H12047

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic Survey

Field No. N/A

Registry No. H12047

LOCALITY

State Hawaii

General Locality North Pacific Ocean

Sublocality Approaches to Honolulu

2009

CHIEF OF PARTY
Paul Turner, PS, NOAA

LIBRARY & ARCHIVES

DATE

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

HYDROGRAPHIC TITLE SHEET

REGISTRY No

H12047

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: N/A

State **Hawaii**

General Locality **North Pacific Ocean**

Sub-Locality **Approaches to Honolulu**

Scale **1:2,500** Date of Survey **April 18 - May 3, 2009**

Instructions dated **3/17/2009** Project No. **S-T342-Ahi-09**

Vessel **R/V Ahi**

Chief of party **Paul Turner**

Surveyed by **Paul Turner, Kurt Brown, Joyce Miller**

Soundings by **Reson 8101**

SAR by **Joe Tegeder** Compilation by **Annie Raymond**

Soundings compiled in **Fathoms**

REMARKS: **All times are UTC. UTM Zone 4N**

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Revisions and end notes in red were generated during office processing. Page numbering may be interrupted or non sequential.

All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/.

Descriptive Report to Accompany Hydrographic Survey H12047

Project S-T342-Ahi-09
Approaches to Honolulu
Hawaii
April - May, 2009
NOAA Research Vessel AHI

Introduction

This project was conducted in collaboration with the National Ocean Service – Office of Coast Survey (OCS), National Marine Fisheries Service – Coral Reef Ecosystem Division (CRED), and the U.S. Army Corps of Engineers (USACE) in order to provide contemporary hydrographic data to update the nautical charts and products in Honolulu Harbor and approaches to Honolulu, Hawaii. All supporting data from this project was acquired aboard the NOAA R/V Ahi by OCS representatives utilizing a RESON 8101 swallow water multibeam sonar system. CRED representatives assisted with daily vessel operations and data collection as necessary and a copy of all standard raw and processed bathymetric data was provided to CRED and USACE. This project provided contemporary hydrographic data to update the nautical charts in the area and support sound navigational decision-making for all mariners entering the channels and ports of Honolulu, HI.

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions S-T342-Ahi-09 dated March 17, 2009 and all other applicable direction[1], with the exception of deviations noted in this report.

The survey was conducted in the approaches to Honolulu Harbor in an area approximately 4 nm wide along the coast of Honolulu, Hawaii. This survey corresponds to Sheet B in the sheet layout provided with the Letter Instructions, as shown in Figure 1 below.

Data acquisition was conducted from April 18 to May 3, 2009 (DN108 to DN122).

[1] NOS Hydrographic Surveys Specifications and Deliverables (April, 2008), OCS Field Procedures Manual for Hydrographic Surveying (May 2008), and all Hydrographic Surveys Technical Directives issued through the dates of data acquisition.

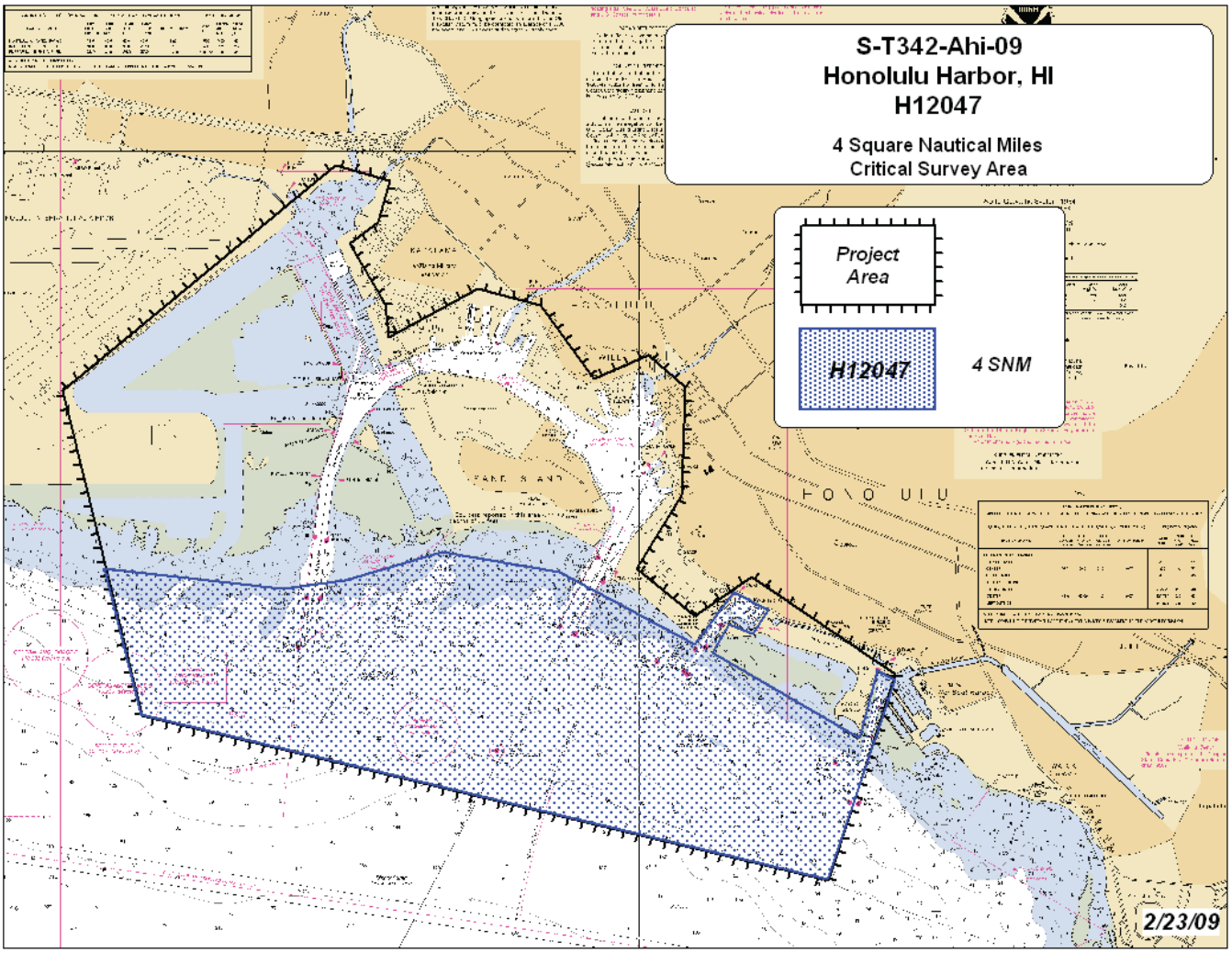


Figure 1: H12047 Survey Area

H11674 Statistics	
Linear Nautical Miles of Mainscheme Multibeam	337.08
Linear Nautical Miles of Cross-lines	9.63
Total Square Nautical Miles	3.3

Table 1: H12047 Statistics

Complete MBES coverage was obtained for roughly 75% of the survey area within the time allotted for S-T342-Ahi-09. A few small holidays exist in the main survey area where insufficient line spacing over irregular coral heads created coverage gaps. The multbeam data was examined and shows no evidence of significant features or DTONS in those areas.[1]

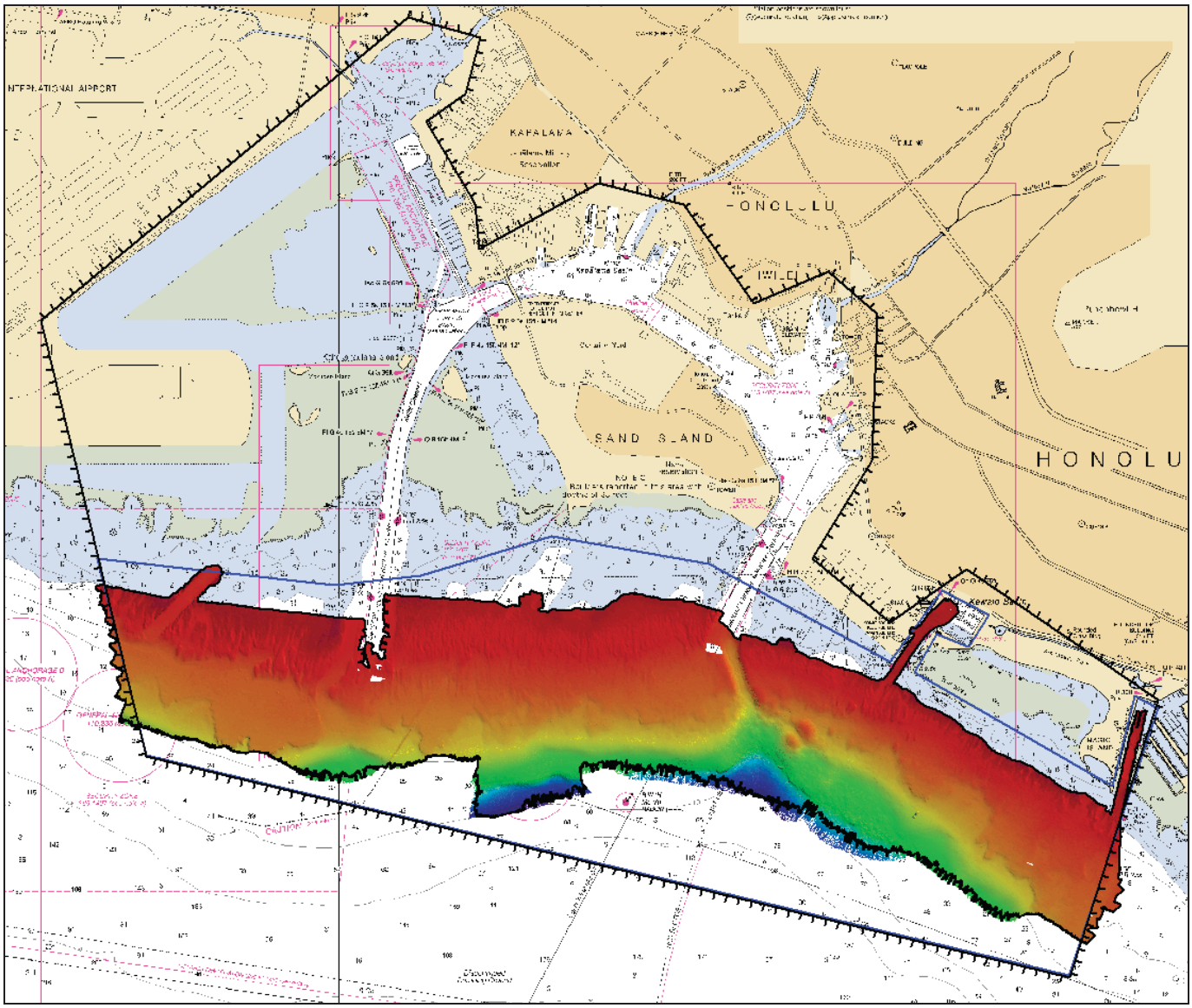


Figure 2: SWMB Coverage

B. DATA ACQUISTION AND PROCESSING

A complete description of data acquisition and processing systems, the R/V AHI, quality control procedures and data processing methods are described in the *S-T342-Ahi-09 Data Acquisition and Processing Report (DAPR)*, submitted under separate cover. Items specific to this survey and any deviations from the aforementioned report are discussed in the following sections.

A 0.8m Z-Value offset was applied to the CARIS .hvf file to correct for an ISS 2000 0.8m Settlement and Squat value. The value was included in the software upgrade that was installed just prior to the beginning of this survey.

Final approved water levels were applied to this survey on June 15, 2009. See Section C for additional information.

B1. Equipment

R/V AHI was the only vessel used during survey H12047. Specifications for the AHI are listed in Table 2.

R/V AHI	
Hull Registration Number	F-2505
Builder	Safe Boat International
Length Overall	25 feet
Beam	10 feet
Draft, Maximum	3.3 ft
Cruising Speed	15 knots
Max Survey Speed	6 knots
Primary Echosounder	RESON 8101
Sound Velocity Equipment	SBE 19
Attitude & Positioning Equipment	POS/MV V4
Type of operations	MBES

Table 2: AHI Specifications

No vessel configurations used during data acquisition deviated from the DAPR.

B2. Quality Control

Data quality for survey H12047 was evaluated through examination of CUBE surfaces that were generated from raw soundings. Internal consistency and integrity of the data were manually examined by the Hydrographer in CARIS subset mode. Soundings and surfaces in overlapping coverage and outer beams were reviewed for systematic errors and excessive noise. The data were found consistent in comparisons between day-day, and line-line coverage.[2]

Data Logging

At the location of the Survey in Honolulu, midnight UTC occurred at 2:00 PM local time. DNs on acquisition logs and in CARIS are named according to the DN occurring after midnight UTC. For example, if data was logged beginning on DN113, starting at 10am local time, and continued past 2:00 pm local into DN114, data for that day was later separated into DN_113 and DN_114 respectively.

Due to the way data was logged in the ISS-2000 system, separate commands were required to stop data logging and change line names. The command to change lines names was missed on several lines so that what should have been two separate lines appear as a single line in CARIS. These single lines do not contain data in the section connecting the line segments as logging had stopped in between lines.[3] An example of a line collected without changing line names is show in Figure 3.

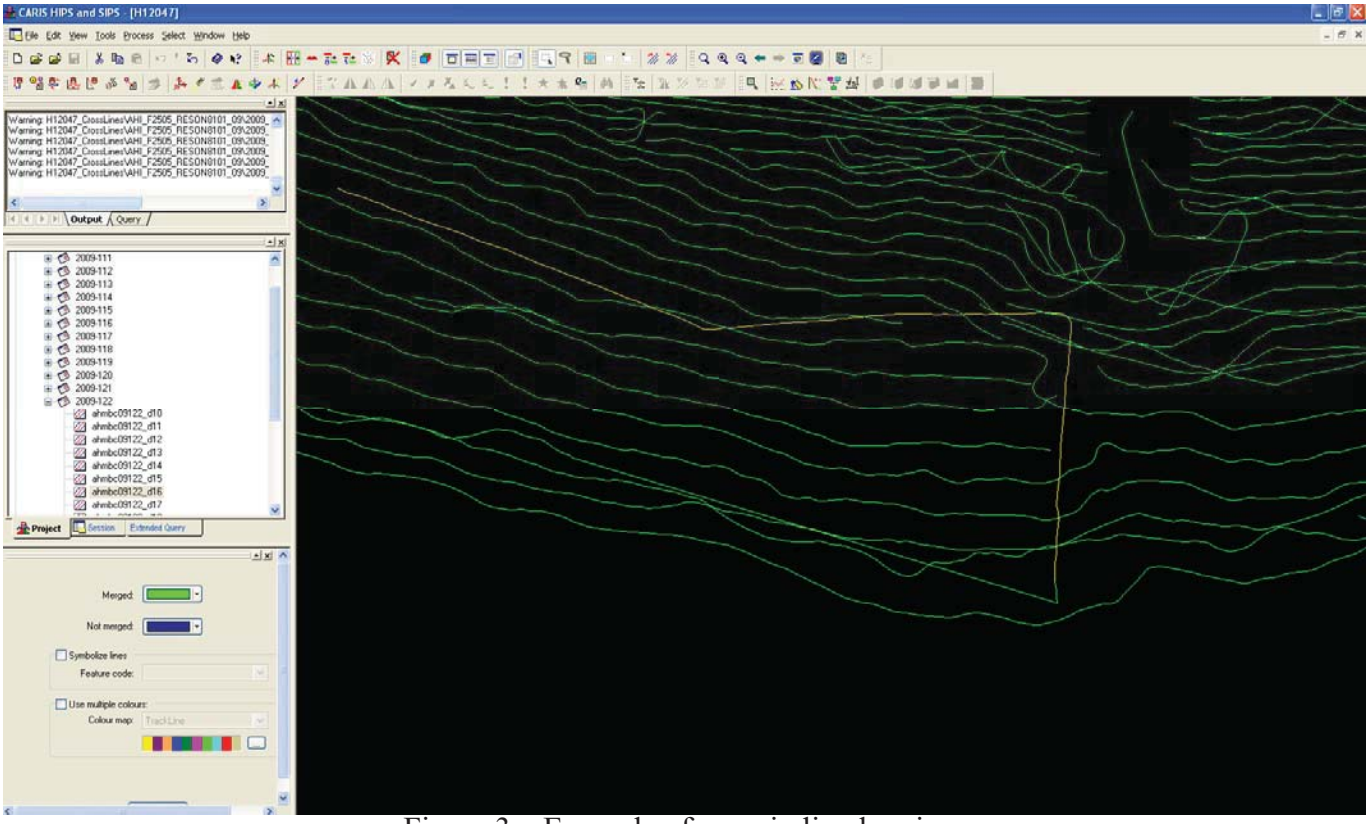


Figure 3 – Example of error in line logging.

