

W00205

<p>NOAA FORM 76-35A</p> <p>U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SURVEY</p> <p>DESCRIPTIVE REPORT</p>	
Type of Survey:	Navigable Area
Registry Number:	W00205
<p>LOCALITY</p> <p>State: Hawaii</p> <p>General Locality: Molokai to Lanai</p> <p>Sub-locality: Penguin Bank</p>	
<p>2008</p> <p>CHIEF OF PARTY Bruce Stier US Navy</p>	
DATE	LIBRARY & ARCHIVES

NOAA FORM 77-28
DEPARTMENT OF COMMERCE
(11-72) NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION

U.S.

REGISTRY NUMBER:

W00205

HYDROGRAPHIC TITLE SHEET

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: **Hawaii**

General Locality: **Molokai to Lanai**

Sub-Locality: **Penguin Bank**

Scale: **1:40,000** Date of Survey: **28 June to 01 August 2008**

Instructions Dated: **N/A** Project Number: **OPR-AHB-08**

Vessel: **USNS Sumner, T-AGS-61**

Chief of Party: **SNR Bruce Stier**

Surveyed by: ***Naval Oceanographic Office Personnel***

Soundings by: **Simrad EM120 and EM710 multibeam echosounders.**

Graphic record scaled by: **N/A**

Graphic record checked by: **N/A**

Protracted by: **N/A** Automated Plot: **N/A**

Verification by:

Soundings in: **Meters at MLLW**

Remarks:

- 1) ***All Times are in UTC.***
- 2) ***This is a Navigable Area Hydrographic Survey.***
- 3) ***Projection is WGS84, Mercator. H-Cell converted to NAD83, UTM Zone 04***

Red, Bold, Italic notes were made during office processing.

DESCRIPTIVE REPORT

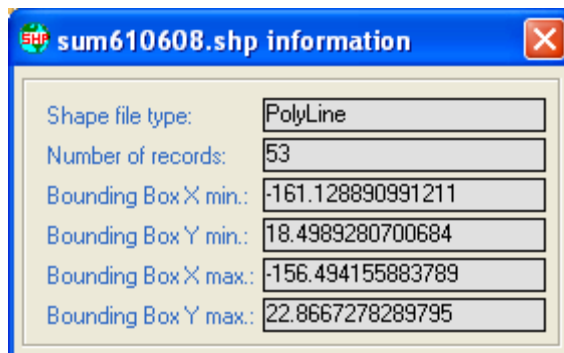
to accompany
Hydrographic Survey W00205
OPR-AHB-08

Scale of Survey 1:40,000
Year of Survey: 2008
US Navy—Naval Oceanographic Office
USNS Sumner, T-AGS-61
Bruce Steir – Senior NAVO Rep.

A. AREA SURVEYED

This Basic Hydrographic survey was conducted in accordance with the Navy Technical Specification TS08FEX01. Hydrographic data were collected during the rim of the Pacific Exercise (RIMPAC) in the Hawaii islands chain. 100% unclassified MBES data was submitted to the Atlantic Hydrographic branch in February, 2009 for NOAA nautical chart updates. No bottom samples or detached positions were collected for this survey.

Survey Limits for W00205 are as follows:



Survey Dates: June 28, 2008 to August 1, 2008

Mainscheme MBES data were collected adjacent to the island of Molokai in an E-W direction with using the real time coverage.

B. DATA ACQUISITION AND PROCESSING

B.1. EQUIPMENT

Data were acquired by Naval Oceanographic Office using the USNS Sumner, T-Ags-61. The vessel configuration is limited to DoD and will not be discussed in the DR. Major data bathymetric acquisition systems are summarized below:

Data acquisition included multibeam bathymetry via the SIMRAD EM120 and EM710 systems and their imagery, GPS navigation, Sea Surface Sound Velocimeter (SSSV), Bathythermograph (XBT) data. Data were acquired using SIS and processed using SAIC SABER.

B.2. GEODETIC CONTROL:

Horizontal Datum: WGS 84

Projection: Mercator

Spheroid: World Geodetic System of 1984

Sounding Datum: Mean Lower Low Water

Data was transformed to the following Geodetic Parameters at AHB

- **Horizontal Datum: NAD83**
- **Projection: UTM Zone 04**
- **Spheroid: NAD83**
- **Sounding Datum: Mean Lower Low Water**

B.3. Survey Planning:

The survey plan was to provide exercise support for the RIMPAC exercise.

