

F00769

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: F00769

LOCALITY

State(s): Georgia

General Locality: Brunswick, GA

Sub-locality: St. Simons Sound and Turtle River

2020

CHIEF OF PARTY
James Kirkpatrick

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

F00769

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): **Georgia**

General Locality: **Brunswick, GA**

Sub-Locality: **St. Simons Sound and Turtle River**

Scale: **10000**

Dates of Survey: **11/05/2019 to 02/10/2020**

Instructions Dated: **04/24/2019**

Project Number: **S-G911-NRT2-19**

Field Unit: **NOAA Navigation Response Team - Fernandina**

Chief of Party: **James Kirkpatrick**

Soundings by: **Multibeam Echo Sounder**

Imagery by: **Side Scan Sonar**

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 17N, MLLW. All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.

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Descriptive Report to Accompany Survey F00769

Project: S-G911-NRT2-19

Locality: Brunswick, GA

Sublocality: St. Simons Sound and Turtle River

Scale: 1:10000

November 2019 - February 2020

NOAA Navigation Response Team - Fernandina

Chief of Party: James Kirkpatrick

A. Area Surveyed

Brunswick Pilots requested a survey from St. Simons Sound Entrance buoy 15 to the Georgia Ports Authority Terminal in the South Brunswick River. Also included were the 3 fingers of of the Mackay River and Back River to the North.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
31° 10' 16.1" N 81° 32' 21.43" W	31° 5' 37.02" N 81° 22' 22.43" W

Table 1: Survey Limits

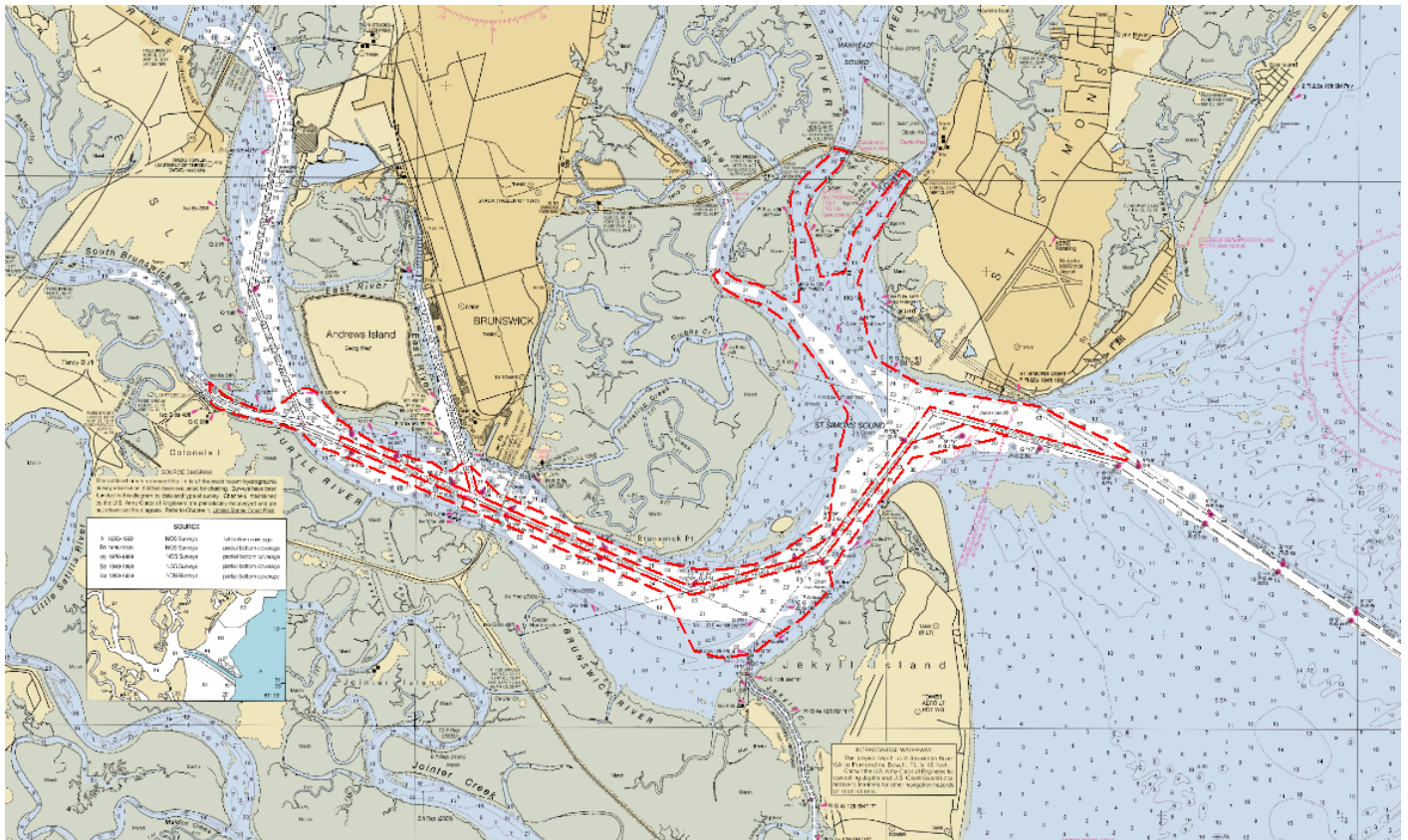


Figure 1: F00769 Survey Area overview.

