedures Manual (FPM), to allow an even number of hydro splits between mainscheme lines. When using the 75 meter range scale, a line spacing of 120 meters was used, as specified in the FPM. Data collected with an EPE of 15 or greater were either rejected or smoothed in the post-processing phase of the survey, so the maximum line spacing was never exceeded.

b. Confidence checks were obtained whenever features such as bridge abutments, sand waves, buoy anchors and lobster pots were encountered. These features were routinely annotated on the sonar grams.



c. Two hundred percent side scan coverage was completed for this survey, wherever safely possible. However, in a small portion of the southwestern edge of the main area of the survey, the number and location of mooring buoys (and associated moored boats) prevented the ship from obtaining side scan coverage to the edge of our survey limits. In addition, areas of reduced coverage occasionally occurred when the ship was forced to avoid buoys or lobster pots. These areas were easily recognized because the swath plot clearly showed the lack of overlap between adjoining swaths. Holiday coverage was run to fill in these gaps, and all side scan coverage was ultimately checked with smooth plots to ensure proper overlap between adjoining lines.

d. Areas of degraded returns due to thermoclines were experienced during portions of this survey. Affected data were rejected and re-run, depending on the amount of thermocline effect.

e. There were occasions when the side scan sonar towfish became entangled in lobster trap buoy lines, temporarily whiting out the sonar gram. On these occasions, the towfish was brought on board, inspected, and serviced as necessary. All affected data were subsequently rejected and re-run.

f. The towfish was deployed exclusively from the stern during this survey.

E.5 Significant side scan sonar contacts were investigated using conventional hydrographic "splits" routinely run at 2 meter line spacing to ensure 100% vertical echo sounder coverage. Many of the contacts are rocks of various dimensions which required a number of lines to fully develop the item. By using the SEABAT in the passive mode, the operator was able to "see" to either side of each split. This capability was used to determine efficiently which way to turn when a small contact was not shown directly below the single beam echo sounder. Contacts warranting even more precise depth determination were then investigated using the SEABAT multibeam sonar system in acquisition mode. Since the system acquires data at such an enormous rate it is only brought on-line approximately 50 meters before the contact and turned off immediately after the

contact has passed. The data for these investigations are summarized in the SEABAT Development Addendum in Section N of this report.

E.6 Overlap was checked on-line using the real-time swath plot, while the edited swath plot was used to identify holidays.

#### F. SOUNDING EQUIPMENT

F.1 All hydrographic soundings were acquired using a Raytheon Model 6000N Digital Survey Echosounder (DSF-6000N). As authorized by the Project Instructions, the Reson SEABAT 9001 shallow-water multibeam sonar system was used to determine precise least depths over significant contacts discovered during routine side scan sonar operations. (Refer to the Descriptive Report for H-10605, section F.5, for a detailed description of the SEABAT system.) A summary of all SEABAT investigations conducted for this survey is contained in the SEABAT 9001 Development Addendum in Section N. Copies of all 15 least depth listings and 3-D graphic images associated with these investigations are included in Separate V. \*

F.2 A diver investigation was conducted on one item which was deemed hazardous to surface navigation. The remaining significant contacts were investigated using 100% echo sounder coverage and the SEABAT to obtain precise least depths over all potentially hazardous bottom features (See section E).

F.3 There were no faults in sounding equipment which affected the accuracy or quality of the data.

F.4 Both high (100 kHz) and low (24 kHz) frequency sounding data were recorded during data acquisition. Only high frequency soundings were plotted.

*\* DATA FILED WITH ORIGINAL FIELD RECORDS.*

**G. CORRECTIONS TO SOUNDINGS**

**G.1 a. Sound Velocity Correctors**

The velocity of sound through water was measured using a Sea-Bird SBE 19 Seacat Profiler (s/n 1448). Seacat Data Quality Assurance Tests were conducted after each respective velocity cast to ensure that the units were operating within tolerance. Velocity casts were conducted weekly without exception.

All data were processed using program **VELOCITY**. Computed velocity correctors were entered into the HDAPS sound velocity table and re-applied during post-processing to both high and low frequency soundings. SEABAT sound velocity and refraction correctors were generated through the **REFRACT** subroutine and applied during post-processing.

The following velocity casts supplied correctors for this survey:

Cast Number	DN	HDAPS Table	Applied to Days
15	159	15	159-160, 163
18	177	18	177-178
21	191	21	191-195
22	198	22	198-199, 202
27	221	27	221
40	272	40	272

A Mod III Diver Least depth gauge (S/N 68336 ) was used for this survey to determine a least depth on a contact in anchorage "D", just west of Goat Island. The gauge was operated in accordance with section 7.2.2 of the FPM. Data Quality Assurance tests were conducted daily as well as just before and just after the dive; none exceeded the acceptable limits.

b. Leadline Comparison

A dual leadline comparison with the DSF-6000N was conducted during special project S-B900-RU-95 on:

DN 082 at 41°21.53'N and 070°46.91'W (41 ft depths)

The greatest variation between leadline and DSF soundings was 0.16 meters. Considering the ship's motion and the wire angle (approximately 5°) in the leadline from the current, this was an excellent value agreement and provided an adequate check that the echo sounder was functioning properly. Data from these comparisons can be found in Separate IV.\*

Two types of leadline were used during the leadline-to-DSF-6000N comparison. The starboard leadline was a steel surveyor's tape graduated in feet with a fixed 5 lb weight at its end. A leadline corrector of 0.0 meters was assumed for this leadline. The port leadline was a traditional leadline made of cotton tiller with a stainless steel cable core. This leadline had a corrector of 0.25 feet up to the 45 foot mark and 0.26 feet for depths greater than 45 feet. Refer to Separate IV\* for data records.