1. DRAFT AND WATERLINE INFORMATION:

On 28 June 08, a reading and calculation of the ship's draft occurred before leaving port. See figure below for readings and calculations.

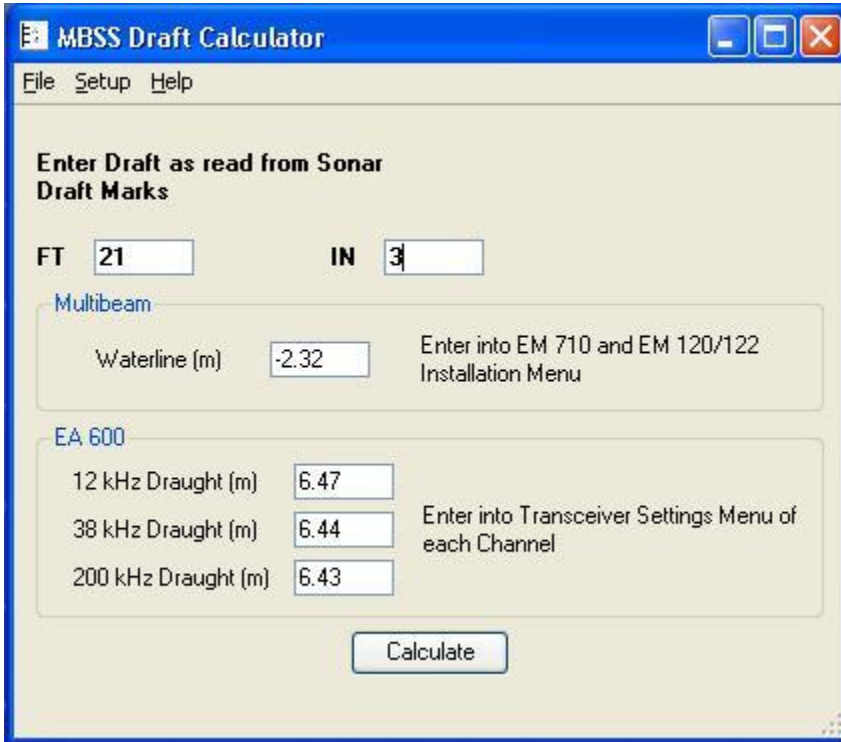


Figure 1: Kongsberg Draft Calculator with ship's draft taken on 06/28/08 before leaving port and offsets calculated for equipment. The ship's draft was taken before leaving port.

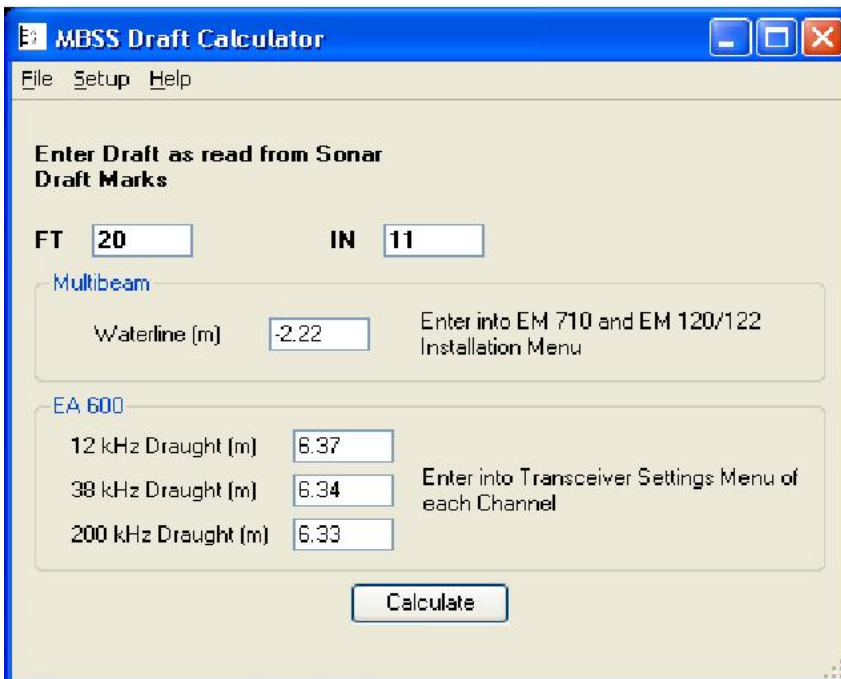


Figure 2: Kongsberg Draft Calculator with ship's draft taken on 07/07/08 before leaving port and offsets calculated for equipment. The ship's draft was taken before leaving port.

