
U.S. Department of Commerce
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Data Acquisition & Processing Report

Type of Survey Hydrographic
Project No. OPR-W408-NRT4-09
Time frame June to October 2008

Locality

State Michigan
General Locality West Lake Erie, Detroit, and St. Clair Rivers

2008

Chief of Party

Lucy Hick, Team Leader

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Date

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Hydrographic Title Sheet

Data Acquisition & Processing Report

<i>State</i>	Michigan
<i>General Locality</i>	West Lake Erie, Detroit, and St. Clair Rivers
<i>Date of Survey</i>	June to October 2008
<i>Instructions Dated</i>	June 2, 2008
<i>Project No.</i>	OPR-W408-NNRT-08
<i>Vessel</i>	S1211
<i>Field Unit</i>	Navigation Response Team 4
<i>Chief of Party</i>	Lucy Hick, Team Leader
<i>Surveyed By</i>	Lucy H, Frank Younger, John Doroba

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DATA ACQUISITION & PROCESSING REPORT

to accompany
OPR-W408-NRT4-08

Year of Survey: 2008
Navigation Response Team 4
NOAA Launch S1211
Lucy Hick - Team Leader

A EQUIPMENT

A.1 VESSEL

NOAA Survey Launch S1211 was used for all operations during this project. This vessel is on loan from Navigation Response Team 1 (NRT1). A Hydrographic Systems Readiness Report (HSRR) was submitted to the Atlantic Hydrographic Branch by NRT1 in April 2008.

S1211 is an Aluminum survey launch, built by the SeaArk Company (Monticello, AR) in 2001. It weighs approximately 10,000 lbs and is approximately 30 ft long. It is powered by dual Honda 130 HP outboard engines and a Kohler 7.3 kW generator. Fuel capacity is approximately 100 gallons unleaded.

On September 22, 2008 the 130 HP engines were replaced with two new 200 HP Honda outboards.



The inventory list of equipment, including hardware and software was compiled by NRT1 and can be found in the S1211 2008 HSRR. Any exceptions to this list are noted in the applicable sections below.

A copy of the vessel wiring diagram was submitted with the S1211 2008 HSRR. NRT4 made no changes to the wiring of S1211.

A.2 VERTICAL BEAM ECHOSOUNDER (VBES)

Survey Launch S1211 is equipped with a vertical beam echosounder, for acquiring sounding data. This system is comprised of the ODOM Echotrac CVX2 topside unit, an Innerspace single frequency transducer, and a Dell PC. All sounding data, for this project, was acquired using this system.

While collecting VBES data, the least depths were sometimes not accurately digitized by the echosounder. However, the least depths were visible in the analog trace. NRT4 personnel adjusted the VBES settings to compensate for this. When this was not effective, the least depths were determined from the analog trace and the digital data was manually edited during CARIS post-processing.

The VBES was calibrated 2008 by NRT1. Information on this calibration can be found in the S1211 2008 HSRR.

NRT4 did no conduct additional calibration tests.

A.3 SIDE SCAN SONAR (SSS)

Survey Launch S1211 is equipped with towed side scan sonar, for identifying underwater objects. This system is comprised of a Klein 3000 towfish, a Klein Topside Processing Unit, and a Dell PC.

The side scan sonar data were acquired at frequencies of 100kHz and 500kHz. The recorder was set to either 50 meter or 75 meter range scale, depending on depth.

Daily confidence checks were conducted by observing side scan imagery in the vicinity of known contacts, such as breakwaters and piers. Side scan data were considered satisfactory if these items could be distinguished throughout the entire range of the side scan trace. The confidence checks were performed daily at both frequencies. Coverage of 200% was obtained wherever possible in the required survey areas and where water depth and/or hazards permitted. Side scan sonar coverage was conducted to the 12-foot depth curve where possible.

When operating in shoal waters, a short tow is required for the Klein system. When cable-out was approximately 7 meters or less, minor degradation of the side scan imagery may be noted due to cross-talk between the Klein and the Odom echosounder.

SSS cable-out readings are provided directly to the SonarPro software through a Dynpar Max2 Cable Counter. Additionally, the cable has been marked, every two meters, with

colored electrical tape. The accuracy of the cable counter is verified on a daily basis by comparing the digital cable-out value with the physical markings on the cable. The cable was marked in September 2008 by NRT4 personnel, using a steel tape.