Crosslines

Multibeam crosslines totaled 9.63 linear nautical miles (lnm), comprising 2.85% of the 337.08 lnm of total MBES hydrography. The main scheme bathymetry was manually compared to the XL nadir beams in CARIS subset mode and agreed well with differences of 0.3 meters or less.[4] Greater variability was observed in the crossline comparison in the deeper areas where the sea floor dramatically drops off, most likely related to the sloping topography of the area. [5]

The 2.85% of lnm of cross-lines for multibeam surveys does not meet the 5% stated in the *NOS Hydrographic Surveys Specifications and Deliverables Manual (HSSDM)*, however, cross-lines were ran over the entire main scheme data set at ~ 45 degrees and the two data-sets show a strong agreement.[6]

Junctions

No contemporary surveys junction with H12047.[7]

Coverage Assessment

Coverage assessment was determined by using one Field Sheet, H12047_Cube with multiple resolution surfaces in CARIS: H12047_0-23_1M; H12047_20-52_2M; and H12047_46-52_4M. These surfaces were combined into the final deliverable surface, H12047_Combined_Final.[8]

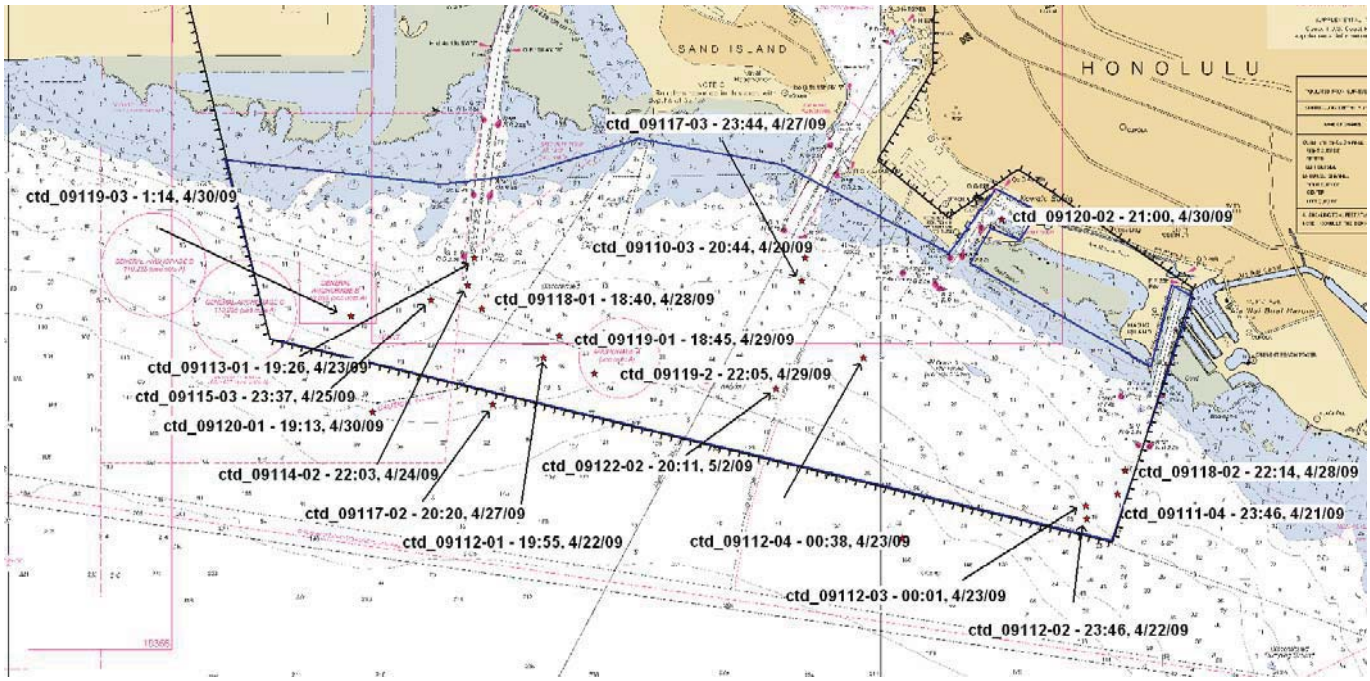
Several small holidays exist throughout the surface, mainly occurring in the outer beam areas between lines. All holidays were examined in CARIS using Subset Editor and Side Scan Editor for small features, no features or contacts were identified in the Side Scan Editor and the holidays were deemed insignificant.[9]

Trueheave

True heave was collected for all data during survey operations for S-T342-Ahi-09. However, due to a bug in the CARIS software related to logging trueheave past the UTC time change,(which occurred at 2:00 pm local Honolulu time), the trueheave file(s) do not correctly apply to all of the data.[10]

Sound Velocity

All sound velocity data were applied during data collection as described in the S-T342-Ahi-09 Data Acquisition and Processing Report. Sound velocity was not applied in CARIS and no CARIS .svp files exist for the survey. Sound velocity data remains in converted file (.cnv) format. The ISS-2000 software did not allow the extension of the sound velocity data based on the slope of the curve. As a result, CTDs were only taken in the deeper regions of the survey area where depths were deeper than the expected survey depth. The figure below displays the names, positions, and times for each CTD cast applied to H12047:



Raw Seacat (.hex) files and the .cnv files are located in Separates II - *Sound Speed Data* of this report.

Accuracy Standards

Uncertainty values in the CUBE surface were generally close to 0.2 meters. Uncertainty values exceeding 0.3 meters exist in isolated spots throughout the finalized CUBE surface and are the result of high standard deviation from steeply sloped bottom features such as the side of dredged areas or coral heads. Data from survey H12047 meet data accuracy specifications as stated in the *HSSDM*.[11]

B3. Corrections to Echo Soundings

Data reduction procedures for survey H12047 conform to those detailed in the DAPR.

B4. Data Processing

Data processing procedures for survey H12047 conform to those detailed in the DAPR.

A single fieldsheet was created to encompass survey H12047 and contains a single combined four meter CUBE surface, H12046_Cube_Combined and one finalized surface, H12047_Combined_Final. The fieldsheet area of coverage is shown in Figure 4.

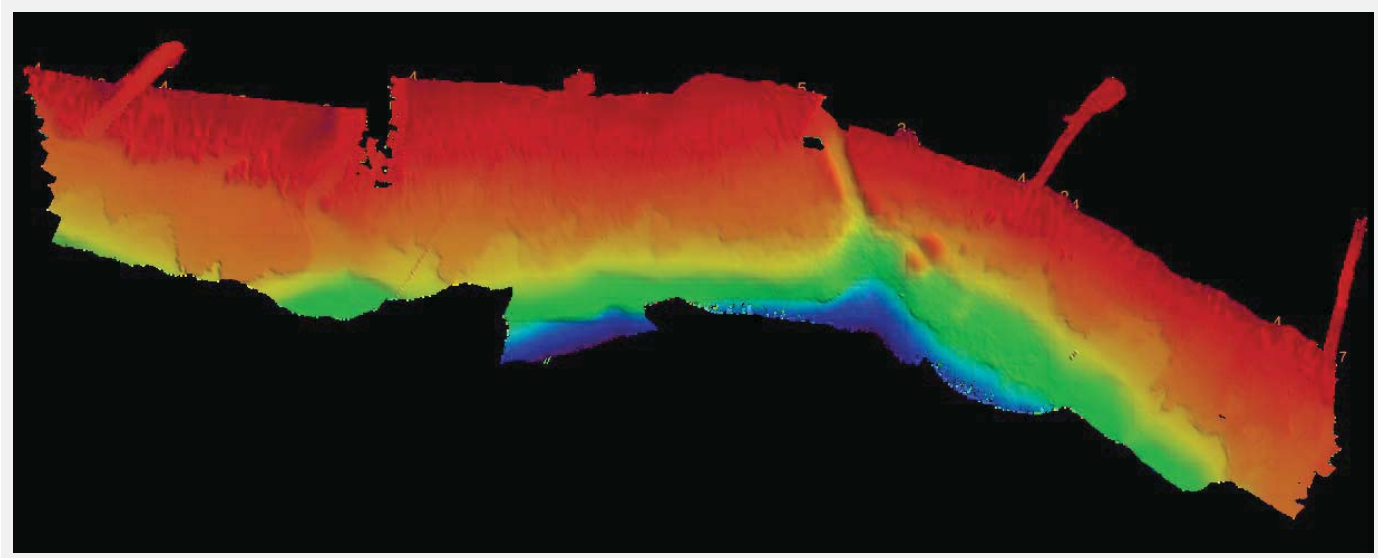


Figure 4 - Fieldsheet H12047

Designated Soundings

Soundings were designated on many of the coral heads, shoaling areas, and obstructions/wrecks in the survey area but not all. The most significant features in a particular area were selected for designated soundings reflecting their shoal point. Many other areas with less shoal depths were examined in the multibeam data but no soundings where designated on their shoal point. In these cases the least depth on the feature was adequately represented in the BASE surface or, if not, the least depth was not deemed significant in relation to nearby features whose shoal depths were designated. All designated soundings where selected based on a detailed examination of the multibeam data in subset mode. In general, noisy outer beam data was not selected as a designated sounding.[12]

C. HORIZONTAL AND VERTICAL CONTROL

Horizontal control work was not done during Survey H12047 and a Horizontal and Vertical Control report was not written for this survey.

Horizontal Control

The horizontal datum for this project is the World Geodetic System of 1984 (WGS84), Zone 4.

Horizontal position was determined using a Global Positioning System (GPS) corrected by U.S. Coast Guard differential GPS (DGPS) beacon stations. Beacons were selected by automatic range in the CSI Wireless, MBX-3S DGPS system.

No horizontal control stations were established for this survey and horizontal dilution of precision (HDOP) was monitored daily. The observed HDOP values did not exceed 4.0.

Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The primary tide station at Honolulu, HI (161-2340) served as control for datum determination and as the primary source for water level correctors for survey H12047 during acquisition.

A request for delivery of final approved water level data (smooth tides) for survey H12047 was forwarded via email to N/OPS1 on May 21, 2009. A copy of the request is included in Appendix III.

The Tide Note for Hydrographic Survey H12047 was received on June 12, 2009. The Tide Note for Hydrographic Survey H12047 states that preliminary zoning is accepted as the final zoning correctors. Final approved water levels consist of verified water level data downloaded from the CO-OPS website for station Honolulu in file 1612340.tid, and the tide zoning information in file T342AHI2009CORP.zdf. The Tide Note for Hydrographic Survey H12047 and ancillary correspondence are included in Appendix III.[13]

It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels to the survey data during the survey acceptance review.

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

Survey H12047 was compared with charts 19367 (39th Ed.; April, 2008, 1:5,000), 19369 (6th Ed.; October, 2006, 1:20,000), and 19357 (24th Ed.; June, 2008, 1:80,000).

Chart 19367

Depths from survey H12047 generally agreed within one to three feet with depths on chart 19367 and the ATON positioning, shoreline, and channel limits are all in agreement with the data from survey H12047.[14]

Chart 19369

Depths from survey H12047 generally agreed within one to three feet with depths on chart 19369 with specific exceptions described below. [15]

A non-dangerous, uncharted wreck was located in the western portion of the survey area in roughly 60 ft. of water. The shoalest sounding was designated in CARIS Subset Editor with a least depth of 54.51 ft, 9.08 fm in position: 21-17-22.3N / 157-54-24.8W. The wreck is approximately 17m. long / 4m wide and appears to be a sunken barge.[16] See Figure 5 below.

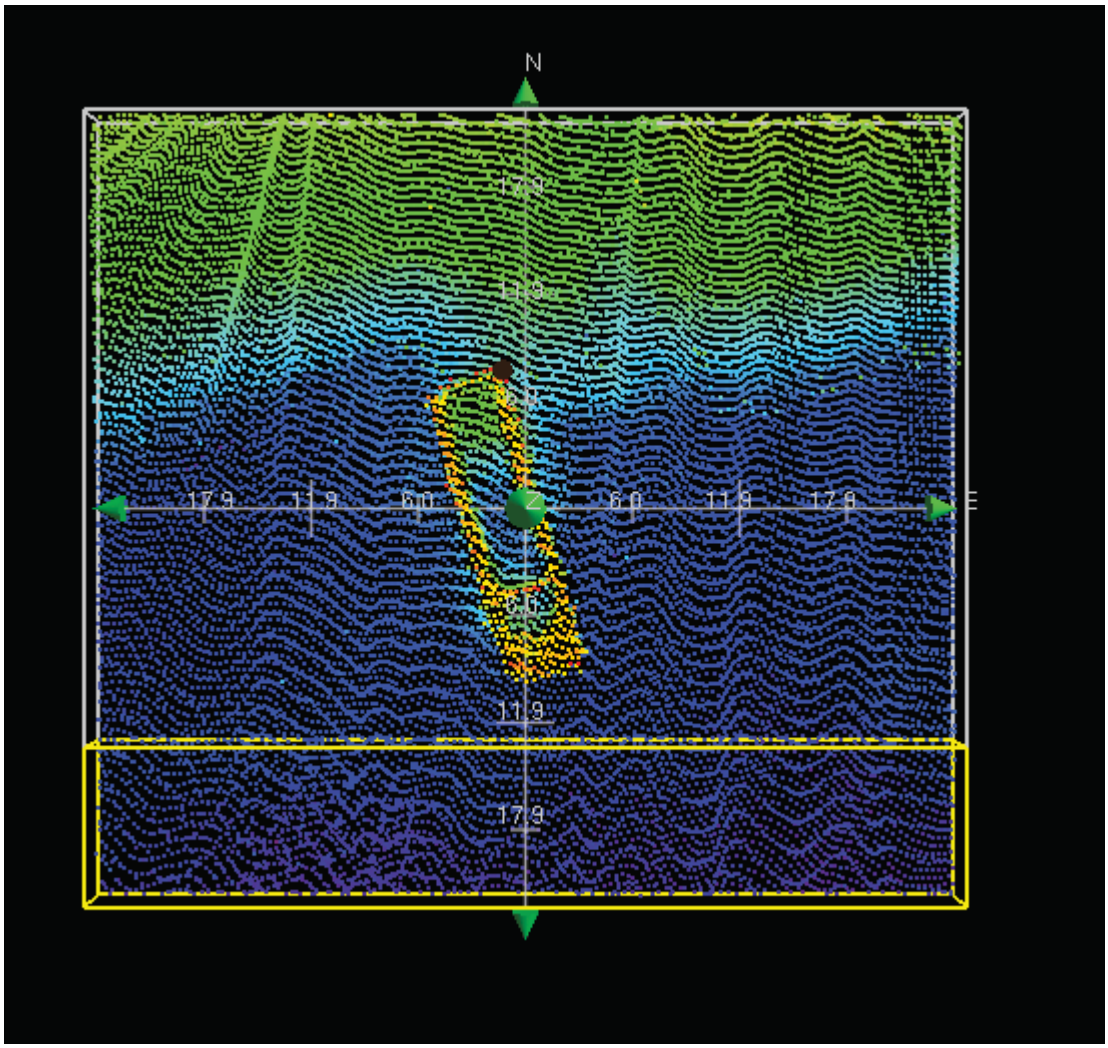
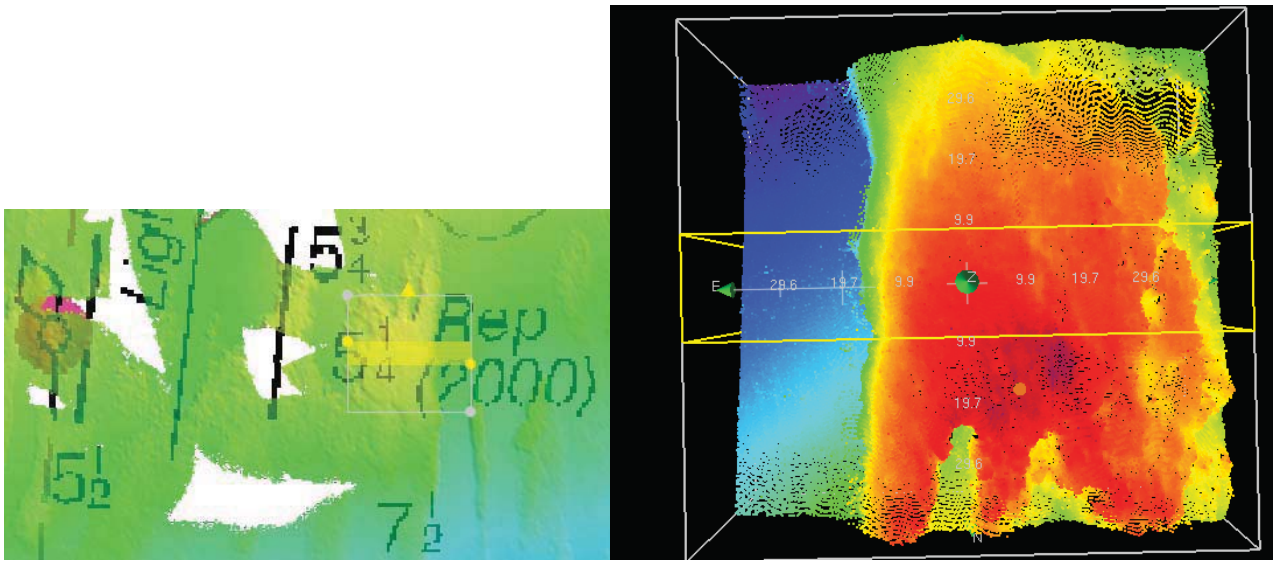