2. CALIBRATIONS:

There were no roll bias runs done on the EM710 which was the primary system during the RIMPAC exercise or the EM120. The Sumner did have a set of reciprocal lines that were used to check the EM710 and EM120. These lines were used to check the roll calibrations (em120: 61mbm08181_u_84.d03, 61mbm08182_u_84.d01) (em710: 61mbn08190_u_84.d02, 61mbn08190_u_84.d04)

NOTE: The EM120 had a roll bias value of .02 in the system. Also some of the values in the reports were not consistent. On JD 181 and 182 the ship ran reciprocal lines over an area that was flat. The roll bias value of .04 seemed to be correct. The em120 was stopped and the roll bias value was changed from .02 to .04 degrees. The first file with a value of .04 degrees is 61mbm08182_u_84.d03. Bathy data is low priority and the roll bias value cannot be verified. The value that was believed to be a good value was entered into the EM710 before any lines were run.

Calibration Parameter	Pass 1 File	Pass 2 File	Old Offset	New Offset
EM120				
Pitch				
Timing				
Roll	61mbm08181_u_84.d03	61mbm08182_u_84.d01	.02	.04

Table 1: EM120 Calibration Table.

Calibration Parameter	Pass 1 File	Pass 2 File	Old Offset	New Offset
EM710				
Pitch				
Roll	61mbn08190_u_84.d02	61mbn08190_u_84.d04		.07

Table 2: EM710 Calibration Table.

3. PFM LOAD PARAMETERS:

The EM710 was operated as the primary sensor. For depths greater than 500 meters the EM120 was used. Depths ranged from 39 meters to 4055 meters. See the following table for bin sizes and area files used for the pfms created during this survop.

PFM FILE	Hits1_pfm1.pfm	MIN DEPTH	39	BIN SIZE	4
AREA FILE	Hits_Box1.ARE	MAX DEPTH	558	DEPTH PRECISION	.01
PFM FILE	Hits1_pfm2.pfm	MIN DEPTH	39	BIN SIZE	4
AREA FILE	Hits_Box1.ARE	MAX DEPTH	67	DEPTH PRECISION	.01
PFM FILE	Hits1_pfm3.pfm	MIN DEPTH	46	BIN SIZE	4
AREA FILE	Hits_Box1.ARE	MAX DEPTH	67	DEPTH PRECISION	.01
PFM FILE	Hits1_pfm4.pfm	MIN DEPTH	44	BIN SIZE	4
AREA FILE	Hits_Box1.ARE	MAX DEPTH	71	DEPTH PRECISION	.01
PFM FILE	MIW_Four.pfm	MIN DEPTH	45	BIN SIZE	4
AREA FILE	MIW.ARE(part of area)	MAX DEPTH	445	DEPTH PRECISION	.01

PFM FILE	West_Box1a.pfm	MIN DEPTH	71	BIN SIZE	40
AREA FILE	West_Box1 & more	MAX DEPTH	4055	DEPTH PRECISION	.01
PFM FILE	West_Box1b.pfm	MIN DEPTH	62	BIN SIZE	5
AREA	South of	MAX	622	DEPTH	.01

FILE	West_Box1	DEPTH	PRECISION
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Table 3: PFMs created during SURVOP 610608 and their coordinating Area files and Bin Sizes.

Fledermaus PFM's are located in directory ../610608/layers/fledermaus_pfm

4. POST PROCESSING:

The following software versions are currently in use on Ocdet 128.

Software	Version
Red Hat Linux	V2.6.9-42.ELSmp
	v3.6
	n/a
BHPP	vEXAMMB_2.19
datasumm	V1.5
exammb	v4.74
pfmLoad	vSABER_4.1.12.1
pfm_unload	v6.5.0 Professional
SABER	vMVE_5.5
FLEDERMAUS	6.5.0
MVE	6.5.0
fmcommand	
pfmdirect software	

All transit data was edited using MVE. Header information for all files has been updated using datasumm and the start and end times were entered into the processing log. All multi-beam data was edited using Saber and Fledermaus. Tidal corrections were only applied to Hits_Box1.ARE and MIW.ARE areas. The xtide program was used to generate tide correctors. The

West_Box1.ARE was 60 miles from any land and no tide correctors were applied to data in that area.