All sounding correctors were applied to both the narrow (100 kHz) and wide (24 kHz) DSF-6000N beams.

c. Static Draft

During the ship's winter 1994 dry-dock period, an exact vertical measurement was taken from the DSF transducer to a fixed point on the bridge wing. After the ship was re-floated, the point's height above the waterline was determined. The ship's static draft was thereby calculated to be exactly 2.12 meters (7.0 feet). Refer to Separate IV\* for data records. This draft corrector was applied to all sounding data via the HDAPS offset table.

d. Dynamic Draft (Settlement and Squat Correctors)

Settlement and squat correctors for the RUDE were determined on the Elizabeth River, Norfolk, VA on January 25, 1995. An

\* DATA FILED WITH ORIGINAL FIELD RECORDS.

observer, stationed with a level on a pier, measured changes in relative height by sighting to a staff held at the longitudinal position of the ship's transducer. The ship steamed directly toward and then away from the observer. The values obtained from the toward and away runs were averaged and applied to soundings through the HDAPS Offset Table #1. Refer to Separate IV\* for data records.

e. Heave, Roll, and Pitch Correctors

Heave data were acquired by a Datawell heave, roll and pitch sensor (s/n 19128-C), and applied to HDAPS soundings in real time. Only the heave corrections were applied to the plotted soundings. Heave, roll and pitch correctors were collected on line and applied to all SEABAT soundings during post-processing. Refer to Separate IV\* for data records.

f. Tide Correctors

The tidal datum for this project is Mean Lower Low Water. The operating tide station at Newport, RI (845-2660) served as both direct control for datum determination and as the reference station for predicted tides. Data for predicted tides were provided on floppy disk before the start of the project. These data were obtained from Table 2 of the East Coast of North and South America Tide Predictions and applied to the digital tide data using HDAPS software. Tidal correctors were applied on-line using HDAPS predicted tide tables numbers.

Since this sheet is located close to Newport, both the time and height correctors were direct on the predicted tides at Newport; no subordinate station was required.

Zoning for this project is consistent with the Project Instructions. A request for smooth tides was mailed on October 2, 1995. *APPROVED TIDES AND ZONING WERE APPLIED DURING OFFICE PROCESSING.*

G.2 Generally, sea conditions greater than one meter affected the graphic sounding record by creating a trace of constant peaks and deeps. Application of heave correctors to raw echo soundings appeared to represent true depths accurately.

\* DATA FILED WITH ORIGINAL FIELD RECORDS.

H. CONTROL STATIONS - SEE ALSO SECTION H. OF THE EVALUATION REPORT.

The horizontal datum for this survey is the North American Datum of 1983 (NAD 83). No horizontal control stations were used or established for this survey.

I. HYDROGRAPHIC POSITION CONTROL

I.1 This survey was conducted exclusively using the Global Positioning System (GPS) corrected by the United States Coast Guard (USCG) Differential Global Positioning System (DGPS) reference station network. Differential correctors were supplied via USCG radiobeacon transmitters, precluding the need for shore-based horizontal control stations.

I.2 Accuracy requirements were met as specified by the Hydrographic Manual and Field Procedures Manual. The Horizontal Dilution of Precision (HDOP) and Expected Position Error (EPE) specified by the FPM were monitored during on-line data collection. When the allowable limits were exceeded, survey operations were suspended until the Differential GPS improved. If the positioning degraded beyond the acceptable limits while on-line, the data were either smoothed or rejected, depending on the extent of the affected data.

I.3 Differential GPS Equipment:

<u>Unit A</u>	<u>Unit B</u>
Ashtech GPS Sensor	Ashtech GPS Sensor
s/n 700417B1083	s/n 700417B1003
Firmware Version 1E89D-P	Firmware Version 1E89D-P
Magnavox MX50R	Magnavox MX50R
DGPS Receiver s/n 078	DGPS Receiver s/n 160

I.4 Correctors were received exclusively from the Montauk, NY radio beacon until June 23, 1995, when the new radio beacon at Chatham, MA, was established. After verifying Chatham's accuracy, the RUDE received correctors from both stations.

Daily performance checks were conducted using the Shipboard Data Integrity Monitor, or "SHIPDIM", (version 2.1), according to section 3.4.5 of the FPM. See SHIPDIM PERFORMANCE CHECKS in Separate III\* for weekly system checks.

The program MONITOR (Ver 3.0) was used on July 4, 1995 to test the differential reference station at Montauk, N.Y. Data were collected for a continuous period of 24 hours. The final statistics showed an excellent correspondence between the received signal and the actual position. The results of this test are contained in Separate III.\*

I.5 The application of calibration data to the raw positioning data was not required, since DGPS was the primary positioning system.