With the exception of one area within a private marina under construction and a few very shallow edges the entire survey limits were surveyed to object detection specifications. The area directly under the hull of the Golden Ray wreck was not fully ensounded. Although the maintained shipping channel was not assigned in the Project Instructions, object detection specifications were achieved except for one small holiday.

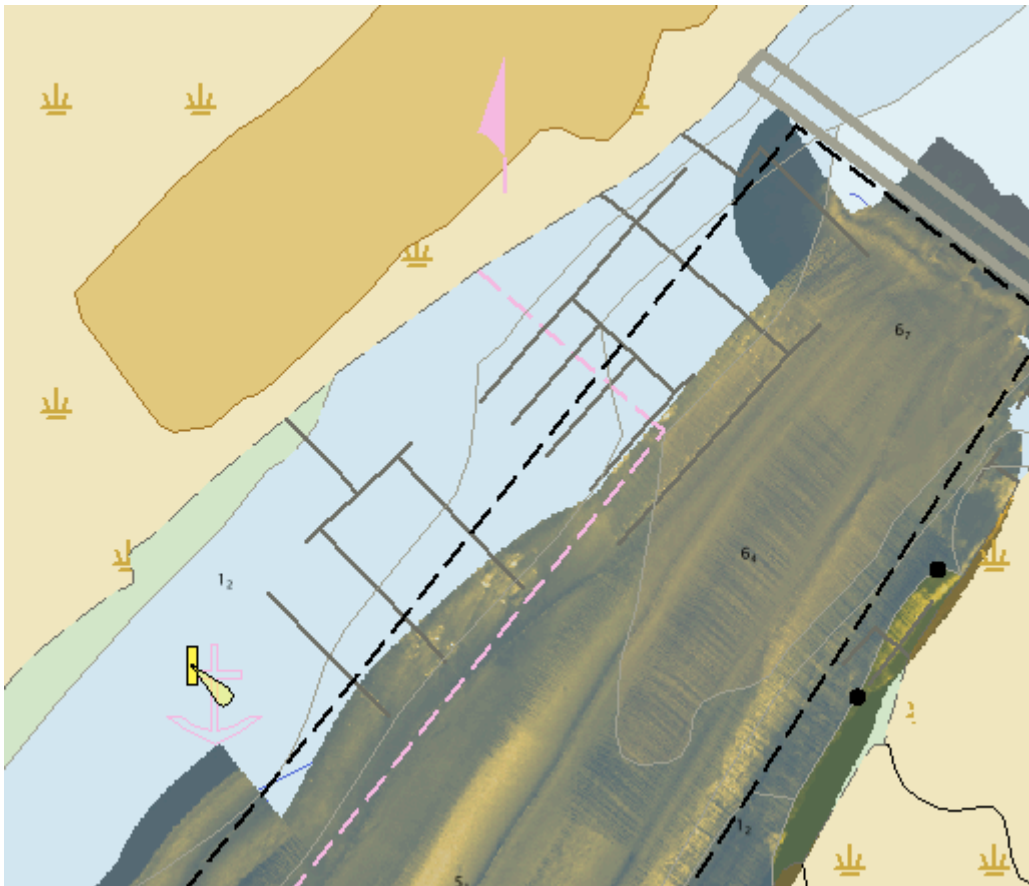


Figure 2: Marina under construction holiday.

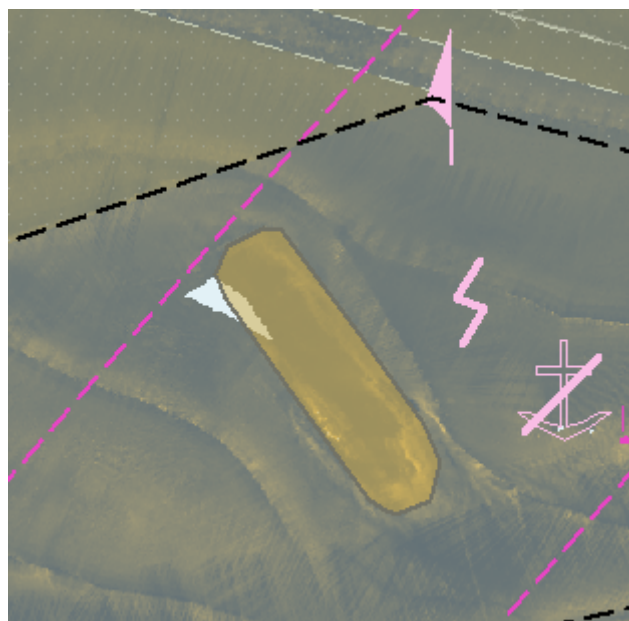


Figure 3: Golden Ray hulk holiday.

