U.S. Department of Commerce National Oceanic and Atmospheric Administration National Ocean Service				
DESCRIPTIVE REPORT				
Type of Survey:	Navigable Area			
Registry Number:	F00797			
	LOCALITY			
State(s):	Texas			
General Locality:	Galveston Bay			
Sub-locality: Boalivar Roads Anchorage C				
	2010			
	2019			
CHIEF OF PARTY				
	Dan Jacobs			
	LIBRARY & ARCHIVES			
Date:				

F00797

NATIONAL	U.S. DEPARTMENT OF COMMERCE OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:			
HYDROGRAPHIC TITLE SHEETF00797					
INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.					
State(s):	Texas				
General Locality:	Galveston Bay				
Sub-Locality:	Boalivar Roads Anchorage C				
Scale:	10000				
Dates of Survey:	10/22/2019 to 12/03/2019				
Instructions Dated:	10/08/2019				
Project Number:	S-K922-NRT4-19				
Field Unit:	Navigation Response Team 4				
Chief of Party:	Dan Jacobs				
Soundings by:	Kongsberg Maritime EM 2040C (MBES)				
Imagery by:	EdgeTech 4125 (SSS)				
Verification by:	Pacific Hydrographic Branch				
Soundings Acquired in:	meters at Mean Lower Low Water				

Remarks:

Any revisions to the Descriptive Report (DR) applied during office processing are shown in red italic text. The DR is maintained as a field unit product, therefore all information and recommendations within this report are considered preliminary unless otherwise noted. The final disposition of survey data is represented in the NOAA nautical chart products. All pertinent records for this survey are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via https://www.ncei.noaa.gov/. Products created during office processing were generated in NAD83 UTM 15N, MLLW. All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.

DESCRIPTIVE REPORT SUMMARY

A. Area Surveyed

This hydrographic survey was acquired in accordance with the requirements defined in the Project Instruction S-K922-NRT4-19. A survey outline of the project was submitted to NOAA's "survey.outlines@noaa.gov" and Mr. Hare, NSD Project Manager, on December 9, 2019. Electronic correspondence regarding that submission can be found in the project folder entitled "Project_Correspondence".

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
29° 21' 57.6" N	29° 20' 9.6" N
94° 44' 20.4" W	94° 47' 24" W



Figure 1: F00797 Sheet Limits and Object Detection Coverage



Figure 2: S-K922-NRT4-19 Area Surveyed - Multibeam Coverage



Figure 3: S-K922-NRT4-19 Area Surveyed - Side scan Coverage

B. Survey Purpose

The Galveston Pilots have requested a hydrographic survey for updated bathymetry in Bolivar Roads Anchorage C. There are concerns of shoaling in the anchorage area. Additionally, NRT4 is assigned to investigate two discrepancy features in the area. Survey data from this project is intended to supersede all prior survey data in the common area.

C. Intended Use of Survey

The entire survey is adequate to supersede previous data.

Survey data from this project is recommended for charting. 200 percent object detection side scan coverage concurrent with multibeam soundings was attained to the 3.5 meter curve in all areas (AWOIS Radii and Anchorage Area C Sheet Limits). All side scan coverage data gaps were addressed for both 100 and 200

S-K922-NRT4-19/F00797 ERRY CHAN 7ft 2N Eastern **Object Detection 200** Investigation percent Sidescan Radius - 200% Iron stake 6 Coverage Object Detection 3 42 Coverage attained Western Investigation Radius - 200% 26 Object Detection Coverage G "1" FI G 4s attained to the 3.5 meter curve 31 Only. INNER BAR CH F00797 Sheet Limits FIG Q G 35th F00797 37 200% Sidescan Coverage 4s 16ft Priv 28

percent by running additional side scan lines. Data gaps occurred due to wind, waves and traffic particularly at low range scales where margins of overlap are narrow.

Figure 4: F00797 Sheet Limits and Object Detection Coverage

D. Data Acquisition and Processing

F00797 is an object detection survey per the project instructions. The criteria was met implementing "Option B" Section 5.2.2.2 of the 2019 HSSD where Multibeam Echosounder data were collected concurrently with 200 percent Side Scan Sonar imagery. Please reference Data Acquisition and Processing Report "S_K922-NRT4-19_DAPR.pdf" for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods.