I.6 a. The Chatham, MA beacon became operational on June 23 (DN 174). Prior to instituting the beacon as the secondary DGPS station, RUDE personnel verified its signal accuracy by the following method:

The ship maneuvered alongside a 2nd Order position disk located on NETC Pier #2. The accuracy of the Montauk, NY DGPS beacon was verified by comparing the known position of the disk to the computed DGPS position. The Ashtech GPS antenna was then placed on the pier at a recoverable point readily accessible from the ship's standard mooring location. MONITOR was run using the Montauk signal to establish a latitude/longitude for that point. In order to check the accuracy of the given position further, MONITOR was run for 24 hours using the Montauk DGPS correctors and the established latitude/longitude position. The verification of the Chatham beacon accuracy was then accomplished by running MONITOR for an additional 24 hours using the Chatham beacon signal and the established point position. The results of monitoring these two stations were then forwarded to Hydrographic Surveys Division (HSD) in Silver Spring, MD. After analyzing the data, HSD deemed the Chatham, Ma. radio beacon sufficient for surveying purposes.

b. There were no equipment malfunctions.

*\* DATA FILED WITH ORIGINAL FIELD RECORDS.*

c. No systematic errors were detected which required adjustments.

d. The maximum allowed HDOP of 3.69 was never exceeded.

e. Antenna positions were corrected for offset and layback, and referenced to the position of the DSF-6000N echosounder transducer. These correctors are located in HDAPS Offset Table #1, and were applied on line to the positioning algorithm. A copy of Offset Table #1\* is contained in Separate III.\*

f. Offset and layback distances for the A-frame (tow point) are located in HDAPS Offset Table #1 and were applied on line. These offsets, along with the cable length, towfish height, and depth of water, were used by the HDAPS system to compute the position of the towfish.

**J. SHORELINE** - SEE ALSO SECTION J. OF THE EVALUATION REPORT

No shoreline is contained within the boundaries of this survey. Shoreline information was transferred from the largest scale chart of the area to the field sheet for orientation purposes only.

**K. CROSSLINES**

A combined total of 5.0 nautical miles of crosslines was acquired for this survey, which represents 16% of the 30.8 nautical miles of the first 100% side scan mainscheme coverage.

An excessed plot of mainscheme soundings with crosslines superimposed was used to conduct mainscheme to crossline comparisons. Soundings at intersections were compared to all other soundings within a 5 mm (50 meter) radius. Based on this procedure, agreement between mainscheme and crossline soundings was found to be excellent, especially in areas of flat or slightly sloping relief. The majority of compared soundings fell within one foot of each other, with only an occasional difference of three feet noted.

\* DATA FILED WITH ORIGINAL FIELD RECORDS.



**L. JUNCTIONS** - SEE ALSO SECTION L. OF THE EVALUATION REPORT.

H-10616 does not junction with any contemporary survey.

**M. COMPARISON WITH PRIOR SURVEYS** - SEE ALSO SECTION M. OF THE EVALUATION REPORT.

A comparison with prior surveys will be performed by the Atlantic Hydrographic Branch as part of the office verification process.

**N. ITEM INVESTIGATION REPORTS** - SEE ALSO SECTION N. OF THE EVALUATION REPORT.

**Area of Investigation**

AWOIS 9421

Narragansett Bay

Reported Position:

41°30'28.00"N

071°21'22.50"W

Datum: NAD83

Feature: Obstruction

**Description and Source of Item**

AWOIS 9421 is located just north of the Newport Bridge, at the western end of the bridge and along the eastern shoreline of Conanicut Island. It is marked on the chart with a Submerged Crib symbol: "Subm crib". See the Automated Wreck and Obstruction Information System (AWOIS) listing for project OPR-B302-RU for a detailed description.

**Results of Investigation**

Due to the depth of water and the proximity to both the shore and the Newport Bridge supports, RUDE personnel initially investigated the item in a small boat, searching for any indication of a buried sewer outfall. There were no signs of a man-made formation extending from the shore. This information

was discussed with the Commanding Officer and the Hydrographic Survey Division (HSD). Upon review of the situation, HSD reduced the item to informational only, requiring the RUDE to investigate such an item only if it were detected during the course of hydrography within project limits. The correspondence with HSD concerning this item is documented in Appendix VI.

Information pertaining to the hydrographic development of significant side scan sonar contacts, including SEABAT 9001 multibeam sonar investigations, is contained in the following SEABAT 9001 Development Addendum.

SEABAT 9001 DEVELOPMENT ADDENDUM

FLX #	Contact	DEV	FILE .LST	VELCAST	DN	GMT	RAW DEPTH (m)	TIDE CORR. (m)	LEAST DEPTH (m) *	LATITUDE	LONGITUDE
13001	344.49P	#28	22157194	95221150	221	155326	7.6	0.0	7.6	41-31-29.559	071-21-33.025
13002	186.56S	#34	2215806M	95221150	221	160801	21.9	0.1	22.0	41-31-05.682	071-21-03.287
13003	336.45S	#38	22158895	95221150	221	162147	11.3	0.1	11.4	41-30-50.903	071-21-27.567
13004	293.21S	#57	22160436	95221150	221	164722	32.6	0.1	32.7	41-29-30.925	071-21-00.834
13005	250.09S	#48	2216515M	95221150	221	181010	26.0	0.0	26.0	41-30-47.250	071-20-44.605
13006	46.58S	#5	27146705	95272131	272	125830	14.8	0.0	14.8	41-29-18.116	071-20-07.253

\* WITH APPROVED TIDES

\*1 FIX #13005 - LEAST DEPTH = 25.9 M

O. COMPARISON WITH THE CHART

O.1. The following charts are affected by this survey:

Chart 13221  
"Narragansett Bay"  
50<sup>th</sup> ed. April 15, 1995  
Scale: 1:40,000

Chart 13223  
"Narragansett Bay Including Newport Harbor"  
34<sup>th</sup> ed. January 28, 1995  
Scale: 1:20,000

O.2 On October 2, 1995, a Danger to Navigation Report was sent to the Commander, First Coast Guard District, outlining the charting discrepancy found during this survey.