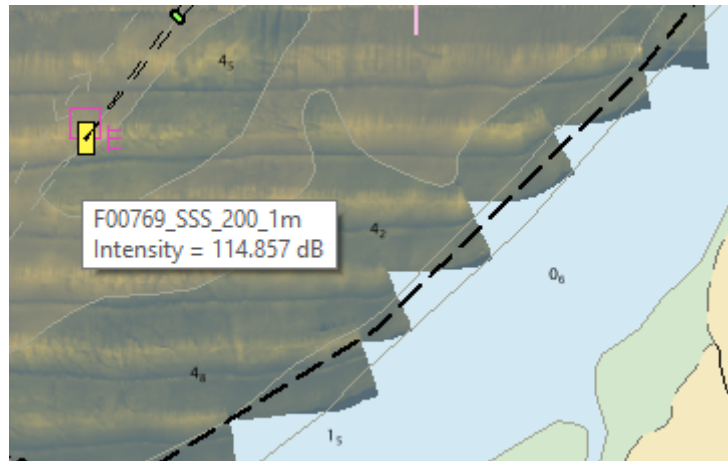


Figure 4: Example of shallow edges holidays.

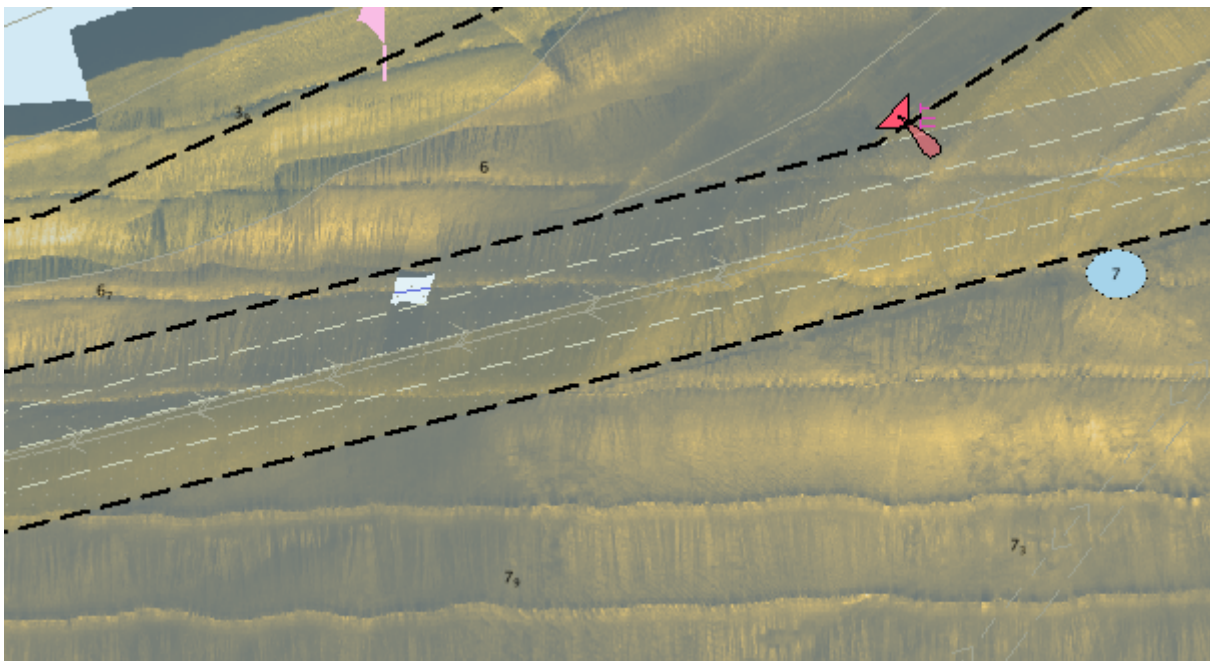


Figure 5: Maintained channel holiday.

A.2 Survey Purpose

Survey data from this project is intended to supersede all prior survey data in the common area.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in F00769 meets Object Detection standards with the exception of areas mentioned above, and is adequate to supersede all previous data.

A.4 Survey Coverage

The following table lists the coverage requirements for this survey as assigned in the project instructions:

Water Depth	Coverage Required
All waters in survey area.	Object Detection Coverage (Refer to HSSD Section 5.2.2.2)

Table 2: Survey Coverage

Survey coverage was in accordance with the requirements listed above and in the HSSD.



Figure 6: F00769 SSS Coverage.