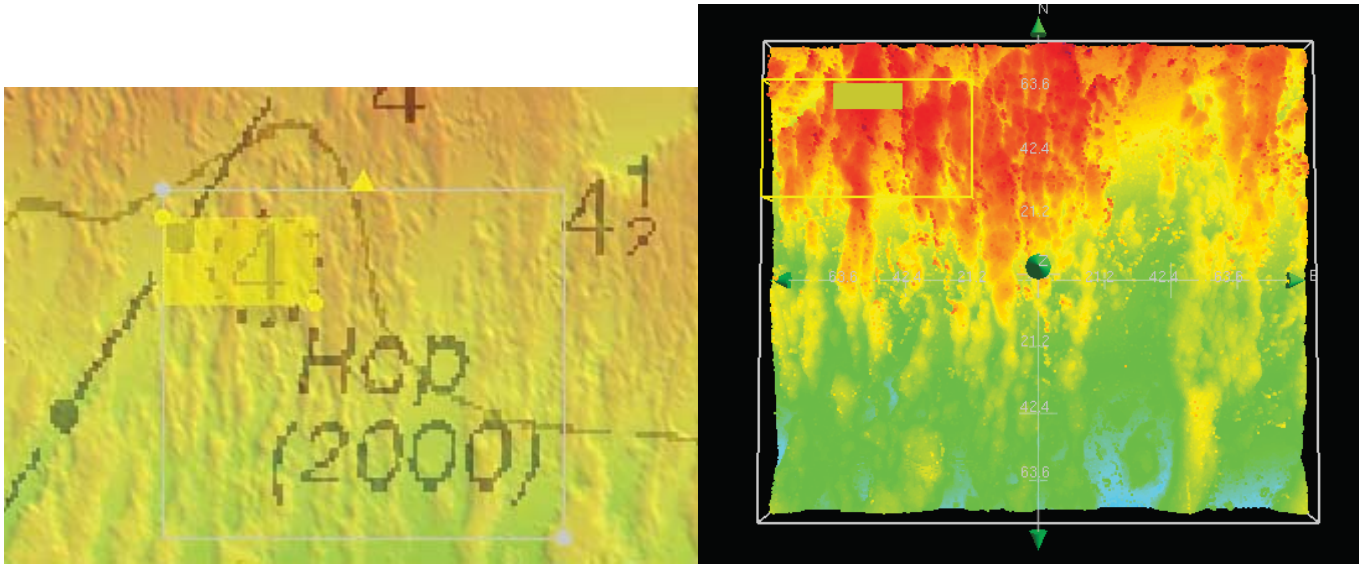
Figure 5

The REP (2000) 5 1/4 obstruction was examined in CARIS Subset Editor and the shoal sounding with a least depth of 31.37ft, 5.22 fm was designated in position: 21-17-23.12N / 157-53-47.39W. The hydrographer recommends deleting the text "REP (2000)" and the retaining the sounding.[17] See figures 6 & 7 below.



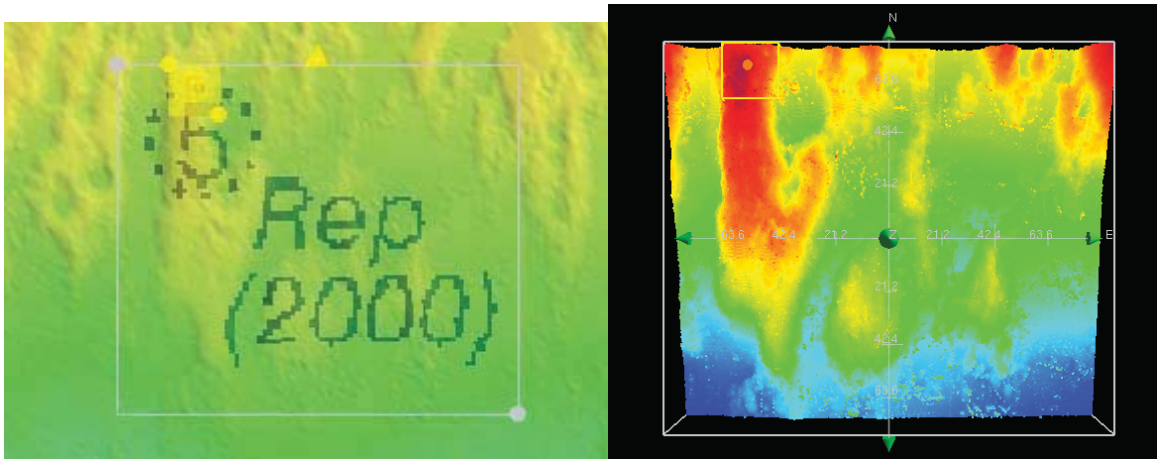
Figures 6 & 7

The REP (2000) 4 obstruction was examined in CARIS Subset Editor and the shoal sounding with a least depth of 24.65ft, 4.11 fm was designated in position: 21-17-33.46N / 157-53-22.71W. The hydrographer recommends deleting the text "REP (2000)" and the retaining the sounding. [18] See figures 8 & 9 below.



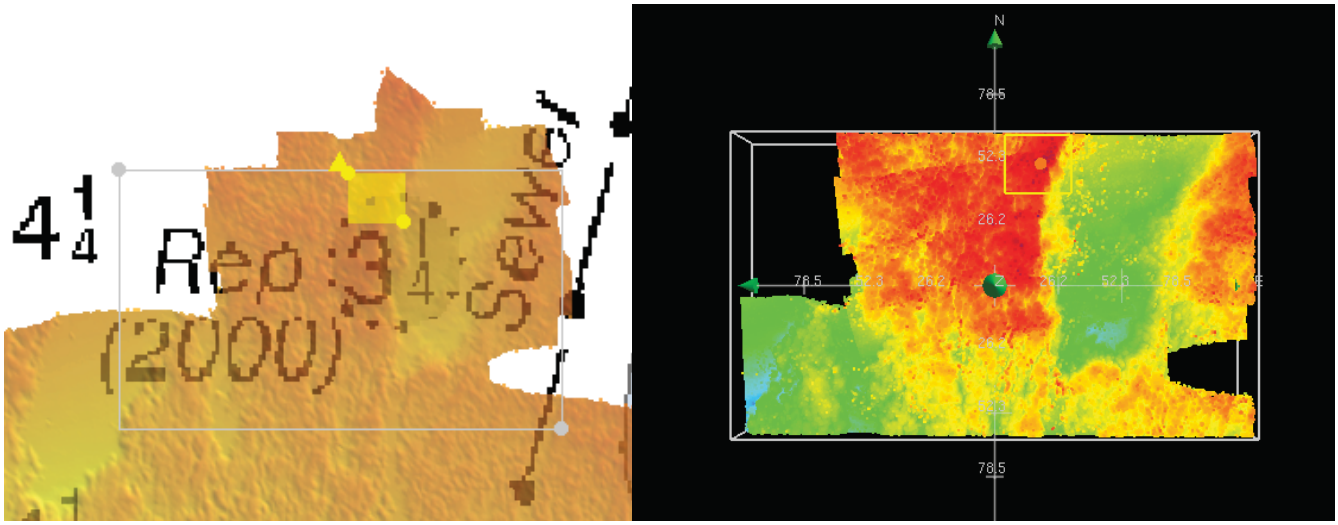
Figures 8 & 9

The REP (2000) 5 obstruction was examined in CARIS Subset Editor and the shoal sounding with a least depth of 29.56ft, 4.92 fm was designated in position: 21-17-28.75N / 157-53-22.72W. The hydrographer recommends deleting the text "REP (2000)" and the 5 fathom sounding and updating the chart with the designated sounding and position.[19] See figures 10 & 11 below.



Figures 10 & 11

The REP (2000) 3 obstruction was examined in CARIS Subset Editor and the shoal sounding with a least depth of 19.92ft, 3.32 fm was designated in position: 21-17-38.87N / 157-53-11.74 W.The hydrographer recommends deleting the text "REP (2000)" and the retaining the sounding. [20] See figures 12 & 13 below.



Figures 12 & 13

A non-dangerous, uncharted wreck was located during post processing in approximately 175ft of water. The shoalest sounding was designated in CARIS Subset Editor with a least depth of 151.90 ft, 25.31 fm in position: 21-16-58.8N / 157-52-08.45W. The wreck is approximately 25m. long / 8m wide. [21] See Figure 14 below.

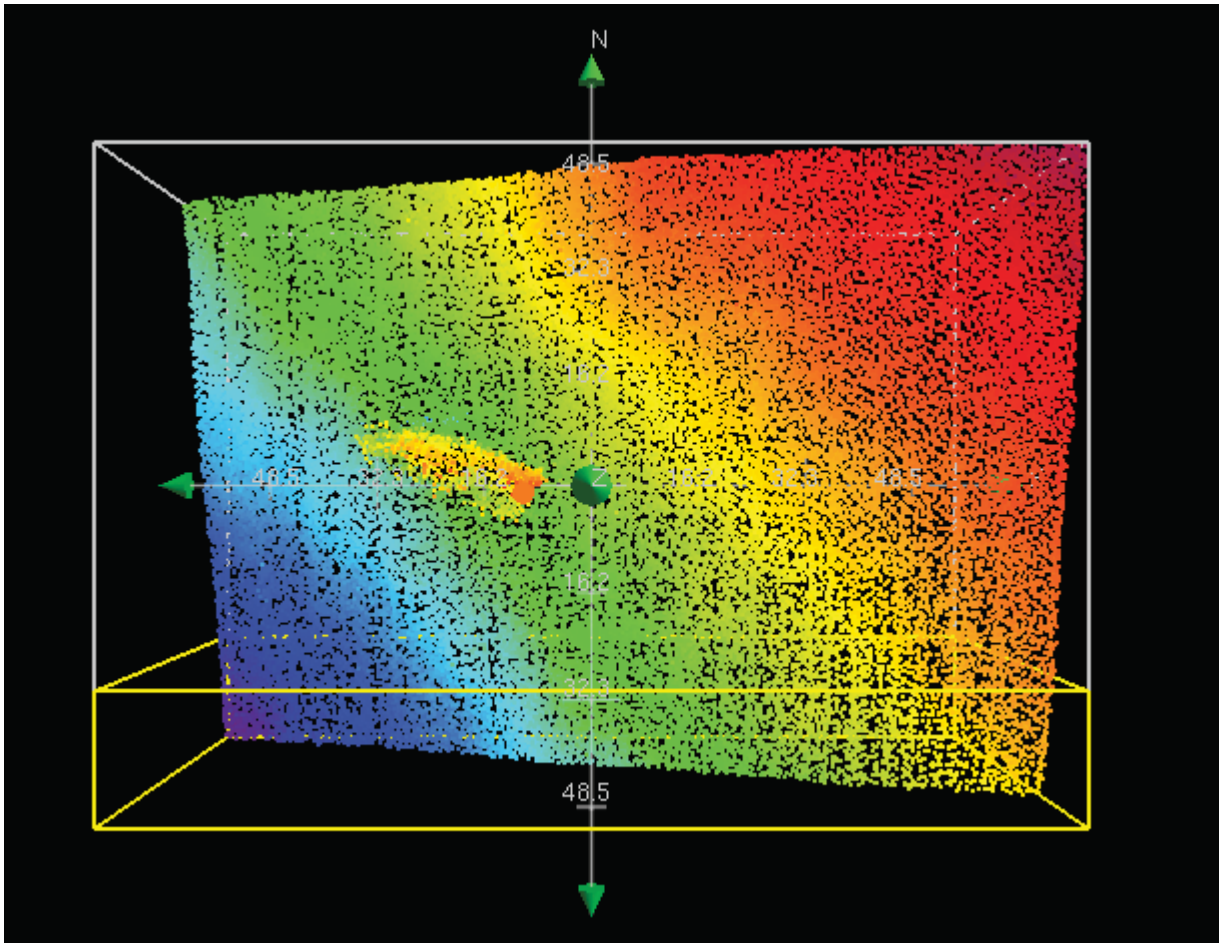


Figure 14

A large non-dangerous, uncharted wreck was located off shore in roughly 110 ft of water between Kewalo Basin and Magic Island. The shoalest sounding was designated in CARIS Subset Editor with a least depth of 74.01 ft, 12.33 fm in position: 21-16-48.23N / 157-51-34.62W. The wreck is approximately 65m. long / 12m wide and frequented daily by local snorkel and dive companies.[22] See Figure 15 below.