All crosschecks were analyzed in Saber and confirmed using Fledermaus. See following Junction Analysis Statistics for more information. Cross check lines were in agreement with the main survey lines. **Based on the data varied ± 0.25 to 0.30 meters at the 95% CI.**

File=/home/common/datasets/610608_u_84/layers/HIts_Box1_crosscheckTest_min_HIts_Box1_Tocrosscheck_min.dif

Category	All		Positive		Negative		Zero Count
	Count	Percent	Count	Percent	Count	Percent	
0-> 5cm	24607	28.87	10412	30.46	11379	23.59	2816
5-> 10cm	23029	55.89	10334	60.69	12695	49.92	
10-> 15cm	19451	78.72	7733	83.31	11718	74.22	
15-> 20cm	7562	87.59	2739	91.33	4823	84.22	
20-> 25cm	5213	93.71	1717	96.35	3496	91.47	
25-> 30cm	2922	97.13	815	98.73	2107	95.83	
30-> 35cm	1009	98.32	231	99.41	778	97.45	
35-> 40cm	418	98.81	81	99.65	337	98.15	
40-> 45cm	331	99.20	56	99.81	275	98.72	
45-> 50cm	232	99.47	31	99.90	201	99.13	
50-> 60cm	332	99.86	30	99.99	302	99.76	
60-> 70cm	101	99.98	3	100.00	98	99.96	
70-> 80cm	17	100.00	0	100.00	17	100.00	
80cm->	2	100.00	1	100.00	1	100.00	

Volumes (cu.m.): Positive = 50215 Negative = -89684 Total = -39469

5. Chart comparisons




5.1 Prior Surveys

Survey	Summary	Ship	Institution	Instrument (primary)	Navigation (primary)	Start Date (YYYYMM MDD)	End Date (YYYYMM MDD)
YK1999	Survey Data	Yokosuka	Japanese Agency for Marine-Earth Science and Technology (JAMSTEC)	SeaBeam 2100	UNKNOWN	19990801	19990922
YK2002	Survey Data	Yokosuka	Japanese Agency for Marine-Earth Science and Technology (JAMSTEC)	SeaBeam 2100	UNKNOWN	20020713	20020902
TUNE04WT	Survey Data	Thomas Washington	University of California, Scripps Institution of Oceanography (UC/SIO)	SeaBeam	GPS,AUTO LOG GYRO+2D DOPPLER SPD	19911005	19911016
SUM0408P	Survey Data	USNS Sumner	US Navy	Simrad EM121	UNKNOWN	20040917	20040920

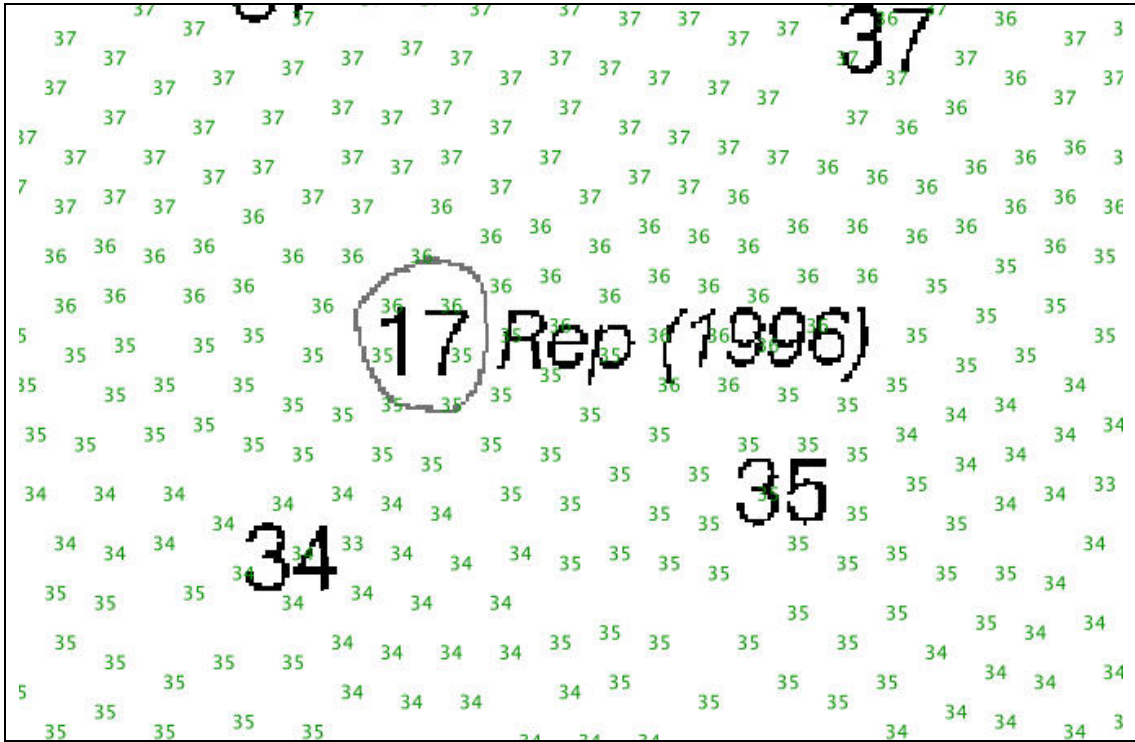
		61					
A198HW	Survey Data	Ocean Alert	US Geological Survey (USGS)	Simrad EM300	P-CODE GPS	19980130	19980223
COOK23MV	Survey Data	Melville	University of California, Scripps Institution of Oceanography (UC/SIO)	SeaBeam 2000	GPS	20020501	20020606
EW9801	Survey Data	Maurice Ewing	Columbia University, Lamont-Doherty Earth Observatory (CU/LDEO)	Atlas Hydrosweep DS	GPS	19980115	19980212