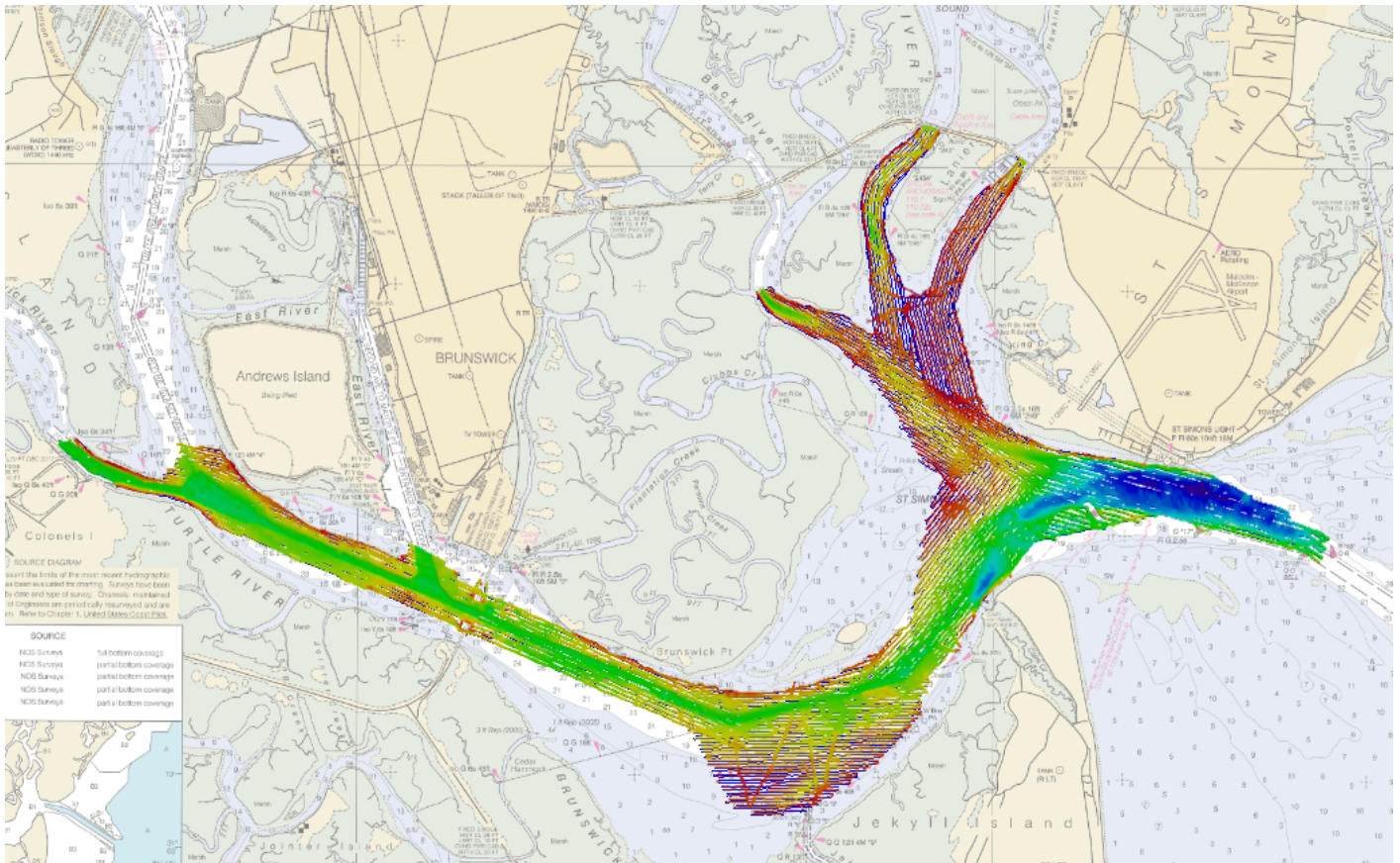


Figure 7: F00769 MBES Coverage.

A.6 Survey Statistics

The following table lists the mainscheme and crossline acquisition mileage for this survey:

	HULL ID	<i>S3009</i>	<i>Total</i>
LNM	SBES Mainscheme	0	0
	MBES Mainscheme	252.644	252.644
	Lidar Mainscheme	0	0
	SSS Mainscheme	255.104	255.104
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	0	0
	SBES/MBES Crosslines	36.228	36.228
	Lidar Crosslines	0	0
Number of Bottom Samples			0
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			2.9719

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
02/10/2020	41
02/04/2020	35

Survey Dates	Day of the Year
01/23/2020	23
01/22/2020	22
01/21/2020	21
01/16/2020	16
01/14/2020	14
01/13/2020	13
11/19/2019	323
11/14/2019	318
11/07/2019	311
11/06/2019	310
11/05/2019	309

Table 4: Dates of Hydrography

Acquisition of F00769 took place on 13 non-consecutive days between November 5th, 2019 and February 10th, 2020.

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the S-G911-NRT2-19_Brunswick Data Acquisition and Processing Report (DAPR) for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR, are discussed in the following sections.

B.1.1 Vessels

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

Hull ID	<i>S3009</i>
LOA	10.5 meters
Draft	1.2 meters

Table 5: Vessels Used



Figure 8: S3009

All survey data for F00769 was collected by Navigation Response Team 2 and S3009.

B.1.2 Equipment

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

Manufacturer	Model	Type
Kongsberg Maritime	EM 2040C	MBES
EdgeTech	4125	SSS
Applanix	POS MV 320 v5	Positioning and Attitude System
AML Oceanographic	MicroX SV	Sound Speed System
YSI	CastAway-CTD	Conductivity, Temperature, and Depth Sensor

Table 6: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Crosslines were collected, processed and compared in accordance with Section 5.2.4.32 of the HSSD. To evaluate crosslines, a surface generated via data strictly from mainscheme lines, and a surface generated via data strictly from crosslines were created. From these two surfaces, a difference surface (mainscheme - crosslines = difference surface) was generated, and is submitted in the Separates II Digital Data folder. Statistics show the mean difference between the depths derived from mainscheme data and crossline data was 0.006 meters.