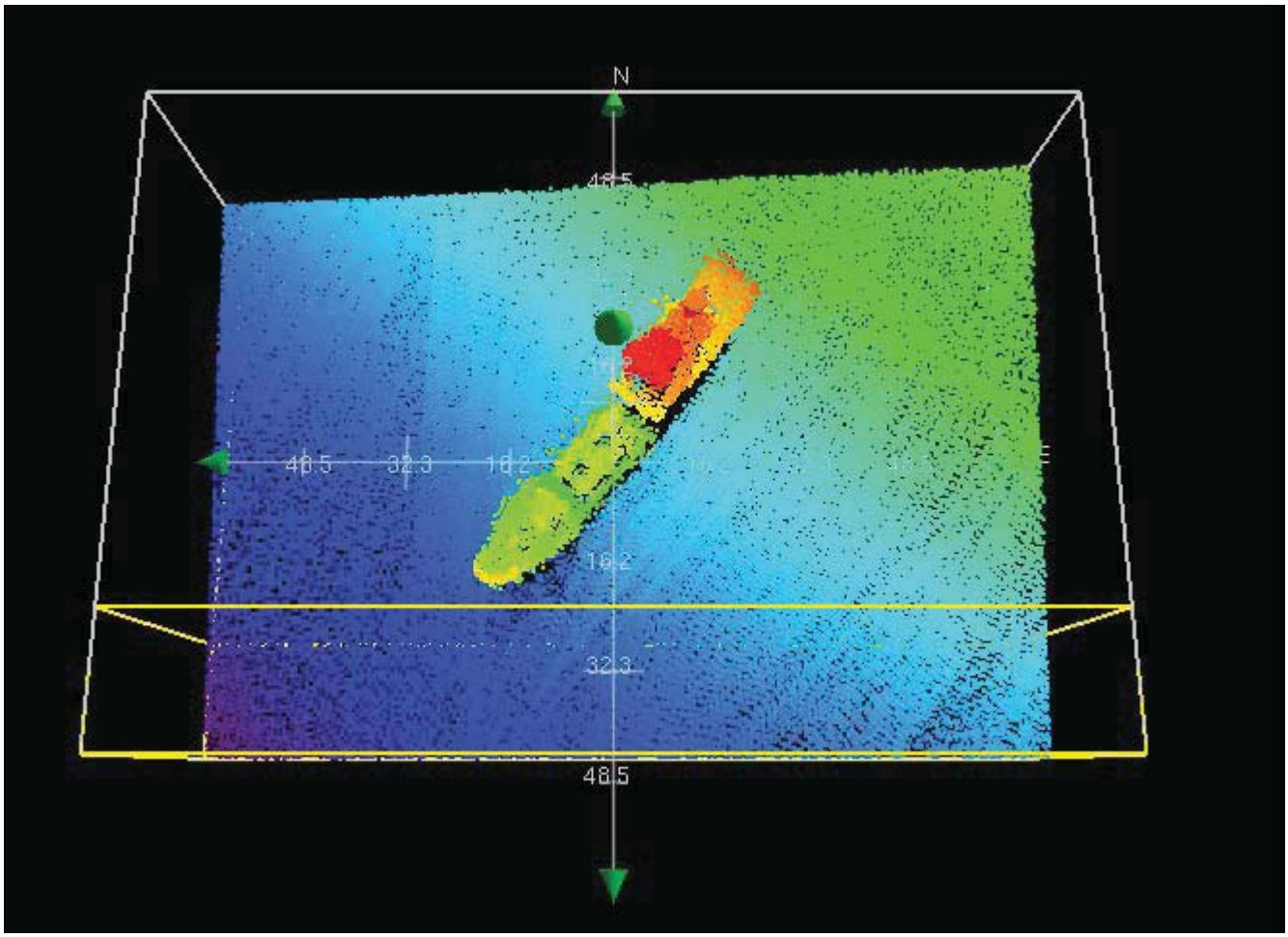
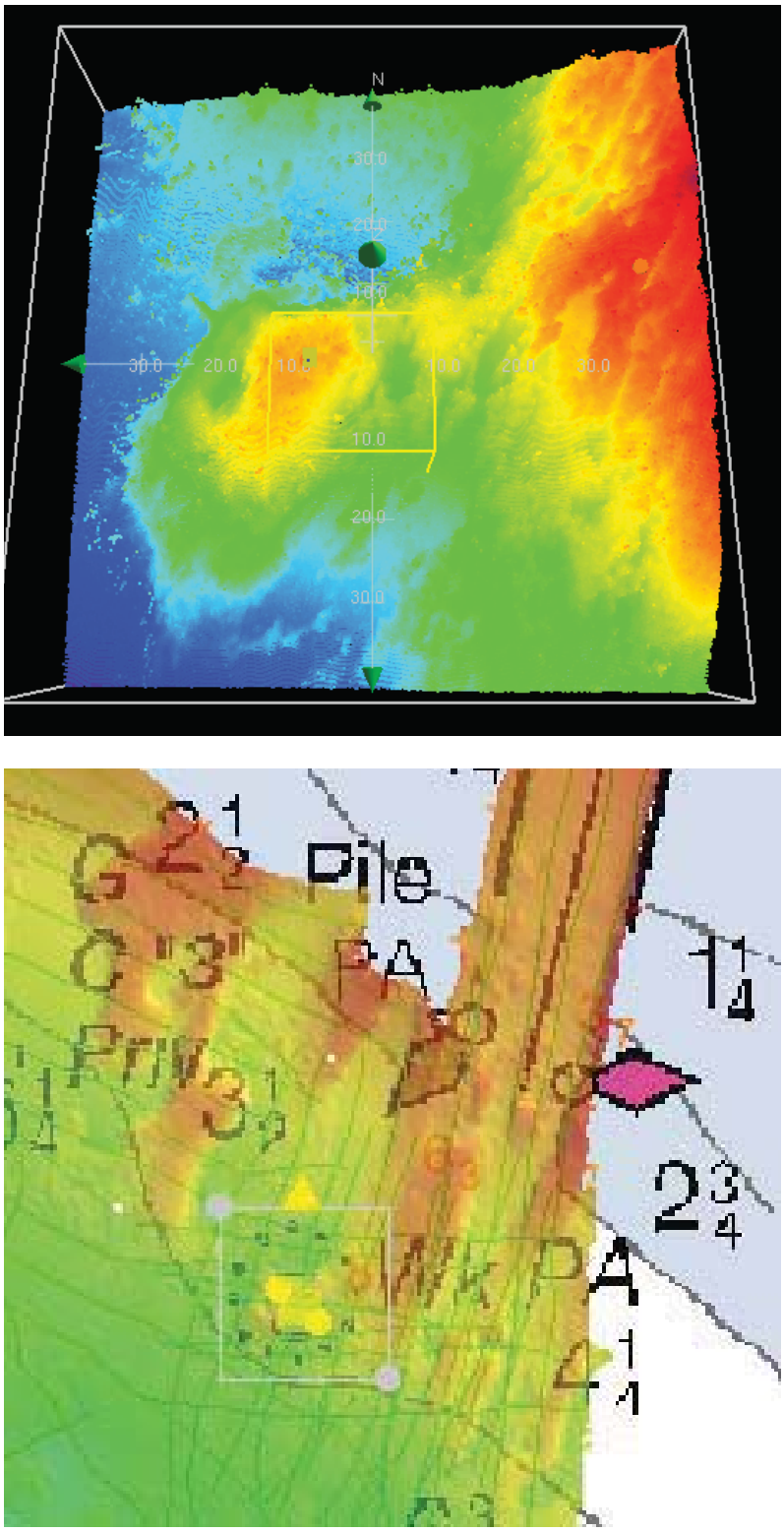


Figure 15

The REP (2000) 2 1/4 obstruction was examined in CARIS Subset Editor and the shoal sounding with a least depth of 14.167ft, 2.36 fm was designated in position: 21-17-28.9N / 157-52-7.43W. The hydrographer recommends deleting the text "REP (2000)" and retaining the sounding. [23]

The charted wreck in position 21-16-43.7N / 157-50-48.51W located in front of the entrance channel to the Ala Wai Boat Harbor was examined in CARIS Subset Editor and no debris or wreckage was visible, the hydrographer recommends deleting the "*Wk PA*" text.[24] See Figures 16 & 17 below.



Figures 16 & 17

Chart 19357

Chart 19357 is a 1:80,000 scale chart and contains minimal sounding data in the survey area. Due to the scale of the chart, a sounding comparison was not possible. The ATON positioning, shoreline, and channel limits are all in agreement with the data from survey H12047.[25]

Refer to Appendix I. *AWOIS & Survey Features Report* for a Pydro generated report detailing the findings and recommendations for two non-dangerous, submerged, uncharted wrecks and one non-dangerous, uncharted obstruction.[26]

Chart Comparison Recommendations

The Hydrographer has determined that bottom coverage requirements have been met for the portion of the assigned survey area completed for this project and data accuracy meets requirements specified by the *HSSDM*. Due to time constants, complete MBES coverage was only obtained for 75% of the assigned survey area and several small holidays exist in the survey area as a result of insufficient line spacing over irregular coral heads.**The surveyed soundings are adequate to supersede prior surveys in their common areas.**[27] Based on the application of verified water level data, final chart comparisons are not required by the Pacific Hydrographic Branch.

Automated Wreck and Obstruction Information System (AWOIS) Investigations

Eight AWOIS items were assigned to S-T342-Ahi-09, sheet H12047 for full investigation. Refer to Appendix I. *AWOIS & Survey Features Report* for details.[28]

Dangers to Navigation

No DTONs where reported for H12047. [29]

D.2 Additional Results

Prior Survey Comparison

Survey H12047 was compared to the 2000 – 2002 U.S. Naval Hydrographic Office Lidar and Multibeam surveys W00102, W00101, W00100, and W00112. Sounding data from these W-Surveys over lay the entire surveyed area for H12047. Depths from survey H12047 are in general agreement with these prior surveys within 1-3 feet and general trends in the bathymetry from the W-Surveys were in agreement with H12047.[30]

Shoreline Verification and Processing

Shoreline verification was not required or performed for survey H12047.[31]

Aids to Navigation

All aids to Navigation were positioned accurately and found to serve their intended purpose. [32]

Bottom Samples

Bottom samples were not required for survey H12047. [33]

Submarine Cables and Pipelines

No charted submerged cable or pipeline areas within the survey limits. [34]

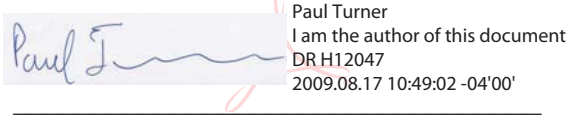
E. APPROVAL

As team leader, field operations for hydrographic survey H12047 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (April 2008 edition), Field Procedures Manual (May 2008 edition), and all HSD Technical Directives issued through May 2009. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required . All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

Listed below are supplemental reports submitted separately that contain additional information relevant to this survey:

Title	**Date Sent**	**Office**
AHI_HSRR_Memorandum	April 25, 2009	N/CS34
S-T342-Ahi-09 Data Acquisition and Processing Report	May 6, 2009	N/CS34

Approved and Forwarded:



Paul Turner, Physical Scientist, NOAA

In addition, the following individuals were also responsible for overseeing data acquisition and processing of this survey:

Kurt Brown
Physical Scientist, NOAA

Revisions Compiled During Office Processing and Certification

[1] Concur. Data is adequate to supersede charting in the common area.
[2] Concur.
[3] Concur.
[4] Concur.
[5] Concur. Higher uncertainties are expected in these cases and have been determined to be acceptable.
[6] Concur. Data is adequate to supersede charting in the common area despite not meeting the crossline requirement.
[7] Do not concur. H12047 junctions with survey H12046 from the same project. The surveys are in agreement along their common borders and a junction has been made.
[8] Office generated surface H12047_Office_Combined_4M was used for compilation.
[9] Concur. Data is adequate to supersede charting in the common area.
[10] Concur. Data is adequate to supersede charting in the common area despite not having trueheave applied.
[11] Concur.
[12] Concur. Not all designated soundings were selected for charting due to scale.
[13] See attached Tide Note.
[14] Concur.
[15] Concur with hydrographer recommendations unless otherwise noted. Chart items per HCell
[16] Concur, chart per HCell. Recommend adding to AWOIS database.
[17] Do not Concur. A slightly shoaler sounding of 5.167fm was selected from junctioning survey H12046 and was included in the H12046 HCell.
[18] Concur, chart new sounding per HCell.
[19] Concur, chart new sounding per HCell.
[20] Concur, chart new sounding per HCell.
[21] Concur, chart per HCell. Recommend adding to AWOIS database.
[22] Concur, chart per HCell. Recommend adding to AWOIS database.
[23] Concur, chart new sounding per HCell.
[24] Concur.
[25] Concur.
[26] See attached AWOIS and Features Report. Recommend adding new features to AWOIS database.
[27] Concur.
[28] See attached AWOIS Report. All AWOIS items are addressed in the HCell
[29] Concur.
[30] Prior surveys were not reviewed by PHB since there is 100% Multibeam coverage.
[31]Concur.
[32] Concur, use latest ATONIS information
[33] Concur. Retain, remove or redistribute charted bottom samples as depicted in the HCell.
[34] Do not concur; several charted pipelines exist in the survey area. Recommend retaining as charted with the exception of the pipelines near 21-17-12.065N, 157-51-54.905W. Only one pipeline is visible at this location and extends approximately 35m from charted on 19367. Recommend charting per HCell.

S-T342-Ahi-09 New Features and AWOIS Report

Registry Number: H12047

State: Hawaii

Locality: North Pacific Ocean

Sub-locality: Honolulu, HI

Project Number: S-T342-Ahi-09

Survey Dates: 04/26/2009 - 04/30/2009

Feature and AWOIS report for H12047 from S-T342-Ahi-09 for three items: two non-dangerous wrecks; one non-dangerous obstruction and eight AWOIS items.

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
19367	39th	04/01/2008	1:5,000 (19367_1)	USCG LNM: 05/13/2008 (01/20/2009) NGA NTM: 12/13/2003 (01/31/2009)
19369	6th	10/01/2006	1:20,000 (19369_1)	USCG LNM: 04/29/2008 (09/16/2008) NGA NTM: 12/13/2003 (09/20/2008)
19357	24th	06/01/2008	1:80,000 (19357_1)	USCG LNM: 12/16/2008 (01/20/2009) NGA NTM: 07/05/2008 (01/31/2009)
19340	27th	03/01/2008	1:250,000 (19340_1)	[L]NTM: ?
19004	38th	05/01/2006	1:600,000 (19004_1)	[L]NTM: ?
19010	19th	10/01/2006	1:675,000 (19010_1)	[L]NTM: ?
19013	18th	11/01/2006	1:675,000 (19013_1)	[L]NTM: ?
19007	18th	12/01/2006	1:1,650,000 (19007_1)	[L]NTM: ?
540	19th	04/01/2008	1:3,121,170 (540_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Obstruction	15.23 m	21° 17' 16.5" N	157° 54' 15.2" W	---
1.2	Wreck	16.62 m	21° 17' 22.4" N	157° 54' 24.8" W	---
1.3	Wreck	22.56 m	21° 16' 48.2" N	157° 51' 34.6" W	---

Generated by Pydro v9.6 (r2698) on Wed Jul 08 15:34:23 2009 [UTC]

2.1	AWOIS	[no data]	[no data]	[no data]	---
2.2	AWOIS	[no data]	[no data]	[no data]	---
2.3	AWOIS	[no data]	[no data]	[no data]	---
2.4	AWOIS	[no data]	[no data]	[no data]	---
2.5	AWOIS	[no data]	[no data]	[no data]	---
2.6	AWOIS	[no data]	[no data]	[no data]	---
2.7	AWOIS	[no data]	[no data]	[no data]	---
2.8	AWOIS	[no data]	[no data]	[no data]	---

1 - New Features

1.1) Profile/Beam - 4886/77 from h12047 / ahi_f2505_reson8101_09 / 2009-116 / ahmbc09116_d01

Survey Summary

Survey Position: 21° 17' 16.5" N, 157° 54' 15.2" W

Least Depth: 15.23 m (= 49.97 ft = 8.328 fm = 8 fm 1.97 ft)

TPU (±1.96σ): **THU (TPEh)** ±3.921 m ; **TVU (TPEv)** ±0.227 m

Timestamp: 2009-116.00:08:12.266 (04/26/2009)

Survey Line: h12047 / ahi_f2505_reson8101_09 / 2009-116 / ahmbc09116_d01

Profile/Beam: 4886/77

Charts Affected: 19367_1, 19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1, 50_1

Remarks:

Small obstruction located during post processing in CARIS Subset Editor, Least depth of 49.96 ft.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12047/ahi_f2505_reson8101_09/2009-116/ahmbc09116_d01	4886/77	0.00	000.0	Primary

Hydrographer Recommendations

Hydrographer recommends charting an obstruction at: 21-17-16.53 / 157-54-15.49.