5.2 Charts Affected

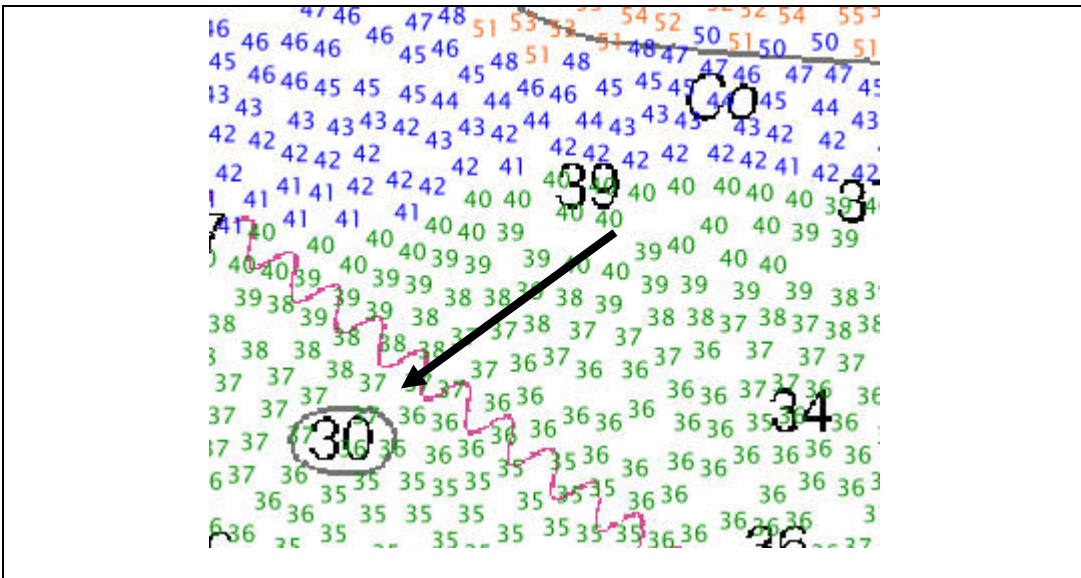
Select \ Deselect All:					
Chart No	Title	Ed.	Edition Date	Issue Date	Update No.
19351	CHANNELS BETWEEN OAHU MOLOKAI AND LANAI	10	2006-05-01	2009-05-30	136
19340	HAWAII TO OAHU	27	2008-03-01	2009-05-30	49
19013	HAWAIIAN ISLANDS NORTHERN PART	18	2006-11-01	2009-05-30	117

Click Image	Chart	Title	Ed.	Update Application Date	Issue Date	Cell Name	Select
	19013	Hawaiian Islands northern Part	1	2009-06-04	2009-06-04	US2HA05M	<input checked="" type="checkbox"/>
	19340	Hawaii to Oahu	1	2009-05-12	2009-05-12	US3HA20M	<input checked="" type="checkbox"/>
	19351	Channels Between Oahu, Molokai and Lanai	1	2009-05-29	2009-05-29	US4HA30M	<input checked="" type="checkbox"/>