See Appendix I for a complete copy of the Danger to Navigation Report, the details of which are summarized in the following table:

* THIS DEPTH AFFECTS THE FOLLOWING CHARTS:			
Chart 13223 (34 <sup>th</sup> Ed. 28 January, 95) Chart Scale 1:20,000			
Chart 13221 (50 <sup>th</sup> Ed. 15 April 95) Chart Scale 1:40,000			
** DEPTH (ft)	LATITUDE (N)	LONGITUDE (W)	HDAPS FIX #
46.12	41°29'18.116"	71°20'07.25 <sup>5</sup> "	13006

\* Updated depth should be viewed as preliminary information, subject to office review.

\*\* Depth reduced to feet at MLLW using <sup>APPROVED</sup> predicted tides.

### 0.3 Comparison of Soundings

The overall correlation between charted soundings and survey depths is excellent, with average differences of approximately one foot in flat and slightly sloping areas and no more than two to three feet in areas with irregular bottoms.

The correlation between charted shoal areas and corresponding soundings from this survey is excellent.

### 0.4 Comparison of Non-Sounding Features

One uncharted wreck and one charted wreck were discovered during the course of this survey, neither of which is dangerous to surface navigation. Detailed results of the investigations are listed below:

#### 0.4.1 - Area of Investigation

AWOIS 7347

Charted Wreck

East Passage, Narragansett Bay

#### Description and Source of Item

AWOIS 7347 was assigned to and completed by the RUDE in 1992 during FE-368. See the AWOIS listing for project OPR-B300-RU for a detailed description. The charted wreck was discovered during mainscheme side scan sonar coverage.

#### Results of Investigation

The wreck of the U.S. Navy submarine TANNER was first logged on side scan sonar as contact #293.21S. It was fully developed with the echo sounder during development #57 and later investigated with SEABAT. No diver investigation was conducted because of the hazardous dive conditions: extreme depth of water, proximity to the channel, and strong local currents. The SEABAT image appears to agree with the AWOIS listing; i.e., the wreck consists of strewn wreckage and shows no resemblance to a submarine.

Results from this development are listed below:

METHOD	DEPTH * (M) <i>FT</i>	DEPTH * (FT) <i>(M)</i>	FIX #	LATITUDE (N)	LONGITUDE (W)
ECHO SOUNDER	<del>106.9</del> <i>789.8</i>	32.6	1120.2	41°29'30.850"	71°21'00.640"
SEABAT	107.23	32.7	13004	41°29'30.925"	71°21'00.834"
AWOIS 7347 listed position (Chart 13223)				41°29'30.92"	71°21'00.78"

*\* WITH APPROVED TIDES*

Comparison with Chart and Charting Recommendations

Largest scale chart of this portion of the survey area:

Chart 13223  
"Narragansett Bay Including Newport Harbor"  
34<sup>th</sup> ed. January 28, 1995  
Scale: 1:20,000

It is the recommendation of the hydrographer to retain the Wk symbol which is accurately charted in position 41°29'30.92"N and 71°21'00.78"W. - *SEE ALSO SECTION O. OF THE EVALUATION REPORT.*

0.4.2 - Area of Investigation

Uncharted Wreck  
East Passage, Narragansett Bay

Description and Source of Item

The uncharted wreck was discovered during mainscheme side scan sonar coverage.

Results of Investigation

A review of all records indicates that side scan sonar contact #250.09S is presumably the mast of a sunken sailboat lying on its keel in approximately 120 feet of water. This contact was

fully developed using echo sounder during development #48 and later investigated with SEABAT. No diver investigation was conducted due to the hazardous conditions of the dive: extreme depth of water, proximity to the channel, and strong local currents.

Results from this development are listed below:

METHOD	DEPTH (m)	DEPTH (FT)	FIX #	LATITUDE (N)	LONGITUDE (W)
ECHO SOUNDER	25.88	84.86	1314.01	41°30'47.182"	71°20'44.704"
SEABAT	26.0 33.7	85.34	13005	41°30'47.250"	71°20'44.605"

Comparison with Chart and Charting Recommendations

Largest scale chart of this portion of the survey area:

Chart 13223  
 "Narragansett Bay Including Newport Harbor"  
 34<sup>th</sup> ed. January 28, 1995  
 Scale: 1:20,000

This previously uncharted wreck does not pose a hazard to navigation. Although small stern trawling fishing boats were observed working in the northern 1/3 of the survey area, no fishermen or evidence of fishing (bottom scours, etc.) were seen in the area of this wreck.

It is the recommendation of the hydrographer that a <sup>APPROVED</sup> predicted tide corrected depth of <sup>84</sup> ~~85~~ feet should be charted in position 41°30'47.182"N and 71°20'44.704"W and annotated as a wreck (Wk). - CONCUR

0.4.3 - Area of Investigation

Uncharted Obstruction  
 East Passage, Narragansett Bay

Description and Source of Item

The uncharted obstruction was discovered during mainscheme side scan sonar coverage.