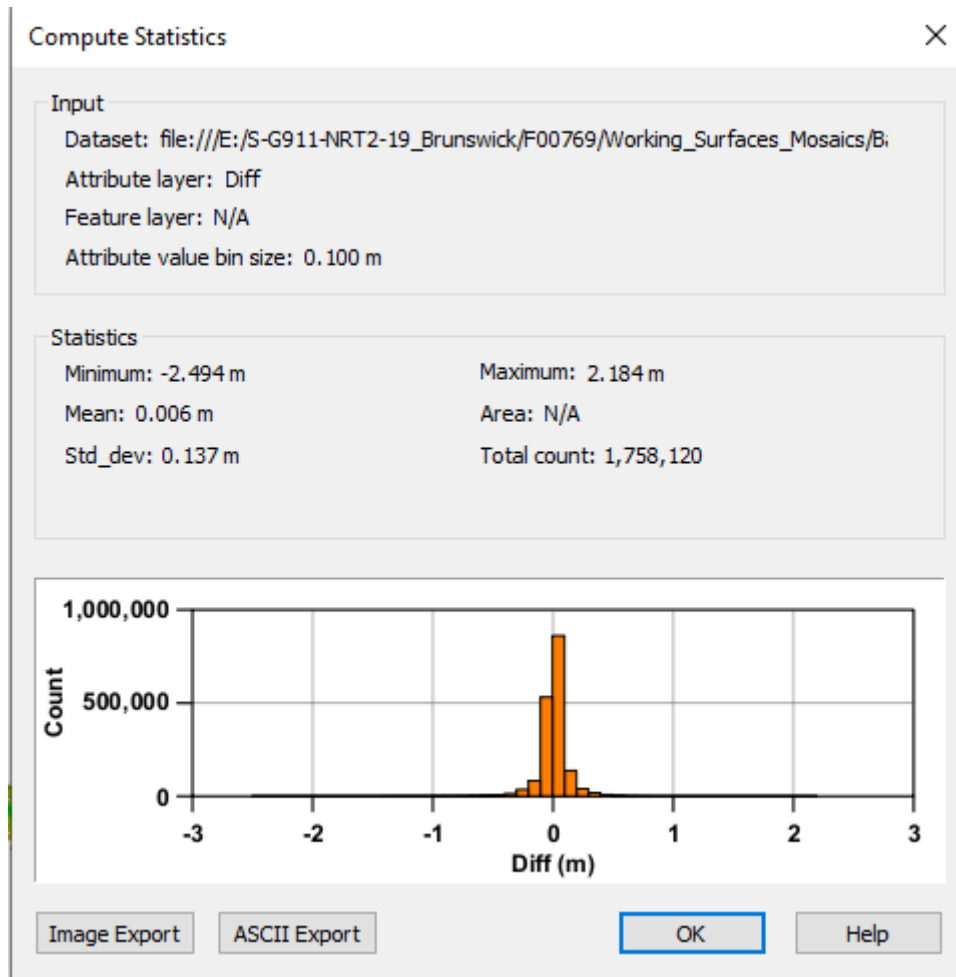


Figure 9: F00769 Crossline Comparison.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0.0 centimeters	11 centimeters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
S3009	2.0 meters/second	N/A	N/A	0.5 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

In addition to the usual a priori estimates of uncertainty provided via device models for vessel motion, VDatum, Poor Mans VDatum (PMVD), and real-time and post-processed uncertainty sources were also incorporated into the depth estimates of survey F00769. Following post-processing of the real-time vessel motion, recomputed uncertainties of vessel gps height and navigation were applied in CARIS HIPS and SIPS via a Smoothed Best Estimate of Trajectory (SBET) RMS file generated in Applanix POSPac.

B.2.3 Junctions

No junction surveys assigned for F00769. NRT1 completed a response survey (F00792) of the area in 2019 and the comparison results are included for information only.