5.3 Chart Discrepancies

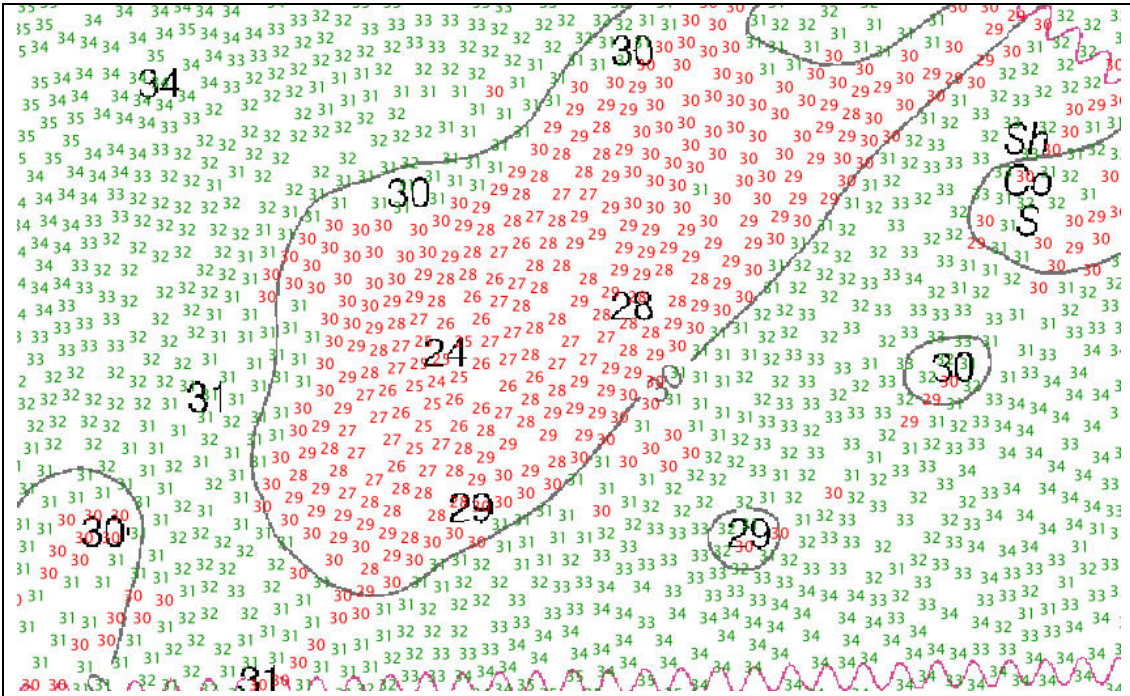


A 17 fathom shoal (Rep 1996) charted in Latitude 21.100417N and Longitude 157.488413 on NOS chart 19351 10th edition is considered disproved by the survey dataset.



A 30 fathom charted in Latitude 21.110 N and Longitude 157.471 on NOS chart

19351 10th edition is considered disproved by the survey dataset.



The hydrographer recommends updating the 30 fathom depth curve on NOS chart 19351 10th edition.

C.1 CROSSLINES

Due to operational specific issues, traditional crosslines were not conducted over the survey area. However, BASE surfaces were examined, and no systematic errors were identified.

Crosslines were compared to the Caris generated Base Surface. The QC report verified that greater than 95% of the data submitted met IHO order1.

C.2 CORRECTIONS TO ECHO SOUNDING

MBES data was corrected for sound velocity and tide in accordance with IHO standards.

D.1.2 Dangers to Navigation (Dton's)

No DTONs were identified by the field party.

D.1.3 AWOIS Items

No AWOIS items were located within the limits of H11767.

D.2 ADDITIONAL RESULTS

D.2.1 Prior Surveys

No prior surveys were listed for comparison in the project instructions.

D.2.2 Aids to Navigation and Other Detached Positions

No fixed or floating aids to navigation were positioned during this project.

D.2.3 Bridges and Overhead Cables

There are no bridges or overhead cables in the survey area.

D.2.4 Ferry Routes

There are no ferry routes in the survey area.

D.2.5 Submarine Cables and Pipelines

No submarine cables or pipelines were located in the survey area.

E. APPROVAL SHEET

**OPR-AHB-08
Penguin Bank, Hawaii**

Survey Registry No. W00205

Field operations for this basic hydrographic survey were conducted under my daily supervision with frequent checks of progress and adequacy. All bathymetry models, this Descriptive Report, and all accompanying records and data are approved.