Cartographically-Rounded Depth (Affected Charts):

50ft (19367_1)

8 ¼fm (19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1)

15.2m (50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: VALSOU - 15.230 m

WATLEV - 3:always under water/submerged

Feature Images

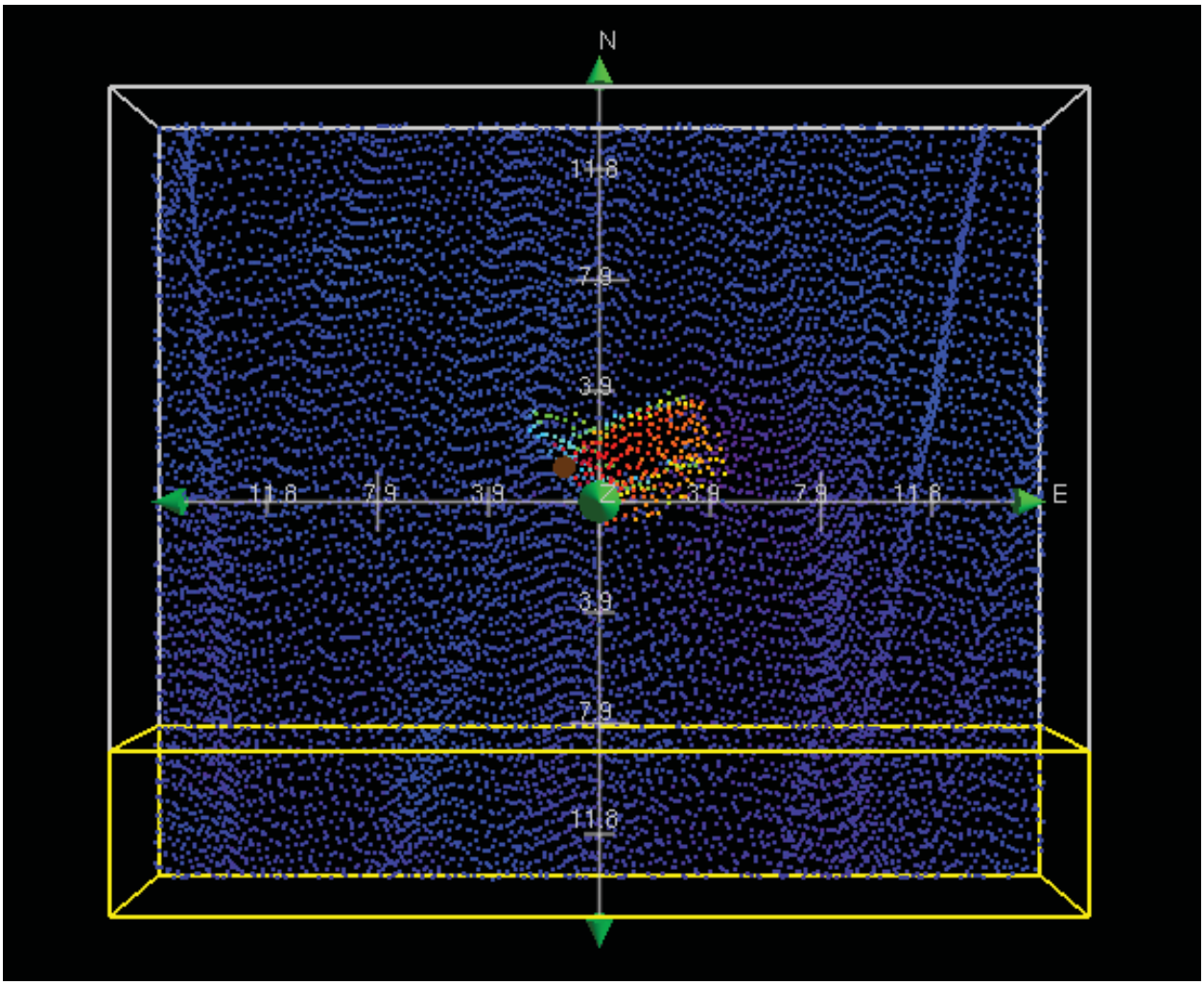


Figure 1.1.1

1.2) Profile/Beam - 2209/81 from h12047 / ahi_f2505_reson8101_09 / 2009-116 / ahmbc09116_d02

Survey Summary

Survey Position: 21° 17' 22.4" N, 157° 54' 24.8" W

Least Depth: 16.62 m (= 54.51 ft = 9.086 fm = 9 fm 0.51 ft)

TPU (±1.96σ): **THU (TPEh)** ±3.922 m ; **TVU (TPEv)** ±0.228 m

Timestamp: 2009-116.00:16:08.255 (04/26/2009)

Survey Line: h12047 / ahi_f2505_reson8101_09 / 2009-116 / ahmbc09116_d02

Profile/Beam: 2209/81

Charts Affected: 19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1, 50_1

Remarks:

Uncharted wreck located in approx. 55 ft of water, least depth of 54.14 ft. Wreck is roughly 17m long / 5m. wide, appears to be a small barge.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12047/ahi_f2505_reson8101_09/2009-116/ahmbc09116_d02	2209/81	0.00	000.0	Primary

Hydrographer Recommendations

Hydrographer recommends adding a non-dangerous wreck symble at 21-17-22.37 / 157-54-24.84.

Cartographically-Rounded Depth (Affected Charts):

9fm (19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1)

16.6m (50_1)

S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: CATWRK - 1:non-dangerous wreck

QUASOU - 6:least depth known

VALSOU - 16.616 m

WATLEV - 3:always under water/submerged

Feature Images

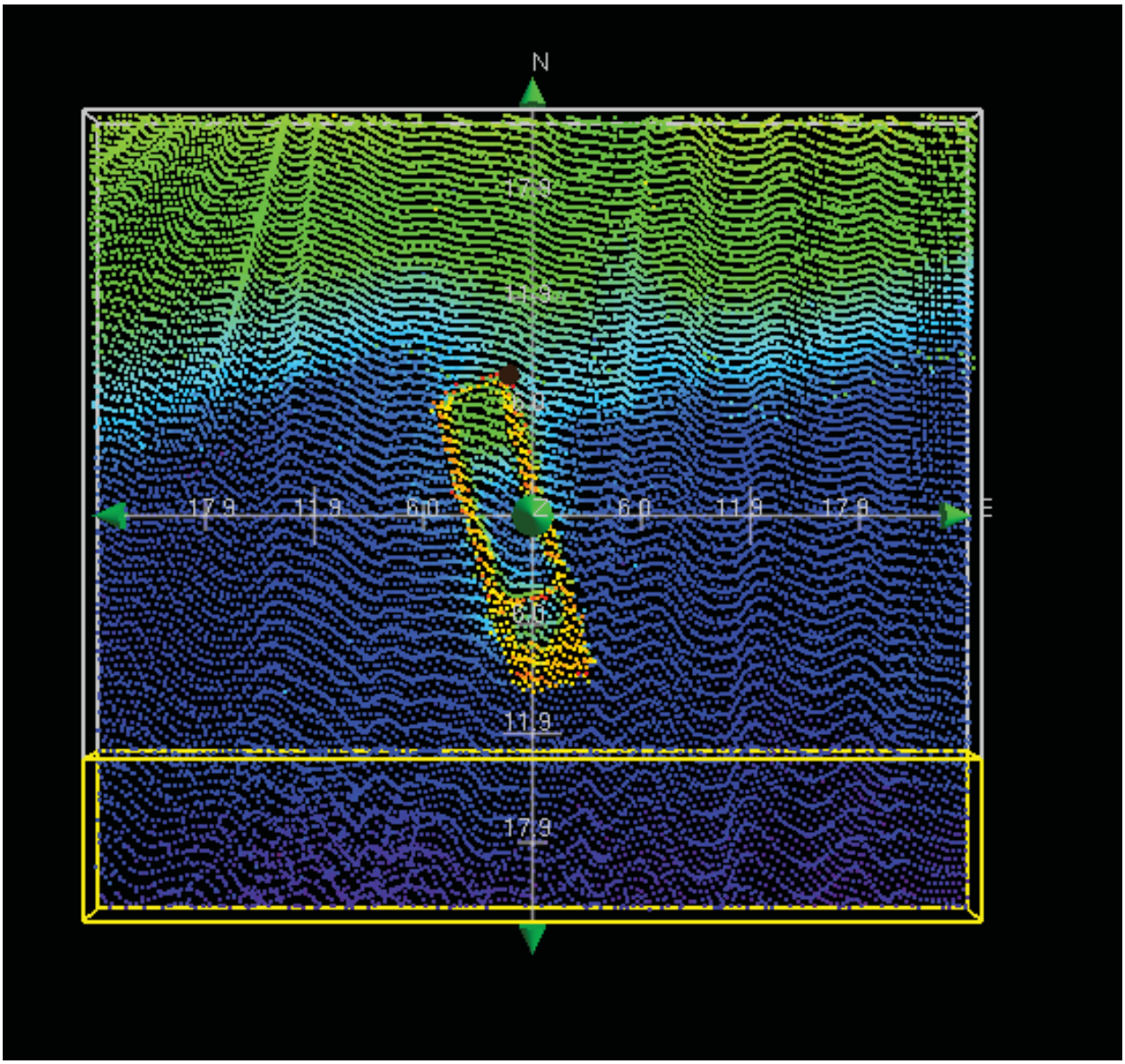


Figure 1.2.1

1.3) Profile/Beam - 105/76 from h12047 / ahi_f2505_reson8101_09 / 2009-120 / ahmbc09120_d13

Survey Summary

Survey Position: 21° 16' 48.2" N, 157° 51' 34.6" W

Least Depth: 22.56 m (= 74.02 ft = 12.336 fm = 12 fm 2.02 ft)

TPU (±1.96σ): **THU (TPEh)** ±3.922 m ; **TVU (TPEv)** ±0.229 m

Timestamp: 2009-120.20:04:48.422 (04/30/2009)

Survey Line: h12047 / ahi_f2505_reson8101_09 / 2009-120 / ahmbc09120_d13

Profile/Beam: 105/76

Charts Affected: 19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1, 50_1

Remarks:

Large uncharted wreck located with multibeam in approx. 100 ft. of water, roughly 65 m long / 12 m wide.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12047/ahi_f2505_reson8101_09/2009-120/ahmbc09120_d13	105/76	0.00	000.0	Primary

Hydrographer Recommendations

-Hydrographer recommends charting a non-dangerous wreck in position: 21-16-48.23 / 157-51-34.62 with a least depth of 74 ft.

Cartographically-Rounded Depth (Affected Charts):

12fm (19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1)

23m (50_1)

S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: CATWRK - 1:non-dangerous wreck

QUASOU - 6:least depth known

VALSOU - 22.560 m

WATLEV - 3:always under water/submerged

Feature Images

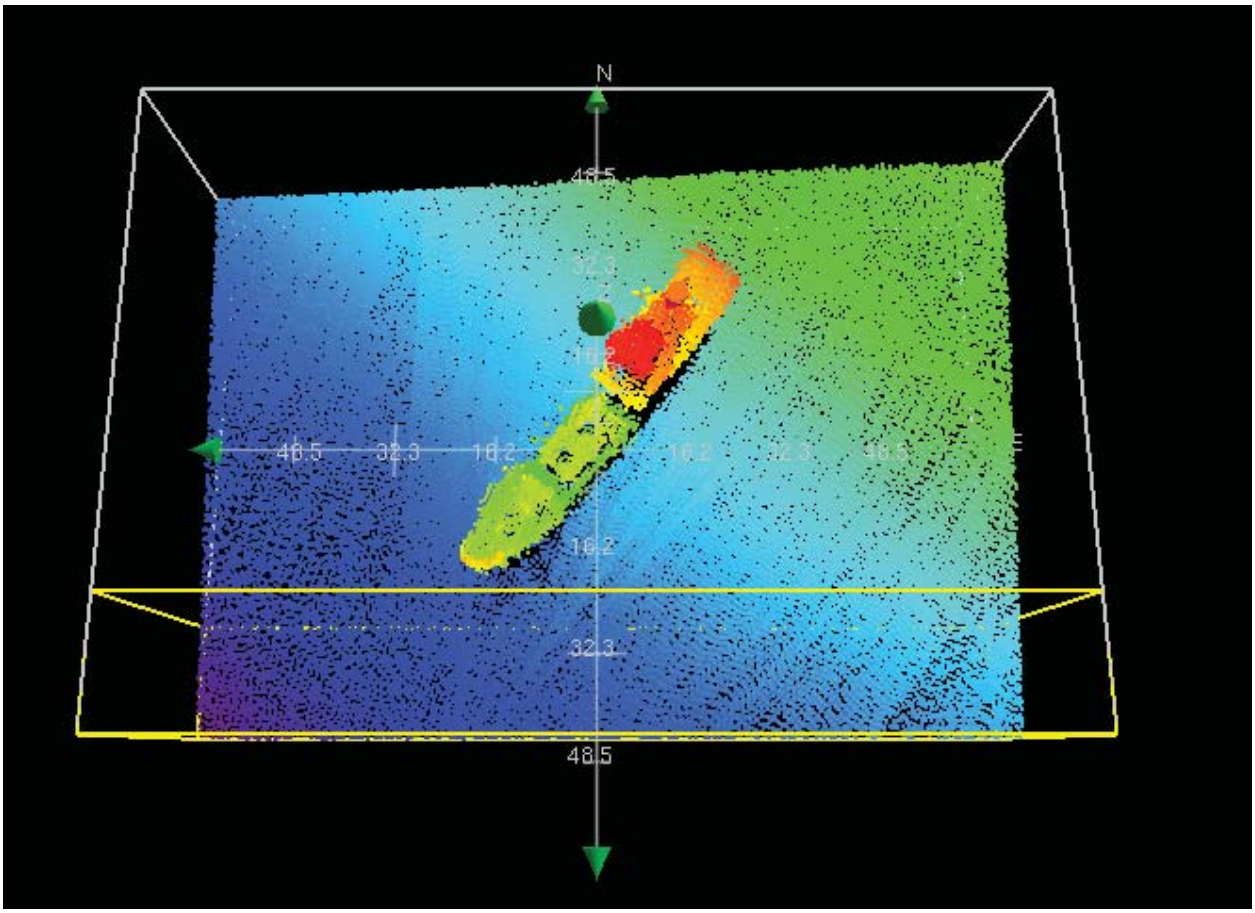


Figure 1.3.1

2 - AWOIS Features

2.1) AWOIS #50609 - UNKNOWN

No Primary Survey Feature for this AWOIS Item

Search Position: 21° 16' 43.6" N, 157° 50' 48.1" W

Historical Depth: 9.14 m

Search Radius: 50

Search Technique: SWMB

Technique Notes: [None]

History Notes:

50609■HISTORY■LNM46/82--SUNKEN WRECK IN APPROX. POS. LAT.21-16-55.3N, LONG.157-50-58.1W. ■ 150 YDS., 220 DEG. TRUE FROM ALA WAI BOAT HARBOR CHANNEL DAYBEACON 3. IN ■ 40 FT COVERED 22 FT MAST REMOVED. ■LNM47/82--SUNKEN WRECK (ABOVE) REMOVED WITH ONLY THE KEEL REMAINING ON THE ■ BOTTOM IN APPROX. POS. LAT.21-16-55N, LONG.157-50-58W. IN 40 FT COVERED ■ 35 FT. ■S-T342-AHI-09 - Charted wreck in entrance to channel, investigate with swmb. (2/9/09, PTT)

Survey Summary

Charts Affected: 19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1, 50_1

Remarks:

The charted wreck in position 21-16-43.7 / 157-50-48.51 located in front of the entrance channel to the Ala Wai Boat Harbor was surveyed with 100% swmb and examined in CARIS Subset Editor and no debris or wreckage was visible.

Feature Correlation

Address	Feature	Range	Azimuth	Status
AWOIS_ORAOP_Office2007	AWOIS # 50609	0.00	000.0	Primary

Hydrographer Recommendations

Hydrographer recommends deleting the text "Wk PA".