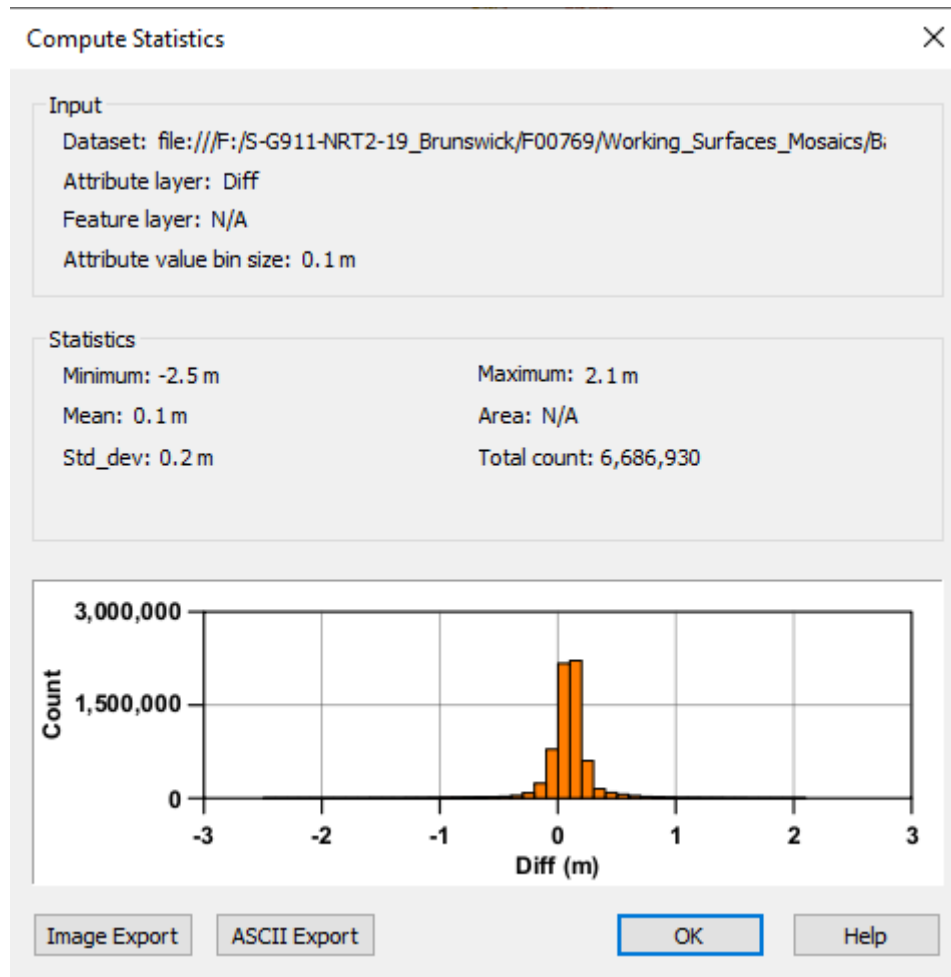


Figure 10: Comparison of F00792 and F00769 MBES data.

There are no contemporary surveys that junction with this survey.

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

There were no conditions or deficiencies that affected equipment operational effectiveness.

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: At least every 4 hours.

Casts were conducted at a minimum of one every four hours during launch acquisition. Casts were conducted more frequently in areas where the influx of freshwater had an effect on the speed of sound in the water column and when there was a change in surface sound speed greater than two meters per second. All sound speed methods were used as detailed in the DAPR.

B.2.8 Coverage Equipment and Methods

200% SSS with concurrent MBES was used over the entire survey area. In deeper areas 100% MBES was achieved.

B.2.9 Density

The surface was analyzed using the HydrOffice QC Tools Grid QA feature and the results are shown below. Density requirements for F00769 were achieved with at least 99% of surface nodes containing five or more soundings as required by HSSD Section 5.2.2.3. The few nodes that did not meet density requirements are due to sparse data in the outer beams, especially near steep slopes where acoustic shadowing occurred, and at the edges of the survey limits.

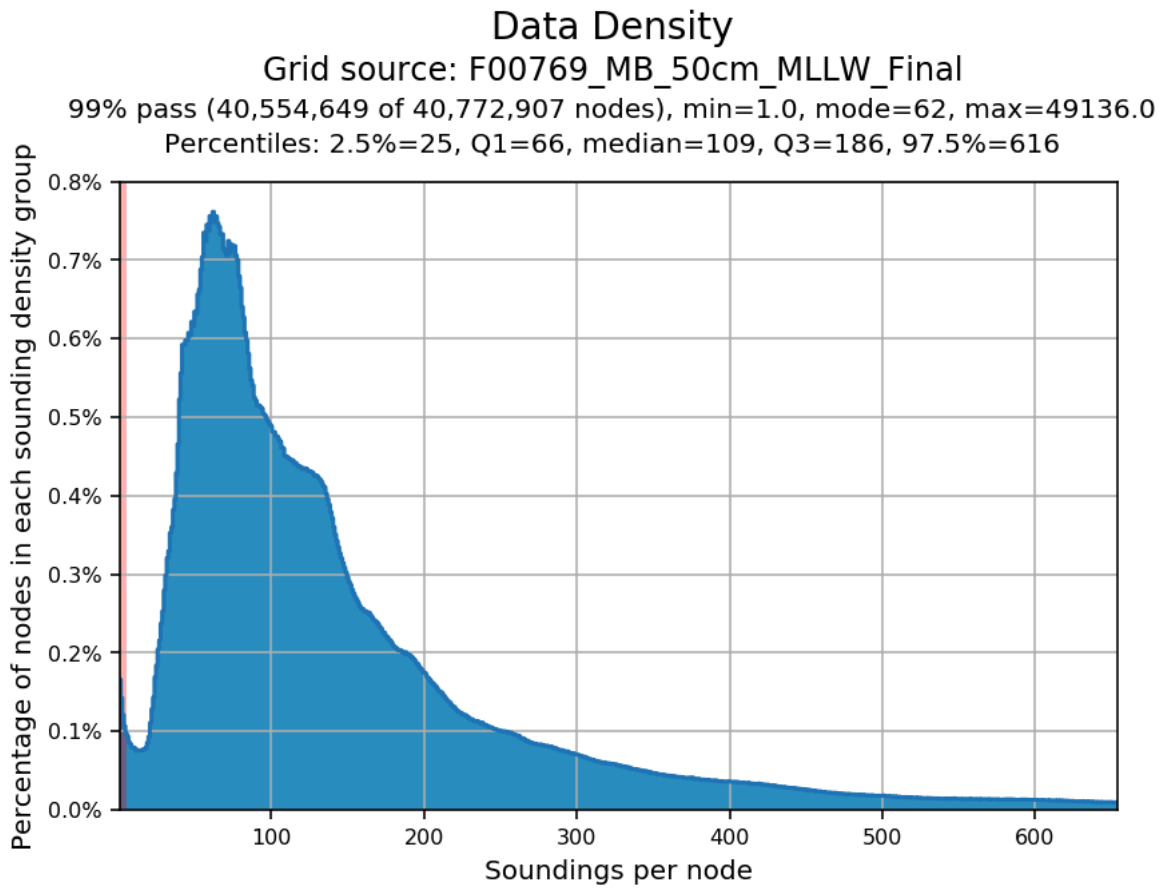


Figure 11: F00769 Data Density.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Backscatter was not acquired for this survey.