This survey is adequate to supersede all prior surveys in common areas and for application to the relevant NOS nautical charts.

Also submitted in association with this descriptive report has been a series of reports and data:

- LEAD NP4 REPORT, Navy Technical Specification TS08FEX01

Respectfully Submitted:

Approved and Forwarded:

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT to ACCOMPANY
SURVEY W00205 (2009)**

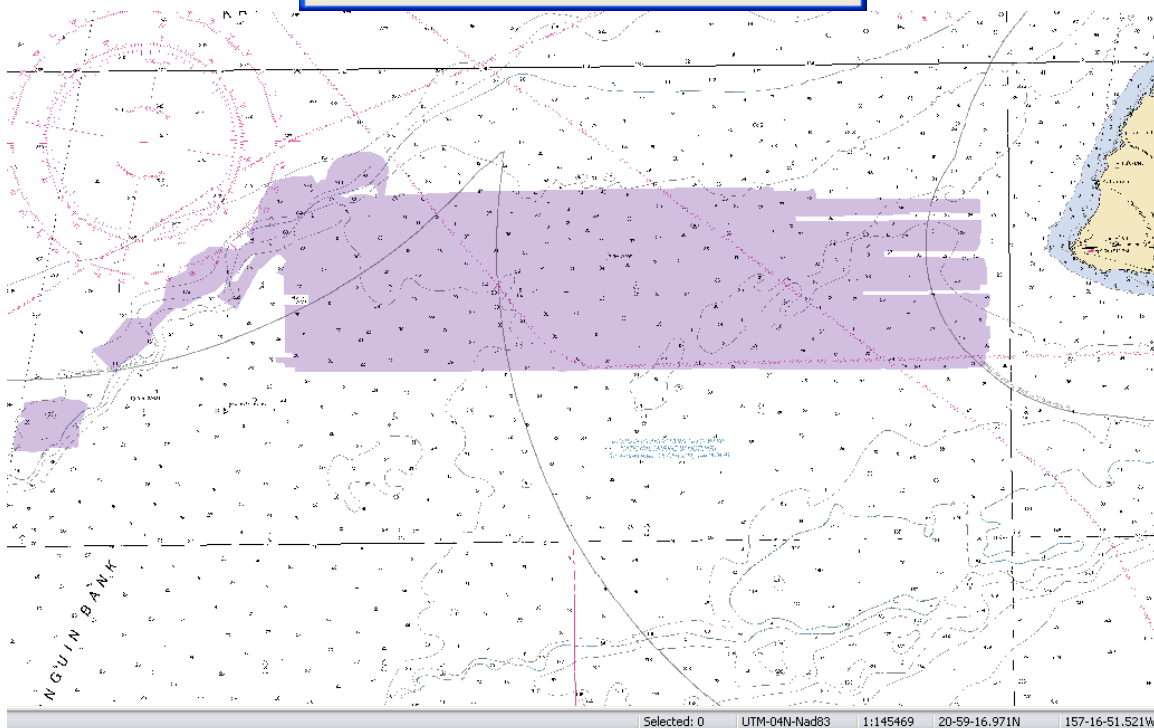
This Evaluation Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

A. AREA SURVEYED

A Basic Hydrographic survey was conducted in accordance with the Navy Technical Specification TS08FEX01. Hydrographic data were collected during the rim of the Pacific Exercise (RIMPAC) in the Hawaii islands chain. 100% unclassified MBES data was submitted to the Atlantic Hydrographic branch in February, 2009 for NOAA nautical chart updates. No bottom samples or detached positions were collected for this survey.

Survey Limits for W00205 are as follows:

Property	Value
Shape file type:	PolyLine
Number of records:	53
Bounding Box X min.:	-161.128890991211
Bounding Box Y min.:	18.4989280700684
Bounding Box X max.:	-156.494155883789
Bounding Box Y max.:	22.8667278289795



B. DATA ACQUISITION AND PROCESSING

B.1 DATA PROCESSING

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

HSTP PYDRO version 7.3 r2239
CARIS HIPS/SIPS version 6.1 SP1 HF 1-6
CARIS Base Manager version 2.1 HF 1-3
DKART INSPECTOR, version 5.0 Build 732 SP1
CARIS HOM version 3.3
CARIS S57 Composer version 1.0

B.2. QUALITY CONTROL

B.2.1. H-Cell

The AHB source depth grid used for W00205 nautical chart update was generated at the Atlantic Hydrographic Branch from the field's submitted raw *.gsf files. The grid was exported from Caris HIPS and SIPS using a depth threshold of 5m and 20m. The 5 meter depth threshold grid included depths from 5m to 90m and the 20 meter depth threshold grid included all other depths. The 5m and 20m grid was then combined in Caris BASE at 20 meter resolution.