Results of Investigation

Side scan sonar contact #46.58S was logged in the "D" anchorage just west of Goat Island. This contact was fully developed using echo sounder and SEABAT during development #5 and later was the center of investigation for Dive #272.1. The results of all investigations on this contact were compared to the charted soundings from chart 13223. This comparison showed a charting discrepancy that warranted a Danger to Navigation Report. Therefore, on ~~September 29~~<sup>OCTOBER 31</sup>, 1995 a Danger to Navigation Report was sent to the First Coast Guard District in Boston; see Appendix I for a copy of this report. The diver investigation revealed a large, steel, cylindrical mooring buoy, 15 feet in diameter, rising 8 feet off the bottom in 56 feet of water. See the Dive Investigation Report (272.1) and attached sketch in Separate VI\* for a more detailed description.

\* DATA FILED WITH ORIGINAL FIELD RECORDS.  
Results from this development are listed below:

METHOD	DEPTH *(m)	DEPTH *(FT)	FIX #	LATITUDE (N)	LONGITUDE (W)
ECHO SOUNDER	14.81	46.83	1337.2	41°29'18.087"	71°20'07.186"
SEABAT	14.01	45.9	13006	41°29'18.116"	71°20'07.2575"
DIVE/MOD III	14.82	46.86	12011	41°29'18.025"	71°20'07.130"

\* WITH APPROVED TIDES

Comparison with Chart and Charting Recommendations

Largest scale chart of this portion of the survey area:

Chart 13223  
"Narragansett Bay Including Newport Harbor"  
34<sup>th</sup> ed. January 28, 1995  
Scale: 1:20,000



The RUDE contacted the Northeast Pilots Association, which provides pilots for the many cruise ships that use this anchorage, and learned that the largest such vessels draw 30 feet and this obstruction does not pose a threat to their normal operations. However, the results were reported as a Danger to Navigation because of the charting discrepancy.

It is the recommendation of the hydrographer that a <sup>APPROVED</sup> ~~predicted~~ tide corrected depth of 46 feet should be charted in position 41°29'18.<sup>037</sup>16"N and 71°20'07.<sup>786</sup>253"W and annotated with the obstruction symbol: *Obstn. Chart 46 Obstn*

O.5 No changes to the scale, coverage, or format of the published charts for this area are recommended.

**P. ADEQUACY OF SURVEY**

This survey is complete and fully adequate to supersede prior survey data in common areas.

**Q. AIDS TO NAVIGATION**

Non- Floating

No non-floating aids to navigation exist within the limits of this survey.

Floating

Detached positions were taken on 12 floating aids to navigation located in, or near, the boundaries of this survey. A comparison was made between the detached positions, the 1995 edition of Light List, Volume I, and the largest scale chart of the area. No floating aid was found to deviate from its published or charted position by no more than a few meters. All floating aids adequately serve the apparent purpose for which they were established.

Four privately maintained buoys were located that are not charted or listed in the Light List. These buoys mark the

entrances to two marinas: Conanicut Marina and Jamestown Boatyard. Each marina is marked with a green can and a red can or nun. None of the buoys are marked. The positions for the four buoys are as follows:

Marina	Buoy	Latitude	Longitude
Conanicut	red can	41°29'45.1"N	71°21'39.2"W
	green can	41°29'43.4"N	71°21'39.9"W
Jamestown Boatyard	red nun	41°29'13.3"N	71°21'24.9"W
	green can	41°29'11.4"N	71°21'24.4"W

**R. STATISTICS**

- R.1 a. Number of Positions . . . . . 1391
- b. Lineal Nautical Miles of Sounding Lines:
  - Nautical Miles of Survey With the Use  
of Side Scan Sonar . . . . . 61.69
  - Nautical Miles of Survey Without the Use  
of Side Scan Sonar . . . . . 65.88
- R.2 a. Square Nautical Miles of Hydrography  
per 100% of Coverage . . . . . 1.36
- b. Days of Production . . . . . 15
- c. Detached Positions . . . . . 13
- d. Bottom Samples . . . . . 32
- e. Tide Stations . . . . . 0
- g. Velocity Casts . . . . . 6
- j. SEABAT Item Investigations . . . . . 6

**S. MISCELLANEOUS**

S.1 No evidence of silting was found during this survey.

No evidence of anomalous tides or tidal current conditions was found during this survey.

S.2 Thirty-two (32) bottom samples were obtained during this survey. As directed by the Project Instructions, all bottom samples were inspected and recorded, but none were submitted to the Smithsonian Institution.

**T. RECOMMENDATIONS**

T.1 See Section O.2 for a danger to navigation noted during this survey.

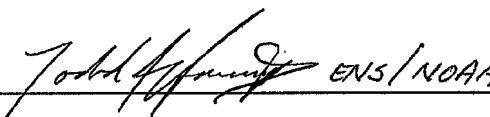
T.2 The RUDE is not aware of any construction or dredging that will affect results of this survey.

T.3 No further investigation of the survey area is recommended.

**U. REFERRAL TO REPORTS**

Reference is made in section F to the Descriptive Report for H-10605 for an explanation of the SEABAT System.

This report and the accompanying field sheets are respectfully submitted.

  
\_\_\_\_\_  
Todd A. Haupt, ENS, NOAA  
Field Operations Officer  
NOAA Ship RUDE

APPENDIX III

LIST OF HORIZONTAL CONTROL STATIONS

No horizontal control stations were needed for this survey since Differential GPS was employed exclusively for all positioning control. The geographic positions for the two Differential GPS radio beacons used during this survey are as follows:

Montauk Point, NY

41°04'02.04<sup>7</sup>"N  
071°51'38.268"W  
274

Chatham, MA

41°40'16.297"N  
069°57'00.162"W

APPENDIX II

NON-FLOATING AIDS AND LANDMARKS FOR CHARTS

No non-floating aids or landmarks exist within the confines of survey H-10616.