S-57 Data

[None]

Feature Images

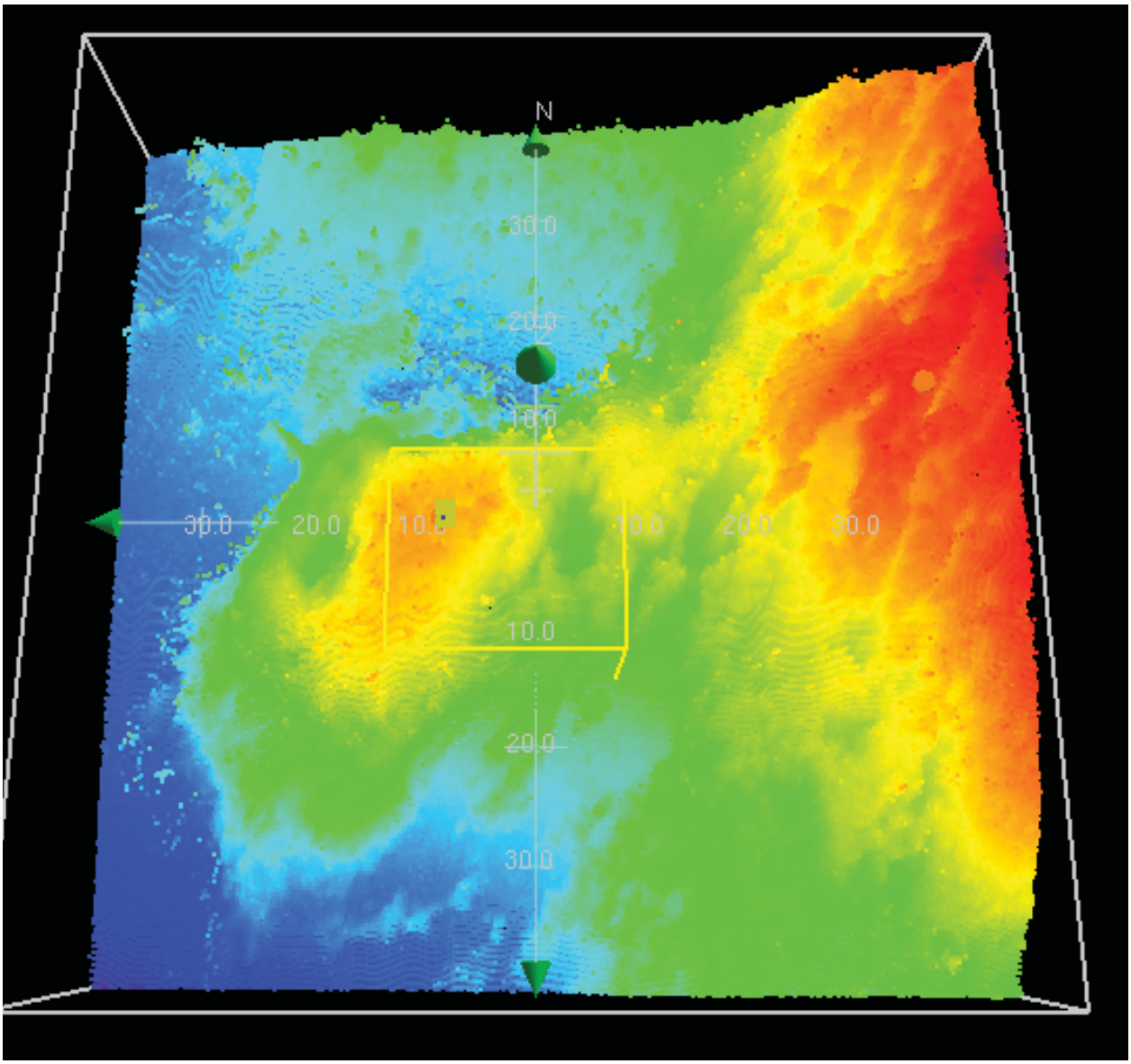


Figure 2.1.1

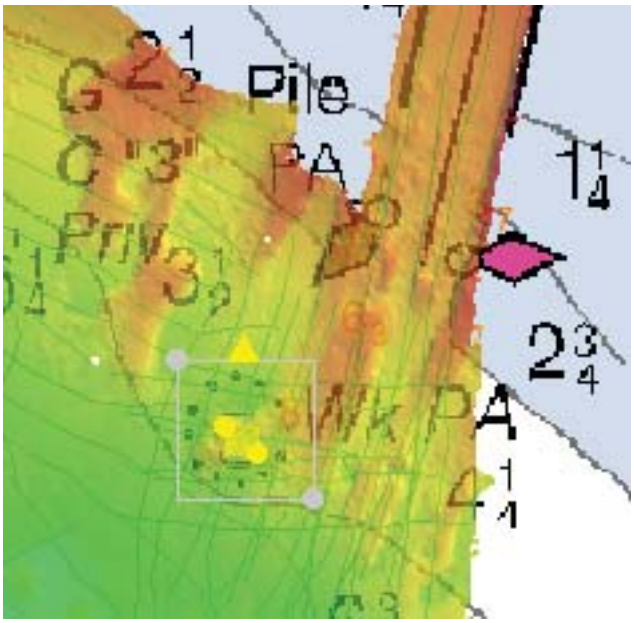


Figure 2.1.2

2.2) AWOIS #53596 - UNKNOWN

No Primary Survey Feature for this AWOIS Item

Search Position: 21° 16' 59.3" N, 157° 52' 08.6" W

Historical Depth: 49.84 m

Search Radius: 50

Search Technique: SWMB

Technique Notes: [None]

History Notes:

W00100 (US Navy LIDAR)■A new obstruction was located during the review of survey W00100. The obstruction appears to be a potential wreck with a least depth of 49.84 meters (163.5 ft, 27.3 fm) located at 21°16'59.30"N, 157°52'8.646" W (Figure 13). It is recommended that the wreck be added to charts 19369 and 19367; however it does not pose a danger to navigation.■■S-T342-AHI-09 - Full investigation of non-dangerous wreck, located during office review from prior survey in 2002 and remains uncharted. (2-9-09. PTT)

Survey Summary

Charts Affected: 19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1, 50_1

Remarks:

A small non-dangerous wreck identified during office processing from the prior surver, W00100 - 2002, was located and investigated with 100% swmb. The wreck does not create a danger to surface navigation. The shoalest sounding was designated in CARIS Subset Editor with a least depth of 151.90 ft in position: 21-16-58.8 / 157-52-08.45. The wreck is approximately 25m. long / 8m wide.

Feature Correlation

Address	Feature	Range	Azimuth	Status
AWOIS_ORAOP_Office2007	AWOIS # 53596	0.00	000.0	Primary

Hydrographer Recommendations

Hydrographer recommends charting a non-dangerous wreck symble in position: 21-16-58.8 / 157-52-08.45 with a least depth of 151.9ft.

S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: VALSOU - 49.84 m

Feature Images

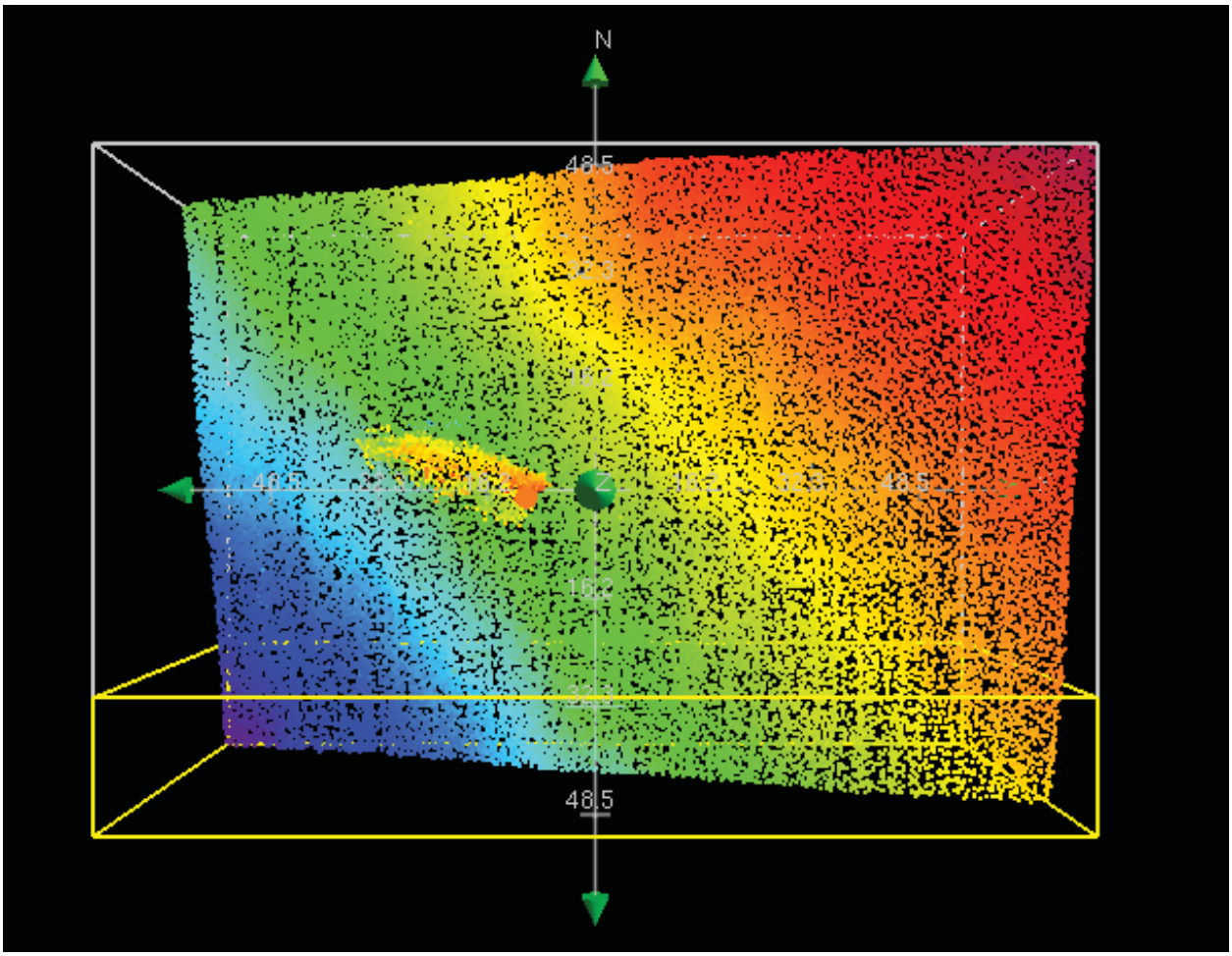


Figure 2.2.1

2.3) AWOIS #53743 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 21° 17' 37.9" N, 157° 53' 11.4" W

Historical Depth: 5.49 m

Search Radius: 50

Search Technique: SWMB

Technique Notes: [None]

History Notes:

S-T342-Ahi-09, Obstruction located during 2000 NAVY LIDAR and SWMB survey of Honolulu Harbor, 3 1/4 fathom obstruction seaward of the 3 fathom depth curve. (PTT 2/10/09).

Survey Summary

Charts Affected: 19367_1, 19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1, 50_1

Remarks:

Item 53743 was investigated with 100% swmb, the REP (2000) 3 obstruction was examined in CARIS Subset Editor and the shoal sounding with a least depth of 19.89ft was designated in position: 21-17-37.82 / 157-53-11.98.

Feature Correlation

Address	Feature	Range	Azimuth	Status
AWOIS_ORAOP_Office2007	AWOIS # 53743	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends delete the text "REP 2000" and retaining the sounding.

S-57 Data

[None]

Feature Images

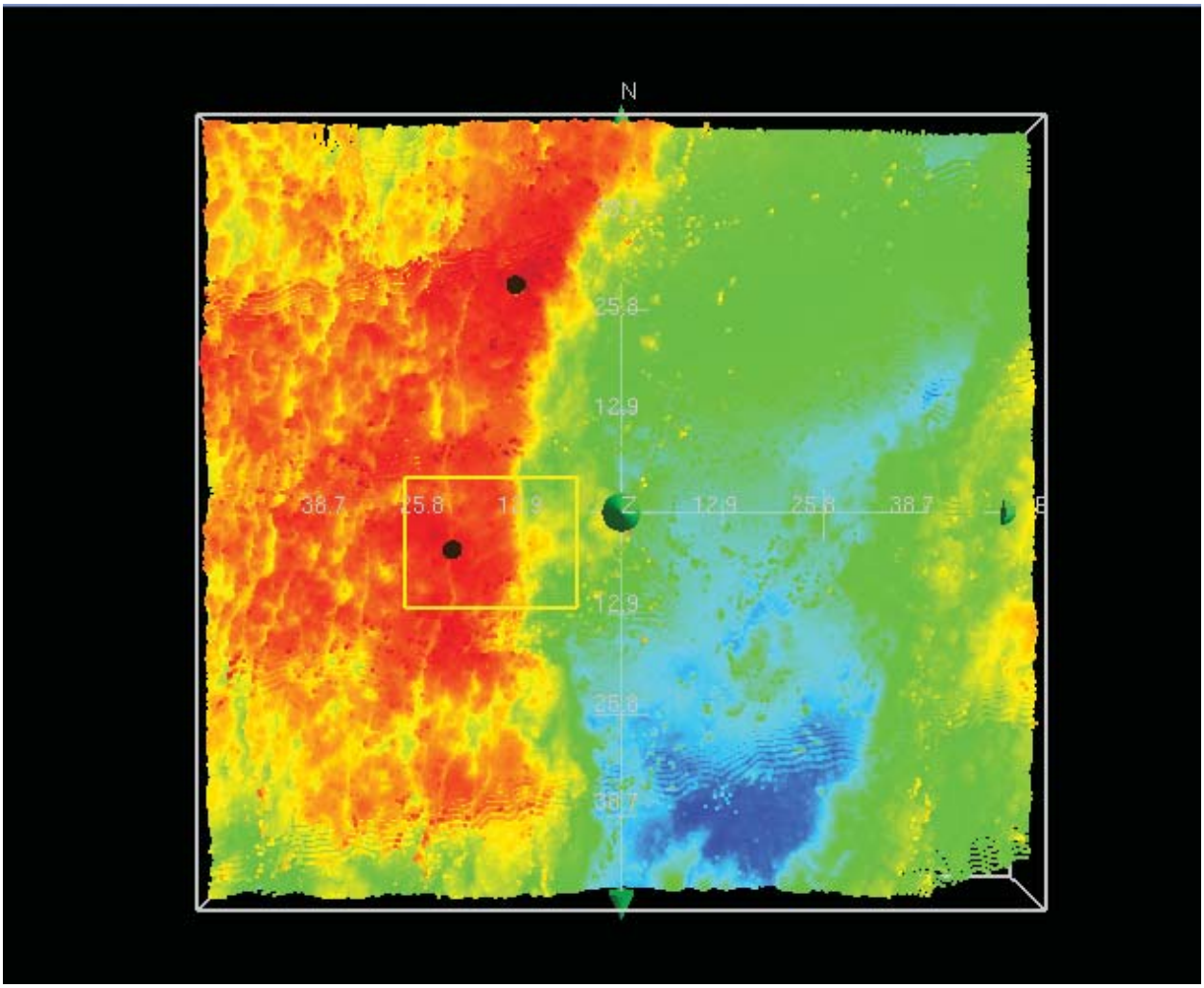


Figure 2.3.1

2.4) AWOIS #53742 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 21° 17' 33.0" N, 157° 53' 22.4" W

Historical Depth: 7.32 m

Search Radius: 50

Search Technique: SWMB

Technique Notes: [None]

History Notes:

S-T342-Ahi-09, Obstruction located during 2000 NAVY LIDAR and SWMB survey of Honolulu Harbor, 4 fathom obstruction seaward of the 5 fathom depth curve. (PTT 2/10/09).

Survey Summary

Charts Affected: 19367_1, 19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1, 50_1

Remarks:

Item 53742 was investigated with 100% swmb, the REP (2000) 4 obstruction was examined in CARIS Subset Editor and the shoal sounding with a least depth of 24.65ft was designated in position: 21-17-33.46 / 157-53-22.71.

Feature Correlation

Address	Feature	Range	Azimuth	Status
AWOIS_ORAOP_Office2007	AWOIS # 53742	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends delete the text "REP 2000" and retaining the sounding.