The combined grid was then used to create a product surface grid with a resolution of 20m. The survey scale selected soundings were extracted from the 20m product surface. The survey scale selected sounding set is approximately 10 to 20 times the number of charted depths. The chart scale selected soundings are a subset of the survey scale selected soundings. The chart scale selected soundings were hand selected from the survey scale selected soundings to ensure that the chart scale selected soundings were a subset of the survey scale selected soundings.

Depth curves were created from the selected soundings set. Using a sounding color range method, depth curves were hand drawn. The depth curves are forwarded to MCD for reference only. The curves were utilized during chart scale sounding selection and quality assurance efforts at AHB. The depth curves are incorporated into the S57 W00205_SS deliverable.

The pre-compilation products or components (Stand Alone HOB files (SAHOB)) are detailed in the Pre-Compile Process Log attached at the end of this document. The SAHOB files included depth curves (DEPCNT), sounding selections (SOUNDG), features (SBDARE), Meta objects (M_COVR, M_QUAL), and cartographic Blue Notes. The individual SAHOB files were inserted into one BASE Manager feature layer and exported to S57 format in order to create the H-Cell deliverable.

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

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

The W00205 CARIS H-Cell final deliverables include the following products:

W00205_CS.000	1: <u>40,000</u> Scale	W00205 H-Cell with Chart Scale Selected Soundings and Cartographic Notes
W00205_SS.000	1: <u>10,000</u> Scale	W00205 Selected Soundings (Survey Scale) and Depth Curves

B.22. Junctions

No contemporary surveys exist for junctioning.

C. VERTICAL AND HORIZONTAL CONTROL

Final vertical correction processing was completed by the field unit with no additional correction required by Atlantic Hydrographic Branch. The field unit applied predicted water levels in conjunction with a tidal zoning which was accepted and approved by the US Navy. Sounding datum is Mean Lower Low Water (MLLW). Vertical datum is Mean High Water (MHW)

Horizontal control used for this survey during data acquisition is based upon the World Geodetic System of 1984 and UTM projection zone 04. The raw data was transformed to North American Datum of 1983 (NAD83), UTM projection zone 04 at the Atlantic Hydrographic Branch. Office ENC processing of this survey required translating the datum to meet S-57 ENC requirements.

D. RESULTS AND RECOMMENDATIONS

Chart and ENC comparisons were made in accordance with the largest chart located in the survey area.

D.1 CHART COMPARISON

19351 (10th Edition, 20090503)

Corrected through NM 07/11/2009
Corrected through LNM 07/11/2009
Scale 1:80,000

ENC Comparison

US4HA30M

Channels Between Oahu, Molokai and Lanai
Edition 1
Application Date 2009-05-29
Issue Date 2009-05-29
Chart 19351

D.1.1 Hydrography

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

a. The *24 fathom shoal (Rep 1997)* charted in Latitude 21° 05' 100.799" N, Longitude 157° 36' 00.954"W on NOS Chart 19351, 10th edition was not found by the survey. However the sounding is located on the perimeter of the survey boundaries and therefore could not be disproved by the survey without further investigation. As a result, the M_COVR was modified to exclude this feature from the survey limits. The hydrographer recommends to retain this feature as charted.

D.2. ADDITIONAL RESULTS

D.2.1. Aids to Navigation

No Aids to Navigation exist in the surveyed area

D.3. MISCELLANEOUS

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland. See Section D.1. of this report for a list of the Raster Charts and Electronic Navigation Charts (ENC) used for compiling the present survey.

D.4. ADEQUACY OF SURVEY

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

**APPROVAL SHEET
W00205**

Initial Approvals:

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

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

**Vanessa
Self**

Digitally signed by Vanessa Self
DN: cn=Vanessa Self, o=AHB, ou,
email=Vanessa.Self@noaa.gov,
c=US
Date: 2009.08.15 12:17:55 -04'00'

Vanessa R. Self

Physical Scientist

Atlantic Hydrographic Branch

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

Approved: _____

Richard Brennan

Lieutenant Commander, NOAA

Chief, Atlantic Hydrographic Branch