E. Uncertainty

A priori and realtime uncertainty sources were incorporated into the depth estimates of this survey. The realtime uncertainties from the Kongsberg MBES sonar and POS MMS (delayed heave) were recorded and applied during post processing. Likewise, the post-processed uncertainties associated with vessel position were applied in CARIS HIPS 11.1 using SBET/RTX files (smrmsg file) generated by POSPac software. The finalized 50cm grid's uncertainty was calculated using "greater of the two" of uncertainty and standard deviation. Over 99 percent of processed, finalized grid nodes passed object detection Total Vertical Uncertainty (TVU) criteria. See Pydro derived histogram plot below.

The 2019 HSSD multibeam coverage density requirement "95 percent of all nodes shall be populated with at least 5 soundings" was achieved for F00797's finalized, 50cm grid where over 99 percent of grid nodes were found to be in compliance. See the Pydro derived density graph, below.

Multibeam crosslines acquired for F00797 totaled 5803.38 meters or 9.6 percent of mainscheme lines (60637.99 meters) thus exceeding the 2019 HSSD object detection requirement of 4 percent. A 50 cm crossline surface was compared to a 50 cm mainscheme surface invoking the Pydro Compare Surfaces script. The two surfaces were in excellent agreement with each other as 99 percent of the nodes passed the allowable error fraction. The analysis was performed on MBES data reduced to MLLW using ellipsoidally referenced RTX SBET methods. Please reference the folder named Crossline_Comparisons for all analysis outputs.

The Pydro QC Tool/Flier Finder discovered approximately 4500 edge fliers and several hundred other fliers of varying categories. These fliers have been cleaned/remedied to the best ability of the hydrographer; 2-3 still remain.



Figure 5: F00797 TVU Compliance, Finalized 50cm Surface



Figure 6: F00797 Density Compliance, Finalized 50cm Surface



Comparison Distribution

Figure 7: F00797 Crossline to Mainsceme Allowable Fraction Plot

F. Results and Recommendations

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

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US5TX53M	1:25000	57	06/12/2019	08/14/2019	NO

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00797_MB_50cm_MLLW	CARIS Raster Surface (CUBE)	0.5 m	2.770 m - 15.710 m	NOAA_0.5m	MBES Trackline
F00797_MB_50cm_MLLW_Final	CARIS Raster Surface (CUBE)	0.5 m	2.03 m - 15.710 m	NOAA_0.5m	MBES Trackline
F00797_SSAB_1m_400kHz_1of2	SSS Mosaic	1 m	2 m - 16 m	NOAA_1m	100% SSS
F00797_SSAB_1m_400kHz_2of2	SSS Mosaic	1 m	2 m - 16 m	NOAA_1m	200% SSS

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

No Notice to Mariner discrepancies existed in the project area during survey dates, Week 4 of October 2019 though Week 1 of December 2019.

One 50cm CUBE surface and two 100 percent side scan surfaces are being submitted for project S-K922-NRT4-19. Multibeam data exhibited much noise, particularly in the outer quarters of the beam swath. More than 6000 fliers required cleaning. 200 percent object detection side scan coverage concurrent with multibeam soundings was attained to the 3.5 meter curve in all areas (AWOIS Radii and Anchorage Area C Sheet Limits). Side scan coverage requirements were met implementing 75, 50 and 25m range scales for their respective depths specified by the HSSD, Section 6.1.2.3. A list of survey lines that contributed to each 100 percent mosaic and their associated range scale can be found in the Support folder accompanying this report. All side scan coverage data gaps were addressed for both 100 and 200 percent coverages by running additional side scan lines. Data gaps due to wind, waves and traffic particularly at low range scales where margins of overlap are narrow were remedied by running additional spits. Several SSS lines from DN295 and DN303 were not included in the mosaic due to inappropriate range scale selection or electronic noise. They are listed in the Support folder accompanying this report. Note several SSS lines with water column noise existed due to the presence of fish or marine mammals; the most pronounced occurrence was on DN295 along the Houston Ship Channel. Data was reacquired for days where ships were at anchor in Eastern AWOIS radius. Graphics shown below.