S-57 Data

[None]

Feature Images

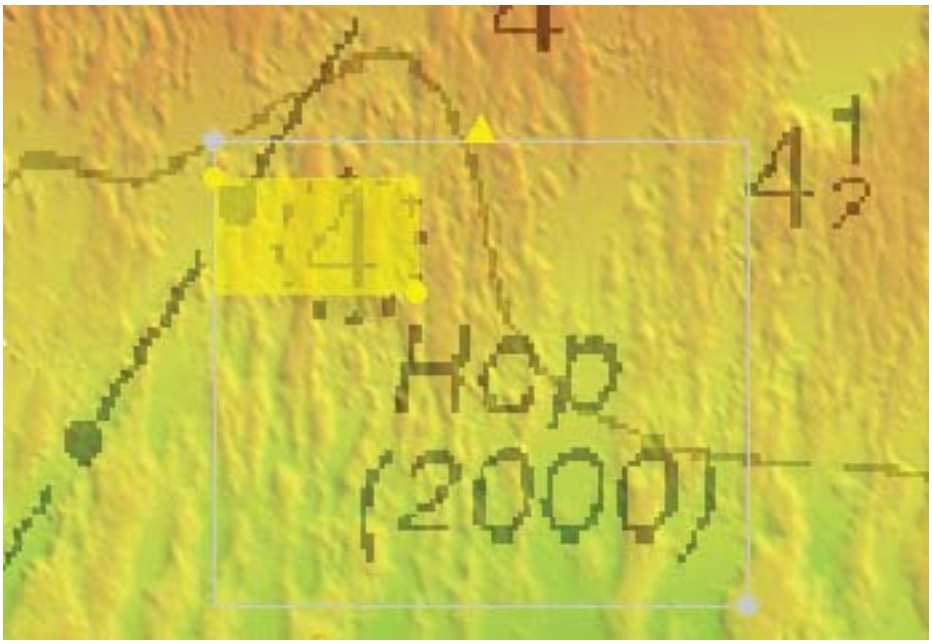


Figure 2.4.1

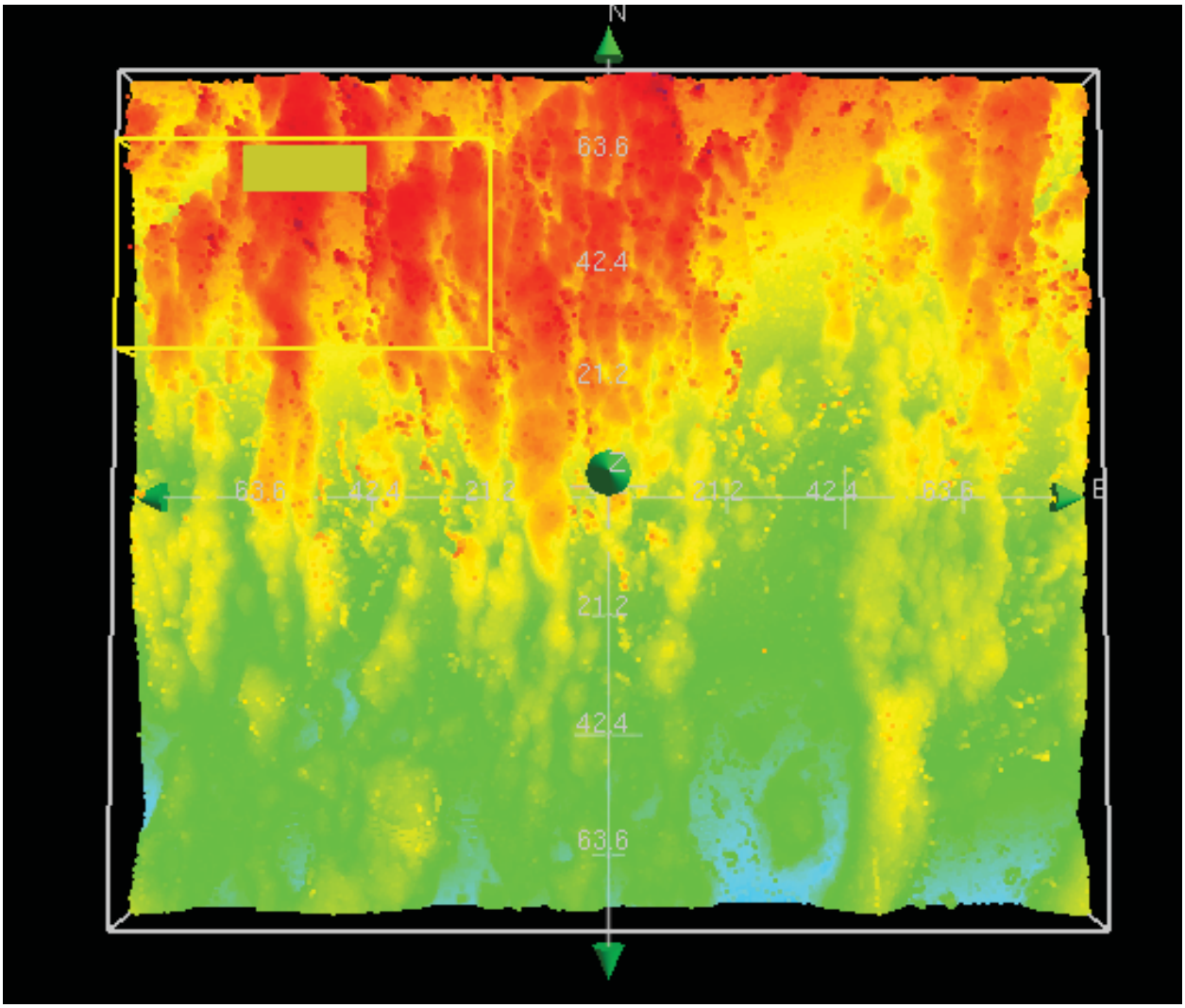


Figure 2.4.2

2.5) AWOIS #53744 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 21° 17' 52.6" N, 157° 53' 03.0" W

Historical Depth: 3.66 m

Search Radius: 50

Search Technique: [None]

Technique Notes: [None]

History Notes:

S-T342-Ahi-09, Obstruction located during W00101 2000 NAVY LIDAR and SWMB survey of Honolulu Harbor, 1 3/4 fathom obstruction seaward of the 2 fathom depth curve. (PTT 2/10/09).

Survey Summary

Charts Affected: 19367_1, 19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1, 50_1

Remarks:

Item 53740 was not surveyed or investigated due to the shallow and unsafe conditions.

Feature Correlation

Address	Feature	Range	Azimuth	Status
AWOIS_ORAOP_Office2007	AWOIS # 53744	0.00	000.0	Primary

Hydrographer Recommendations

Retain current current charted position.

S-57 Data

[None]

2.6) AWOIS #53740 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 21° 17' 37.7" N, 157° 53' 59.7" W

Historical Depth: 3.00 m

Search Radius: 50

Search Technique: SWMB

Technique Notes: [None]

History Notes:

S-T342-Ahi-09, Obstruction located during 2000-2002 NAVY SWMB LIDAR survey of the Honolulu Harbor area, W00101, REP 1 3/4 (FATHOM) OBSTRUCTION. (PTT 2/10/09).

Survey Summary

Charts Affected: 19367_1, 19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1, 50_1

Remarks:

Item 53740 was not surveyed or investigated due to the shallow and unsafe conditions.

Feature Correlation

Address	Feature	Range	Azimuth	Status
AWOIS_ORAOP_Office2007	AWOIS # 53740	0.00	000.0	Primary

Hydrographer Recommendations

Retain current current charted position.

S-57 Data

[None]

2.7) AWOIS #53741 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 21° 17' 28.0" N, 157° 53' 22.6" W

Historical Depth: 9.14 m

Search Radius: 50

Search Technique: SWMB

Technique Notes: [None]

History Notes:

S-T342-Ahi-09, Obstruction located during 2000 NAVY LIDAR and SWMB survey, W00101, 5 fathom Obstruction. (PTT 2/10/09)

Survey Summary

Charts Affected: 19367_1, 19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1, 50_1

Remarks:

Item 53741 was invested with 100% coverage using a RESON 8101 swmb, the REP (2000) obstruction was examined in CARIS Subset Editor and the shoal sounding with a least depth of 29.56ft was designated in position: 21-17-28.75 / 157-53-22.72.

Feature Correlation

Address	Feature	Range	Azimuth	Status
AWOIS_ORAOP_Office2007	AWOIS # 53741	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends delete the text "REP 2000" and retaining the sounding.

S-57 Data

[None]

Feature Images

Figure 2.7.1

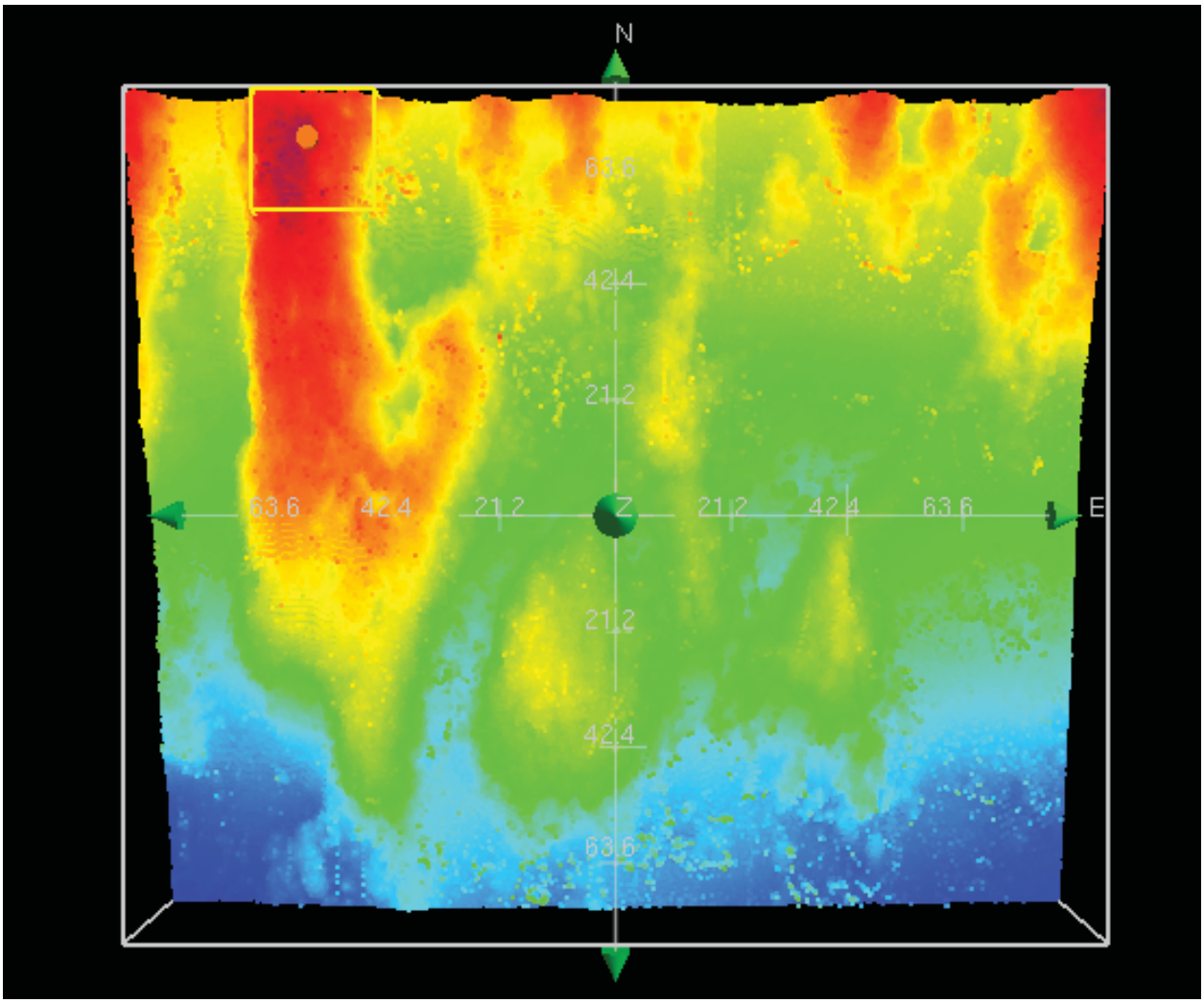


Figure 2.7.2

2.8) AWOIS #53745 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 21° 17' 27.6" N, 157° 52' 07.7" W

Historical Depth: 3.66 m

Search Radius: 50

Search Technique: [None]

Technique Notes: [None]

History Notes:

S-T342-Ahi-09, Obstruction located during W00101 2000 NAVY LIDAR and SWMB survey of Honolulu Harbor, 2 1/4 fathom obstruction seaward of the 3 fathom depth curve. (PTT 2/10/09).

Survey Summary

Charts Affected: 19367_1, 19369_1, 19357_1, 19340_1, 19004_1, 19010_1, 19013_1, 19007_1, 540_1, 530_1, 50_1

Remarks:

Item 53745 was investigated with 100% swmb, the REP (2000) 2 1/4 obstruction was examined in CARIS Subset Editor and the shoal sounding with a least depth of 14.16ft was designated in position: 21-17-27.96/ 157-52-8.20.

Feature Correlation

Address	Feature	Range	Azimuth	Status
AWOIS_ORAOP_Office2007	AWOIS # 53745	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends delete the text "REP 2000" and retaining the sounding.

S-57 Data

[None]