Concur with clarification. During office processing the Backscatter mosaics were created. NRT Team Fernandina did collect all the necessary (.All) files to process the backscatter mosaics.*

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following software program was the primary program used for bathymetric data processing:

Manufacturer	Name	Version
Caris	Hips and Sips	11.3.3

Table 9: Primary bathymetric data processing software

The following software program was the primary program used for imagery data processing:

Manufacturer	Name	Version
QPS	FMGT	7.9.6

Table 10: Primary imagery data processing software

The following Feature Object Catalog was used: Caris_Support_Files_2020v1.

B.5.2 Surfaces

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

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00769_MB_50cm_MLLW_Final	CARIS Raster Surface (CUBE)	0.5 meters	0.4 meters - 21.6 meters	NOAA_0.5m	Concurrent MBES
F00769_SSSAB_400kHz_1of2	SSS Mosaic	1 meters	-	N/A	100% SSS

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00769_SSSAB_400kHz_2of2	SSS Mosaic	1 meters	-	N/A	200% SSS

Table 11: Submitted Surfaces

The NOAA CUBE parameters defined in the HSSD were used for the creation of all CUBE surfaces for F00769. The surfaces have been reviewed where noisy data, or "fliers," are incorporated into the gridded solutions causing the surface to be shoaler or deeper than the true sea floor. Where these spurious soundings cause the gridded surface to be shoaler or deeper than the reliably measured seabed by greater than the maximum allowable Total Vertical Uncertainty at that depth, the noisy data have been rejected by the hydrographer and the surface recomputed. Flier Finder, part of the QC Tools package within HydrOffice, was used to assist the search for spurious soundings following gross cleaning. Flier Finder was run iteratively until all remaining flagged fliers were deemed to be valid aspects of the steep slopes and dynamic nature of the seafloor.

Concur with clarification. The SSS mosaic surfaces were renamed with the proper naming convention: F00769_SSSAB_1m_400kHz_1of2, F00769_SSSAB_1m_400kHz_2of2

C. Vertical and Horizontal Control

Additional information discussing the vertical or horizontal control for this survey can be found in the accompanying DAPR.

C.1 Vertical Control

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

ERS Datum Transformation

The following ellipsoid-to-chart vertical datum transformation was used:

Method	Ellipsoid to Chart Datum Separation File
ERS via VDATUM	Extended_limits_NAD83-MLLW S-G911-NRT2-19_VDatum Limits_xyNAD83-MLLW_geoid12b

Table 12: ERS method and SEP file

NRT2 created an extended limits SEP model to fully cover the assigned survey area.

C.2 Horizontal Control

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 17.

The following PPK methods were used for horizontal control:

- RTX

WAAS

The Wide Area Augmentation System (WAAS) was used for real-time horizontal control during data acquisition.

D. Results and Recommendations

D.1 Chart Comparison

A comparison was performed between survey F00769 and chart 11506 as well as ENC USGA13M using CARIS HIPS and SIPS sounding and contour layers derived from the F00769_MB_50cm_MLLW_Final surface. The contours and soundings were overlaid on the charts to assess differences between the surveyed soundings and charted depths. All data from F00769 should supersede charted data. In general, surveyed soundings agree with the majority of charted depths. A full discussion of the disagreements follows below.

D.1.1 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date
USGA13M	1:40000	50	05/07/2020	05/07/2020

Table 13: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.3 Charted Features

Significant charted features are included in the Final Feature File.

D.1.4 Uncharted Features

Significant uncharted features are included in the Final Feature File.

D.1.5 Channels

Although maintained channels were not assigned in the Project Instructions, survey data is in good agreement with charted data. One anomaly in ENC USGA13M was noted. The Left Outside Quarter of Plantation Creek Range is shaded blue while all other quarters of the range are white. Survey data shows a least depth of 10.0 meters.