A comparison of charted (11324) depths and contours vs survey depths and contours was performed for this field examination project. Depths in the Anchorage Area "C" were generally the same or deeper by 1-2 feet from charted soundings. A mutilbeam survey sounding plot with color breaks for 12, 18 and 30 foot depth intervals revealed a general deepening trend migrating northward toward the shoreline throughout the anchorage. The charted 30 foot contour has migrated nearly 400 meters shoreward (northeast) at one location and averaged 20-30 meters northerly deviation at other locations. The 18 foot contour has seen as much as a 140 meter shift northward and most of the soundings had migrated 30-40 meters northward elsewhere. The charted 12 foot contour bisecting the NW corner of Anchorage Area C has migrated north and is now situated directly over or outside of the anchorage's northern border. See graphics below.

No DtoNs existed for F00797. Eleven (11) features were assigned to F00797 and 4 "new" features were discovered. All features were investigated implementing object detection methods prescribed in Section 5.2.2.2 of the 2019 HSSD and attributed accordingly. Please reference the final feature file in the project's S57 folder for all descriptions, recommendations, attributes and graphics.

All ATONs within the project area (2 lighted buoys, assigned) were confirmed to be on station and serving their intended purpose.

A ferry route/ferry terminal exists 800 meters northwest of Anchorage Area "C" chart 11324 at Point Bolivar. The route connects Texas State Highway 87 in Galveston to Texas State Highway 87 on the Bolivar Peninsula. Its presence is acknowledged by "NOTE E" on chart 11324 however no ferry route or track is depicted connecting the two landings. According to a the Texas Department of Transportation website (www.txdot.gov/driver/travel/ferry-schedules.html) the ferry departs and arrives back to each terminal hourly. One vessel is in operation 24 hours per day/365 days a year with a second augmenting during high traffic. The ferry track is likely not charted due to the confluence of so many other navigation routing measures occurring at this busy shipping intersection.

No overhead features, submarine features, or platforms, existed within the project area.

No construction or dredging was occurring during this project.

Abnormal seafloor or environmental conditions were not observed.



Figure 8: Electronic interference, noisy side scan imagery DN295



Figure 9: Noisy water column, fish and marine mammals DN295.



Ships at Anchor, DN305 (Line 1604)

Figure 10: Ships at Anchor within survey area - Hull of ship evident in water column DN305.



Figure 11: F00797 Survey Soundings and 30 Foot Contour



Figure 12: F00797 Survey Soundings and 18 Foot Contour



Figure 13: F00797 Survey Soundings and 13 Foot Contour

G. Vertical and Horizontal Control

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

The vertical uncertainty for this project is Mean Lower Low Water (MLLW). Soundings were reduced from NAD83 to MLLW using Vdatum file "S-K922_VDatum_Limits_100m_NAD83-MLLW_geoid12b.csar" located in the survey "Water_Levels" folder. The vertical uncertainty for this model was 9.06201cm. This value was applied in Charlene v3.1.5.

The horizontal datum for this project is North American Datum of 1983 (NAD 83). The projection used for this project is Universal Transverse Mercator (UTM) Zone 15.

The horizontal datum for this project is North American Datum 1983. The projection used for this survey is Projected UTM 15 North.

H. Additional Results

There are no additional results for this survey.

I. Approval

As Chief of Party, field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Survey Summary Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys Specifications and Deliverables, Field Procedures Manual, Standing and Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Survey Summary Report.

Approver Name	Title	Date	Signature
Dan Jacobs	Team Lead, NRT4	01/10/2020	JACOBS.DAN.L. Digitally signed by JACOBS.DAN.L.1151633478 Date: 2020.01.20 16:16:05 -06'00'

APPROVAL PAGE

F00797

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NCEI for archive

- Descriptive Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Collection of sidesce mosaics
- Processed survey data and records
- Bottom samples
- GeoPDF of survey products

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

Approved:

Commander Olivia Hauser, NOAA Chief, Pacific Hydrographic Branch