Feature Images

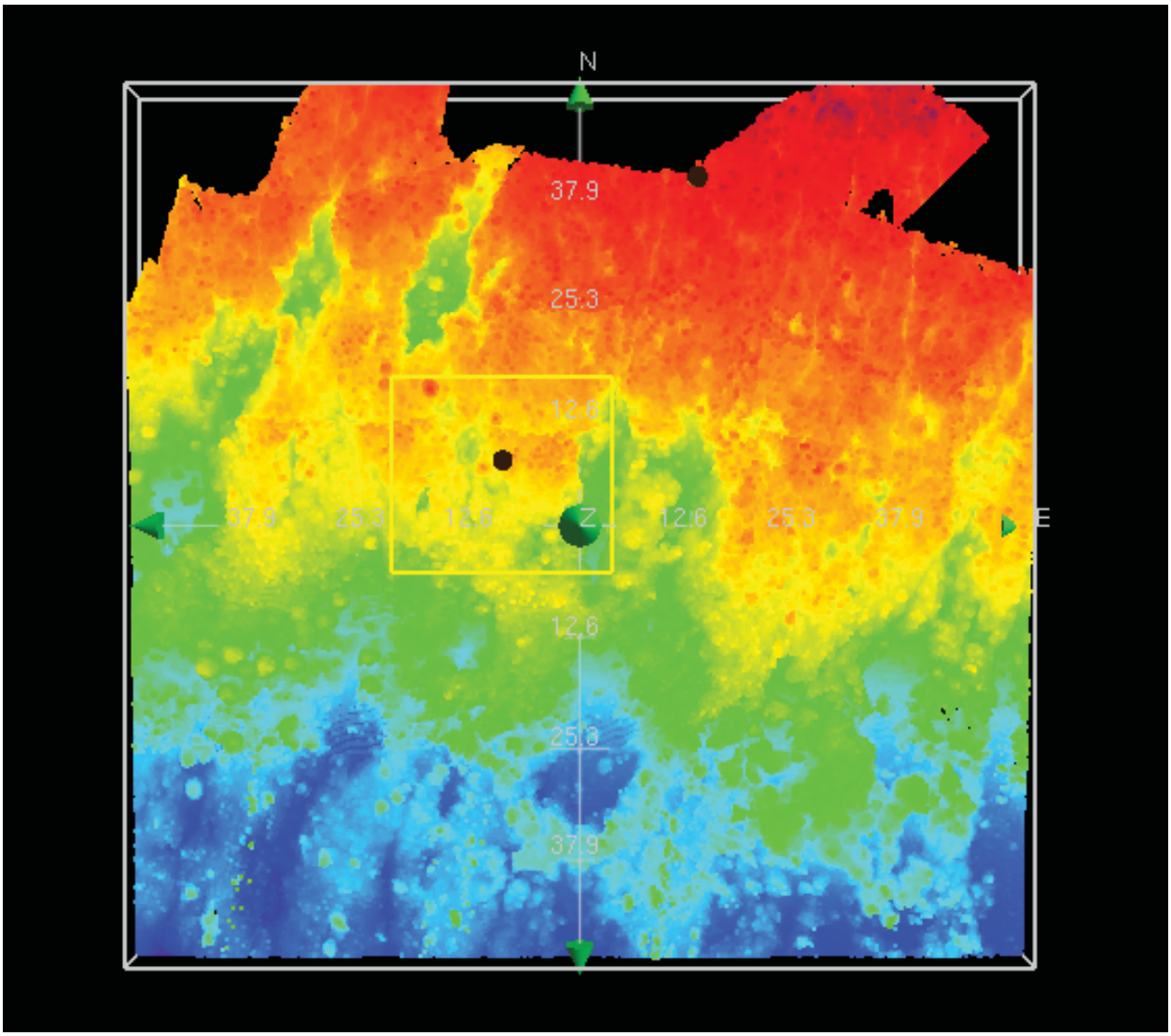


Figure 2.8.1

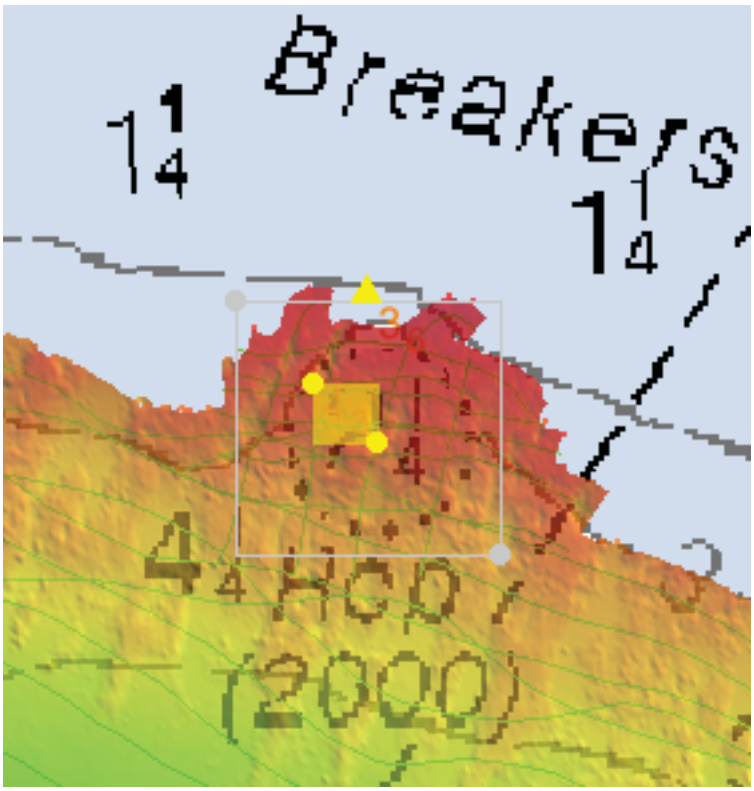


Figure 2.8.2

UNITED STATES DEPARMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : June 10, 2009

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: S-T342-AHI-2009
HYDROGRAPHIC SHEET: H12047

LOCALITY: North Pacific Ocean, Honolulu, HI
TIME PERIOD: April 20 - May 02, 2009

TIDE STATION USED: 161-2340 Honolulu, Hawaii
Lat. 21° 18.4'N Long. 157° 52.0' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.439 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project S-T342-AHI-2009, H12047, during the time period between April 20 - May 02, 2009.

Please use the zoning file "T342AHI2009CORP" submitted with the project instructions for S-T342-AHI-2009. Zones H1211A and H1211 are the applicable zones for H12047.

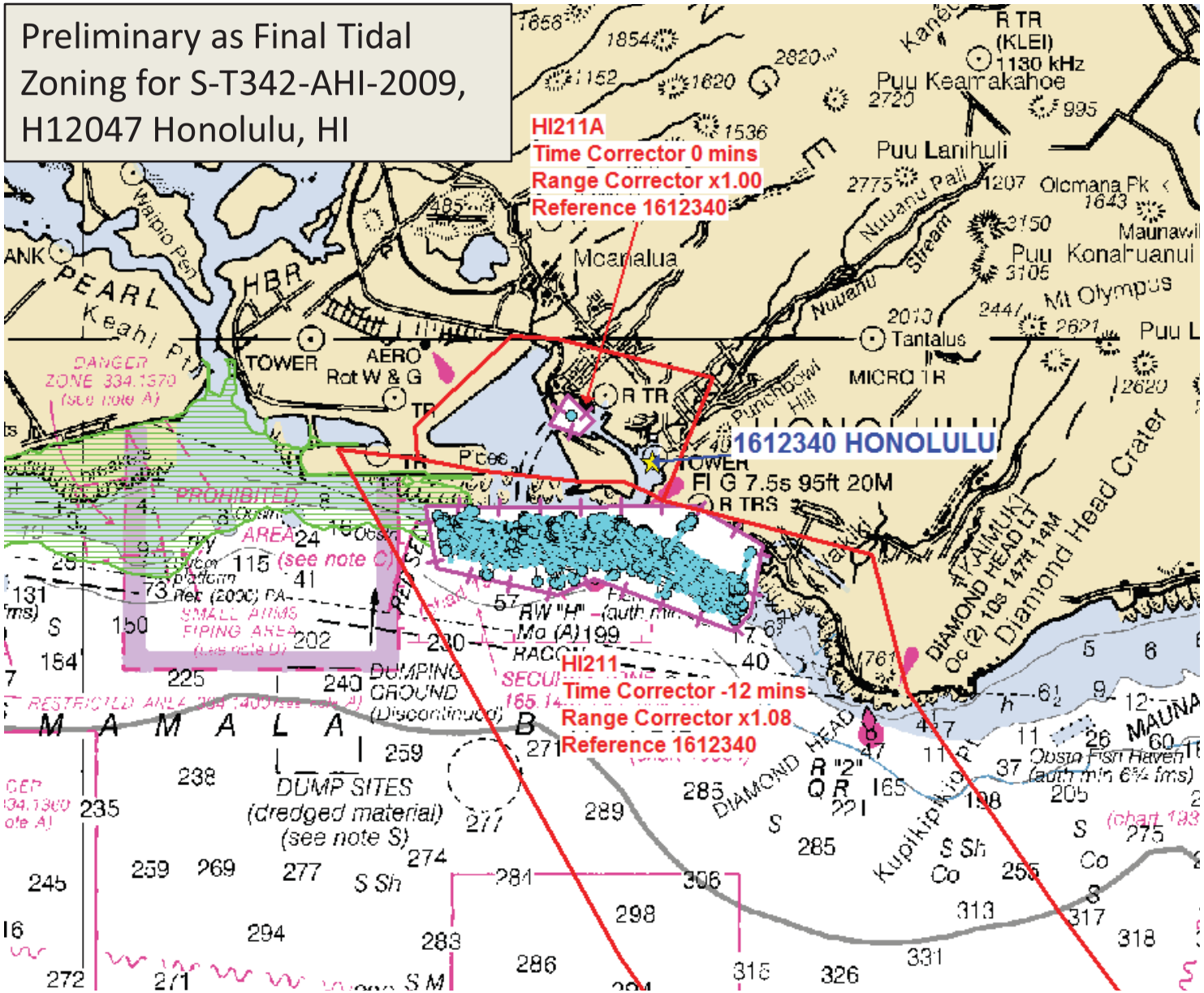
Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

Peter J. Stone

Digitally signed by Peter J. Stone
DN: cn=Peter J. Stone, o=Oceanographic Division, ou=NOAA/NOS/CO-OPS, email=peter.stone@noaa.gov, c=US
Date: 2009.06.12 07:58:04 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION


Preliminary as Final Tidal Zoning for S-T342-AHI-2009, H12047 Honolulu, HI
HI211A
Time Corrector 0 mins
Range Corrector x1.00
Reference 1612340
1612340 HONOLULU
Fl G 7.5s 95ft 20M
HI211
Time Corrector -12 mins
Range Corrector x1.08
Reference 1612340
PEARL HBR
Keahi Pt
Waipio Pen
Mcanalua
Puu Kearrakahoe
Puu Lanihuli
Puu Konahuanui
Olomana Pk
Mt Olympus
Tantalus
TOWER
AERO
Rot W & G
MICRO TR
R TR
(KLEI)
1130 kHz
DANGER ZONE 334.1370 (see note A)
PROHIBITED AREA (see note C)
SMALL ARMS FIRING AREA
DUMPING GROUND (Discontinued)
DUMP SITES (dredged material) (see note S)
DIAMOND HEAD
Kupikipikio Pt
Obstn Fish Haven
MAUNA
M A M A L A B

H12047 HCell Report

Annie Raymond, Physical Scientist
Pacific Hydrographic Branch

1.0 Specifications, Standards and Guidance Used in HCell Compilation

HCell compilation of survey H12047 used:

Office of Coast Survey HCell Specifications: Version: 4.0, 2 June, 2010.
HCell Reference Guide: Version 2.0, 2 June, 2010.

2.0 Compilation Scale

Depths and features for HCell H12047 were compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NTM Date
19367	1:5,000	39th	04/01/2008	05/29/2011
19369	1:20,000	6th	10/01/2006	05/29/2011

The following ENCs were also used during compilation:

Chart	Scale
US5HA55M	1:5,000
US5HA53M	1:20,000

3.0 Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 4-meter Combined Surface in CARIS BASE Editor. A shoal-biased selection was made at 1:2,500 and 1:5,000 survey scale using a Radius Table file with values shown in the table, below.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
-4.7	10	3
10	20	4
20	50	4.5
50	200	5

In CARIS BASE Editor soundings were manually selected from the high density sounding layers (SS) and imported into a new layer (CS) created to accommodate chart density depths. Manual selection was used to accomplish a density and distribution that closely represents the seafloor morphology.

4.0 Depth Contours

Depth contours at the combined intervals on the largest scale chart 19367 and the next largest scale chart 19369 are included in the H12047_SS HCell for MCD raster charting division to use

for guidance in creating chart contours. The metric, feet, and fathom equivalent contour values are shown in the table below.

Chart Contour Intervals in Fathoms from Chart 19367 and 19369	Metric Equivalent to Chart Units, Arithmetically Rounded	Metric Equivalent of Chart Units, with NOAA Rounding Applied	Chart Units with NOAA Rounding Applied	Chart Units with NOAA Rounding Removed for Display on H12047_SS.000
12 ft	3.6576	3.8862	2.125	12 ft
18 ft	5.4864	5.715	3.125	18 ft
24 ft	7.5438	7.5438	4.125	24 ft
30 ft	9.144	9.3726	5.125	30 ft
36 ft	10.9728	11.2014	6.125	36 ft
10 fm	18.288	18.5166	10.125	10 fm
20 fm	36.576	37.9476	20.750	20 fm
50 fm	91.44	92.812	50.750	50 fm

Contours have not been deconflicted against shoreline features, soundings and hydrography, as all other features in the H12047_CS file and soundings in the H12047_SS have been. This may result in conflicts between the H12047_SS file contours and HCell features at or near the survey limits. Conflicts with M_QUAL and SBDARE objects representing MLLW, should be expected. HCell features should be honored over H12047_SS.000 file contours in all cases where conflicts are found.

5.0 Meta Areas

The following Meta object areas are included in HCell H12047:

M_QUAL
M_CSCL

The Meta area objects were constructed on the basis of the limits of the hydrography.

6.0 Features

Features addressed by the field units are delivered to PHB where they are deconflicted against the hydrography and the largest scale chart. These features, as well as features to be retained from the chart and features digitized from the Base Surface, are included in the HCell. The geometry of these features may be modified to emulate chart scale per the HCell Reference Guide on compiling features to the chart scale HCell.

7.0 Spatial Framework

7.1 Coordinate System

All spatial map and base cell file deliverables are in an LLDG geographic coordinate system, with WGS84 horizontal, MHW vertical, and MLLW (1983-2001 NTDE) sounding datums.

7.2 Horizontal and Vertical Units

DUNI, HUNI and PUNI are used to define units for depth, height and horizontal position in the chart units HCell, as shown below.

Chart Unit Base Cell Units:

Depth Units (DUNI):	Feet
Height Units (HUNI):	Feet
Positional Units (PUNI):	Meters

During creation of the HCell in CARIS BASE Editor and CARIS S-57 Composer, all soundings and features are maintained in metric units with as high precision as possible. Depth units for soundings measured with sonar maintain millimeter precision. Depths on rocks above MLLW and heights on islets above MHW are typically measured with range finder, so precision is less. Units and precision are shown below.

BASE Editor and S-57 Composer Units:

Sounding Units:	Meters rounded to the nearest millimeter
Spot Height Units:	Meters rounded to the nearest decimeter

See the HCell Reference Guide for details of conversion from metric to charting units, and application of NOAA rounding.

7.3 S-57 Object Classes

The CS HCell contains the following Object Classes:

$CSYMB	Blue Notes (points) —Notes to the MCD chart Compiler
M_QUAL	Data quality Meta object
M_CSCL	Compilation scale features
OBSTRN	Obstruction objects
* SOUNDG	Soundings at chart scale density
SBDARE	Coral Seabed areas
WRECKS	Wrecks

* The M_QUAL is adequate for NDB product searches except for features in these object classes which reside outside the M_QUAL limits.

The SS HCell contains the following Object Classes:

DEPCNT	Generalized contours at chart scale intervals (See table under section 4.)
SOUNDG	Soundings at the survey scale density (See table under section 3.)

8.0 Data Processing Notes

There were no significant deviations from the standards and protocols given in the HCell Specification and HCell Reference Guide.

9.0 QA/QC and ENC Validation Checks

H12047 was subjected to QA checks in S-57 Composer prior to exporting to the metric HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to chart units and NOAA rounding applied. dKart Inspector was then used to further check the data set for conformity with the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and warnings and errors investigated and corrected unless they are MCD approved as inherent to and acceptable for HCells.

10.0 Products

10.1 HSD, MCD and CGTP Deliverables

H12047_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:5,000 and 1:20,000
H12047 _SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:2,500 and 1:5,000
H12047 _DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H12047 _outline.gml	Survey outline
H12047 _outline.xsd	Survey outline

11.0 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 3.0, HF10	Creation of soundings and bathy-derived features, creation of the meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.2, HF4	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1, SP 1	Validation of the base cell file.
Northport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

12.0 Contacts

Inquiries regarding this HCell content or construction should be directed to:
Annie Raymond
Physical Scientist
Pacific Hydrographic Branch
Seattle, WA
206-526-6849
annemieke.raymond@noaa.gov

APPROVAL SHEET
H12047

Initial Approvals:

The survey evaluation and verification has been conducted according to branch processing procedures and the HCell compiled per the latest OCS HCell Specifications.

Digitally signed by Annemieke Raymond
DN: cn=Annemieke Raymond, o=NOAA, ou=NOS/OCS/PHB, email=annemieke.raymond@noaa.gov, c=US
Date: 2011.09.12 14:15:12 -07'00'

The survey and associated records have been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, S-57 classification and attribution of soundings and features, cartographic characterization, and verification or disproval of charted data within the survey limits. The survey records and digital data comply with OCS requirements except where noted in the Descriptive Report and are adequate to supersede prior surveys and nautical charts in the common area.

Katie Reser
2011.09.12
14:13:08 -07'00'

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

Digitally signed by NELSON.GARY.C.1365885318
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=NELSON.GARY.C.1365885318
Date: 2011.09.12 14:22:21 -07'00'

Paul Turner
AWOIS & SURF Review
2011.09.22 09:14:19 -04'00'