**U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
Office of NOAA Corps Operations  
NOAA Ship RUDE S-590  
439 W. York Street  
Norfolk, VA 23510-1114**

October 2, 1995

Commander  
First Coast Guard District  
Aids To Navigation Office  
408 Atlantic Avenue  
Boston, Massachusetts 02110-3350

*PRELIMINARY INFORMATION -  
SUBJECT TO OFFICE REVIEW*

**REPORT OF DANGER TO NAVIGATION**

Dear Sir:

The NOAA Ship RUDE recently completed a hydrographic survey centered approximately 0.45 nautical miles east of Conanicut Island, Narragansett Bay, Rhode Island. During the course of this survey, one discrepancy was found which affects charts 13223 (34th Ed. 28 January, 1995) and chart 13221 (50th Ed. 15 April 1995). It is requested that this discrepancy be published in the Local Notice to Mariners as the depth listed below with an associated Obstruction symbol: "Obstn".

The updated depth is given in the following table. The attached chartlet shows the survey boundaries and the plotted position of the added depth. All information is preliminary and subject to office review.

This item was subject to hydrographic development using a Raytheon DSF-6000N survey echo sounder. This depth has been reduced to Mean Lower Low Water (MLLW) by applying predicted tide corrections. The horizontal datum is NAD 83.

This investigation was performed in support of the following hydrographic survey:

Hydrographic Survey Registry No.	....H-10616
State	.....Rhode Island
General Locality	.....Narragansett Bay
Locality	.....0.45 NM East of Conanicut Island
Project Number	.....B302-RU-95
Surveyed by	.....NOAA Ship RUDE



\* THIS DEPTH AFFECTS THE FOLLOWING CHARTS:

Chart 13223 (34<sup>th</sup> Ed. 28 January, 95)  
Chart Scale 1:20,000

Chart 13221 (50<sup>th</sup> Ed. 15 April 95)  
Chart Scale 1:40,000

** DEPTH (ft)	LATITUDE (N)	LONGITUDE (W)
46 "Obstn"	41°29'18.116"N	71°20'07.253"W

\* Updated depth should be viewed as preliminary information, subject to office review.

\*\* Depth reduced to feet at MLLW using predicted tides.

Contact either of the following personnel for further information:

Commanding Officer  
NOAA Ship RUDE  
P.O. Box 5238  
Newport, R.I. 02841  
401-524-1260

Chief, Atlantic Hydrographic Branch  
Atlantic Marine Center  
439 W. York St.  
Norfolk, VA 23510  
804-441-6746