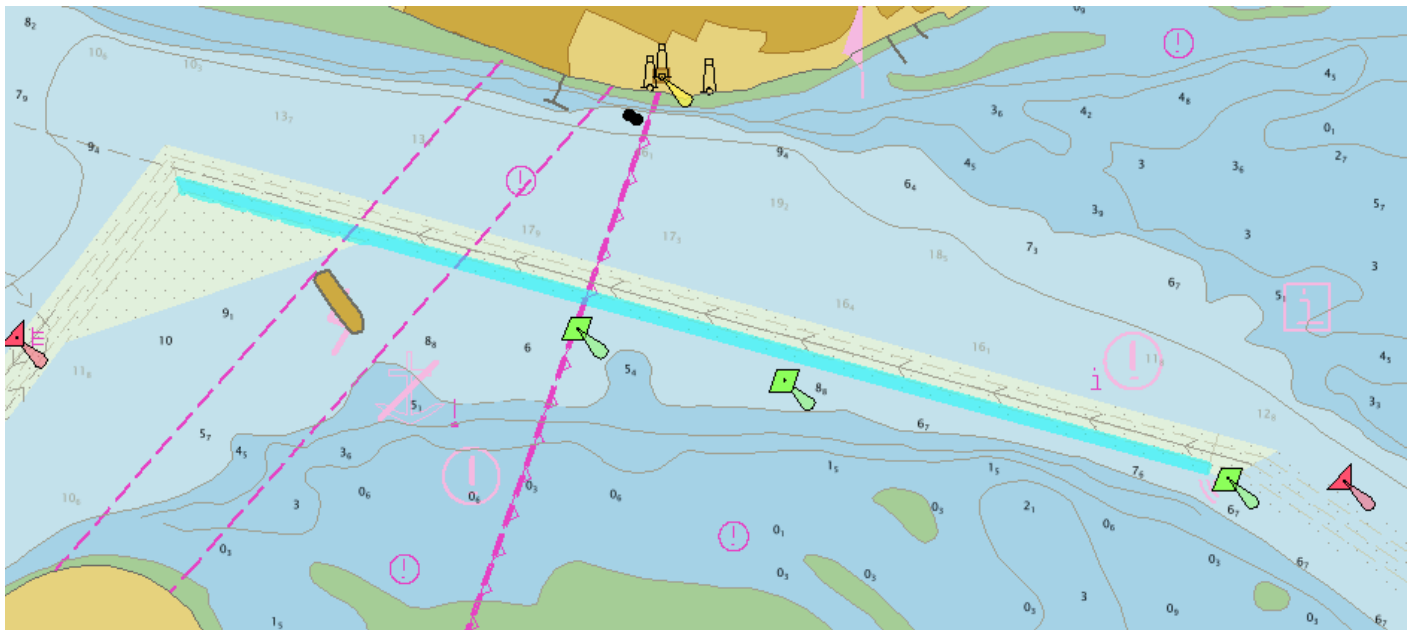


Figure 12: Left Outside Quarter Plantation Creek Range.

D.2 Additional Results

D.2.1 Aids to Navigation

All ATONs in the survey limits were investigated and found to be serving their intended purpose.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

No bottom samples were required for this survey.

D.2.4 Overhead Features

All overhead features were examined visually and determined to be accurate.

D.2.5 Submarine Features

One submerged cable area was investigated within the project area between St. Simons Island and Jekyll Island. No cables were found protruding above the sea floor.

D.2.6 Platforms

No platforms exist for this survey.

D.2.7 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.8 Abnormal Seafloor or Environmental Conditions

No abnormal seafloor or environmental conditions exist for this survey.

D.2.9 Construction and Dredging

The marina located at 31-09-59.672621N, 081-24-55.359930W in the Mackay River is currently under construction. Verbal correspondence with employees revealed a completion date of Summer 2020. The Golden Ray wreck at location 31-07-40.438052N, 081-24-13.065845W is scheduled to be cut into eight pieces and removed by barge by the end of 2020.

D.2.10 New Survey Recommendations

A new survey is recommended when the above mentioned construction and salvage projects are completed.

D.2.11 ENC Scale Recommendations

No new ENC scales are recommended for this area.

E. Approval Sheet

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

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

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

Approver Name	Approver Title	Approval Date	Signature
James Kirkpatrick	Chief of Party	06/10/2020	KIRKPATRICK.JAMES.LEROY.IV.1400487398 MES.LEROY.IV.1400487398 400487398 Digitally signed by KIRKPATRICK.JAMES.LEROY. IV.1400487398 Date: 2020.06.11 16:50:57 -04'00'

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continuously Operating Reference Station
CTD	Conductivity Temperature Depth
CEF	Chart Evaluation File
CSF	Composite Source File
CST	Chief Survey Technician
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Detached Position
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
ERS	Ellipsoidal Referenced Survey
ERTDM	Ellipsoidally Referenced Tidal Datum Model
ERZT	Ellipsoidally Referenced Zoned Tides
FFF	Final Feature File
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division

Acronym	Definition
HSSD	Hydrographic Survey Specifications and Deliverables
HSTB	Hydrographic Systems Technology Branch
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	Linear Nautical Miles
MBAB	Multibeam Echosounder Acoustic Backscatter
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NALL	Navigable Area Limit Line
NTM	Notice to Mariners
NMEA	National Marine Electronics Association
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRT	Navigation Response Team
NSD	Navigation Services Division
OCS	Office of Coast Survey
OMAO	Office of Marine and Aviation Operations (NOAA)
OPS	Operations Branch
MBES	Multibeam Echosounder
NWLON	National Water Level Observation Network
PDBS	Phase Differencing Bathymetric Sonar
PHB	Pacific Hydrographic Branch
POS/MV	Position and Orientation System for Marine Vessels
PPK	Post Processed Kinematic
PPP	Precise Point Positioning
PPS	Pulse per second

Acronym	Definition
PRF	Project Reference File
PS	Physical Scientist
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
RTX	Real Time Extended
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
SSSAB	Side Scan Sonar Acoustic Backscatter
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPU	Total Propagated Uncertainty
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDF	Zone Definition File