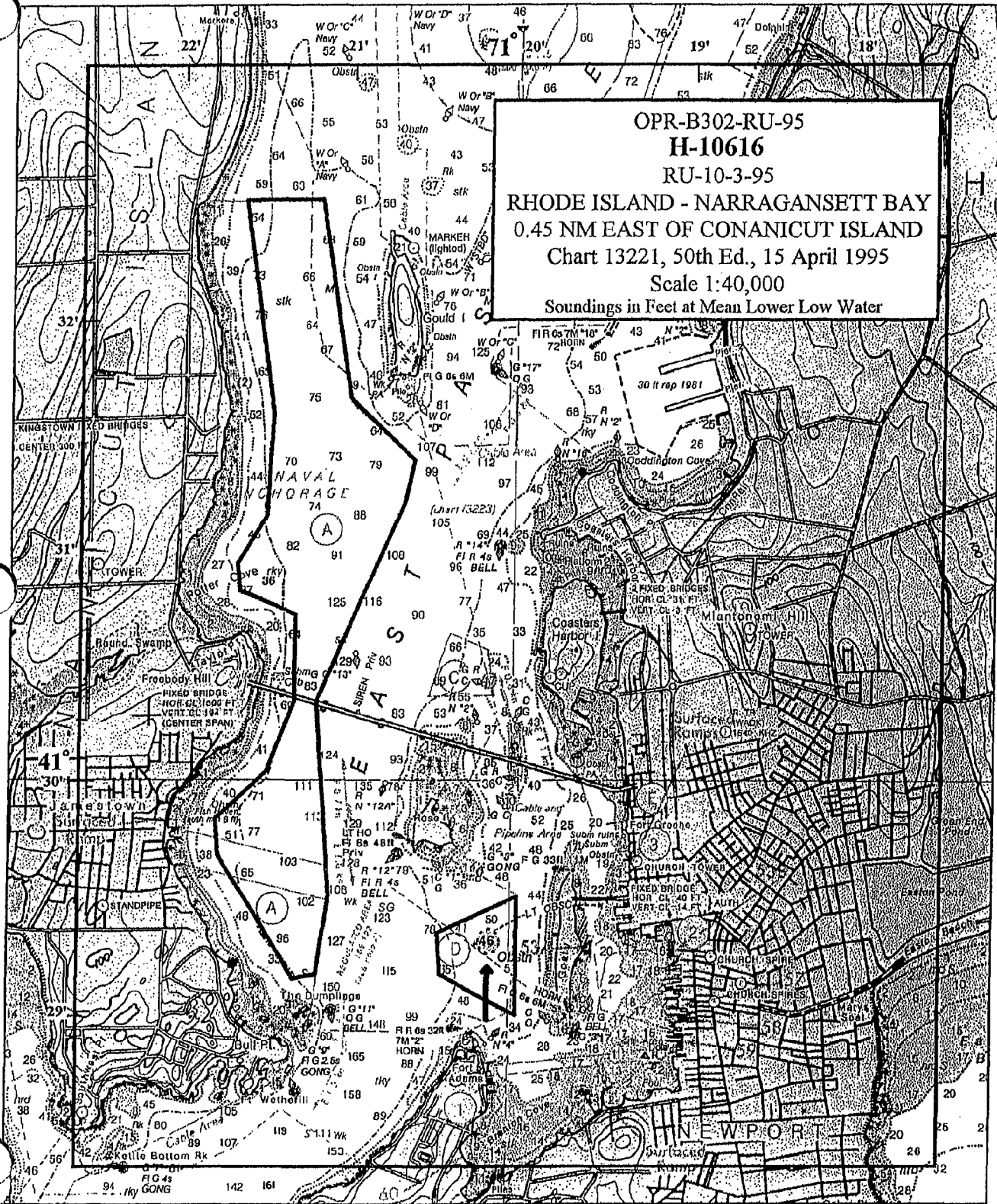
Sincerely,



Samuel P. De Bow  
Commander, NOAA  
Commanding Officer  
NOAA Ship RUDE

PRELIMINARY INFORMATION-  
SUBJECT TO OFFICE REVIEW

OPR-B302-RU-95  
H-10616  
RU-10-3-95  
RHODE ISLAND - NARRAGANSETT BAY  
0.45 NM EAST OF CONANICUT ISLAND  
Chart 13221, 50th Ed., 15 April 1995  
Scale 1:40,000  
Soundings in Feet at Mean Lower Low Water





APPENDIX VII

APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO: H-10616

This report and the accompanying field sheets are respectfully submitted.

Field operations contributing to the accomplishment of this Navigable Area survey were conducted under my direct supervision with frequent personal checks of progress and adequacy. All field sheets and reports were reviewed in their entirety and all supporting records were checked as well.

This survey was completed with 200% side scan sonar coverage and is more than adequate to supersede ALL prior surveys in common areas. The survey is considered complete and adequate for nautical charting.

*Samuel P. De Bow, CDR, NOAA*

Samuel P. De Bow, CDR, NOAA  
Commanding Officer  
NOAA Ship RUDE



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Office of Ocean and Earth Sciences  
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: March 20, 1996

HYDROGRAPHIC BRANCH: Atlantic

HYDROGRAPHIC PROJECT: OPR-B302

HYDROGRAPHIC SHEET: H-10616

LOCALITY: Rhode Island, Narragansett Bay 0.45 Nautical Miles east  
of Conanicut Island

TIME PERIOD: June 8 - September 29, 1995

TIDE STATION USED: 845-2660 Newport, R.I.  
Lat.  $41^{\circ} 30.3'N$  Lon.  $71^{\circ} 19.6'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 1.67 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.7 ft.

REMARKS: RECOMMENDED ZONING

1. In East Passage, Narragansett Bay, north of  $41^{\circ} 27.0'N$ , and south of  $41^{\circ} 28.5'N$ , times are direct, and apply a X0.94 range ratio to heights using Newport, R.I. (845-2660)
2. In East Passage, Narragansett Bay, north of  $41^{\circ} 28.5'N$ , and south of  $41^{\circ} 31.0'N$ , times and heights are direct on Newport, R.I. (845-2660).
3. In East Passage, Narragansett Bay, north of  $41^{\circ} 31.0'N$ , and south of  $41^{\circ} 33.5'N$ , times are direct, and apply a X1.04 range ratio to heights using Newport, R.I. (845-2660).

Notes: 1. Times are tabulated in Greenwich Mean Time.  
2. Data for Newport, R.I. (845-2660) are temporarily stored in file #645-2660.

*William M. H. H.*  
CHIEF, DATUMS SECTION



H-10616

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO. 13725, 13721 B ON PREVIOUS SURVEY NO. C ON U.S. QUADRANGLE MAPS D FROM LOCAL INFORMATION E ON LOCAL MAPS F P.O. GUIDE OR MAP G RAND McNALLY ATLAS H U.S. LIGHT LIST K										
	BRYER POINT	X		X							
BULL POINT	X		X								2
COASTERS HARBOR ISLAND	X		X								3
CODDINGTON POINT	X		X								4
CONANICUT ISLAND	X		X								5
CRANSTON COVE	X		X								6
DUMPLINGS, THE	X		X								7
EAST PASSAGE	X		X								8
FORT ADAMS (locale)	X		X								9
GOAT ISLAND	X		X								10
GOULD ISLAND	X		X								11
JAMESTOWN	X		X								12
NARRAGANSETT BAY (title)	X		X								13
NEWPORT	X		X								14
POTTER COVE	X		X								15
RHODE ISLAND	X		X								16
ROSE ISLAND	X		X								17
TAYLOR POINT	X		X								18
											19
											20
											21
											22
											23
											24
											25

Approved

*Arthur B. Boy*  
Chief Geographer

AUG 9 1996

LETTER TRANSMITTING DATA

N/CS33-126-96

DATA AS LISTED BELOW WERE FORWARDED TO YOU BY  
(Check):

- ORDINARY MAIL
- AIR MAIL
- REGISTERED MAIL
- EXPRESS
- GBL (Give number) \_\_\_\_\_

TO:

Chief, Data Control Group, N/CS3x1  
 NOAA/National Ocean Service  
 Station 6815, SSMC3  
 1315 East-West Highway  
 Silver Spring, Maryland 20910-3282

DATE FORWARDED

13 NOV 1996

NUMBER OF PACKAGES

ONE TUBE

**NOTE:** A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

H-10616

RHODE ISLAND, NARRAGANSETT BAY, 0.45 NM EAST OF CONANICUT ISLAND

1 (ONE) Tube containing the following:

- 1 SMOOTH SHEET (H-10616)
- 1 ORIGINAL DESCRIPTIVE REPORT
- 2 Composite Drawing for chart #13223
- 1 H-Drawing for chart #13223
- 1 Drawing History Form #76-71 for chart # 13223

FROM: (Signature)

Robert R. Hill Jr.

RECEIVED THE ABOVE

(Name, Division, Date)

Return receipted copy to:

Atlantic Hydrographic Branch  
 N/CS33  
 439 West York Street  
 Norfolk, VA 23510-1114

11/12/96

HYDROGRAPHIC SURVEY STATISTICS  
REGISTRY NUMBER: H-10616

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	1391
NUMBER OF SOUNDINGS	7497

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	41	06/04/96
VERIFICATION OF FIELD DATA	101.50	08/20/96
QUALITY CONTROL CHECKS	0	
EVALUATION AND ANALYSIS	35.50	
FINAL INSPECTION	6	07/16/96
COMPILATION	70	11/01/96
TOTAL TIME	254	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		08/19/96

**ATLANTIC HYDROGRAPHIC BRANCH  
EVALUATION REPORT FOR H-10616 (1995)**

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.

**D. AUTOMATED DATA ACQUISITION AND PROCESSING**

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

Hydrographic Processing System  
AutoCAD, Release 12  
NADCON, version 2.10  
QUICKSURF, version 5.1  
MicroStation, version 5.0  
I/RAS B, version 5.01

The smooth sheet was plotted using an ENCAD NovaJet III plotter.

**H. CONTROL STATIONS**

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). The smooth sheet has been annotated with ticks showing the computed mean shift between the North American Datum of 1983 (NAD 83) and the North American Datum of 1927 (NAD 27).

To place the survey on the NAD 27 datum, move the projection lines 0.368 seconds (11.353 meters or 1.14 mm at the scale of the survey) north in latitude and 1.813 seconds (42.031 meters or 4.20 mm at the scale of the survey) east in longitude.

**J. SHORELINE**

Brown shoreline originates with National Ocean Service (NOS) chart 13221 (50<sup>th</sup> Edition, April 15, 1995) and is for orientation purposes only.

**L. JUNCTIONS**

There are no surveys that junction with the present survey. Charted depths are in general harmony with present survey depths in the junctional areas.

M. COMPARISON WITH PRIOR SURVEYS

A comparison with prior surveys was not performed. This is in accordance with section 4. of the memorandum titled, "Changes to Hydrographic Survey Processing", dated May 24, 1995.

N. ITEM INVESTIGATION REPORTS

AWOIS Item #9421, a charted submerged crib, in Latitude 41°30'28.00"N, Longitude 71°21'22.50"W, originates with Chart Letter 64 of 1979 (CL64/79). This item was not investigated by the field unit because of vessel safety. No change in charting status is recommended.

O. COMPARISON WITH CHARTS 13221 (50<sup>th</sup> Edition, Apr 15/95)  
13223 (34<sup>th</sup> Edition, Jan 28/95)

The charted hydrography originates with prior surveys and miscellaneous sources. An adequate comparison is made in section 0., p. 17-22, of the Descriptive Report and needs no further discussion. Attention is directed to the following:

AWOIS Item #7347, a charted wreck with a least depth of 108 feet (32<sup>9</sup> m), in Latitude 41°29'30.92"N, Longitude 71°21'00.78"W, originating with Chart Letter 930 of 1954 (CL930/54), was investigated by the field unit. The wreck, with a SEABAT depth of 107 feet (32<sup>7</sup> m), was located in Latitude 41°29'30.92"N, Longitude 71°21'00.83"W. It is recommended that the wreck be charted as shown on the present survey.

The present survey is adequate to supersede the charted hydrography in the common area.

P. ADEQUACY OF SURVEY

This is an adequate hydrographic/side scan sonar survey; no additional work is recommended.

S. MISCELLANEOUS

Chart compilation using the present survey data was done by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compiled data will be forwarded to the Hydrographic Survey Division, Silver Springs, Maryland upon completion of the project.

RUDE Processing Team

Richard W. Blevins  
Richard W. Blevins  
Cartographic Technician  
Verification of Field Data  
Evaluation and Analysis



APPROVAL SHEET  
H-10616

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Robert G. Roberson Date: August 19, 1996  
Robert G. Roberson  
Cartographer  
Chief, Cartographic Section

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Nicholas E. Perugini Date: August 19, 1996  
Nicholas E. Perugini  
Commander, NOAA  
Chief, Atlantic Hydrographic Branch

\*\*\*\*\*

Final Approval:

Approved: Andrew A. Armstrong Date: December 9, 1996  
Andrew A. Armstrong, III  
Captain, NOAA  
Chief, Hydrographic Surveys Division