An SSS calibration test was performed by NRT1 in 2008. Details of that test can be found in the S1211 2008 HSRR.

NRT4 did not conduct an addition calibration test.

The Klein survey computer, described in the HSRR, was found to be inoperable and was sent to the NOS Help Desk for repair. This computer was replaced by NRT4's Side Scan Sonar (SSS) acquisition computer:

Manufacturer/Model	Dell Optiplex 745
Date Purchased	7/27/2007
Date of Last Rebuild	N/A
Processor	Core 2 @ 2.66 GHz
RAM	2GB
Video Card	ATI Radeon X1300 Pro
Video RAM	256 Mb

A.4 POSITIONING SYSTEM

A.4.1 Vessel

Survey Launch S3001 is equipped with a Differential Global Positioning System (DGPS) for obtaining positioning the vessel, during data acquisition. This system is comprised of a Trimble DSM212L DGPS beacon receiver & antenna.

A.4.2 Backpack

A Trimble DGPS backpack unit was used for collecting shoreline data and positioning some stationary Aids to Navigation (AtoNs). NRT4 did no use the system described in the HSRR. Instead, the following system was used:

POSITIONING & ATTITUDE EQUIPMENT						
Equipment Type	Manufacturer	Model	Serial Number	Firmware/Software Version	Date of last Calibration	Date of last Service
DGPS Backpack Unit Receiver DGPS Backpack Unit Antenna DGPS Backpack Hand Help Unit	Trimble	33302-51 33580-50 TSCe P/N 45286-00	224010134 0220361549 00030965		N/A	N/A

A.5 SOUND VELOCITY PROFILERS (SVP)

Sound velocity data, for this project, were acquired using an ODOM Digibar Pro Sound Velocity Profiler and a Sea-Bird SBE 19+ Sound Velocity Profiler. NRT4 did not use the SVPs described in the HSRR. Instead, the following instruments were used:

SOUND SPEED MEASUREMENT EQUIPMENT						
Equipment Type	Manufacturer	Model	Serial #	Firmware /Software Version	Date of last Calibration	Date of last Service
Sound Speed Profiler	Sea-Bird	SBE 19+	19P38684-4674		10/10/2008	N/A
Sound Speed Profiler	Odom	Digibar Pro	9150	v1.10	8/8/2008	N/A

When possible, an SVP cast was performed at the end of each survey day. Data acquired by these instruments were applied to the sounding data in post-processing.

The Digibar was calibrated, by the manufacturer in August 2008. The Sea-Bird was calibrated, by the manufacturer in October 2008. The calibration reports can be found in Appendix IV.

A.6 LEAD LINE

NRT1 used a leadline to verify the accuracy of the VBES. This leadline was calibrated by NRT1. Information about this calibration can be found in the S1211 2008 HSRR.

NRT4 did not use or calibrate a leadline during this survey.

A.7 AUTOMATIC LEVEL

A Sokkisha B1 Automatic Level was used to determine the dynamic draft (settlement & squat) values for S1211 after the installation of the new engines.

NRT4 did not use the level described in the S1211 2008 HSRR. Instead, the following instrument was used:

TIDES & LEVELING EQUIPMENT						
Equipment Type	Manufacturer	Model	Serial Number	Firmware /Software Version	Date of last Calibration	Date of last Service
Automatic Level	Sokkisha	B1	4968	N/A	10/1/2008	10/1/2008

The level was serviced and calibrated by Level Repair of Warren, MI in October 2008. After the calibration, a Kukkamaki collimation check was performed on the instrument. This check was done on a level parking lot at the US Coast Guard Air Station Detroit, at Selfridge Air National Guard Base. The standard of accuracy for NRT4's level was measured to be 0.010 mm/m, which is below the cut-off limit of 0.05 mm/m. Data from this check and the level Letter of Certification can be found in Appendix IX.

A.8 SOFTWARE

A software inventory was provided in the S1211 2008 HSRR. No changes were made to the software on the acquisition computers, except for SSS PC, as described above.

All processing was completed on NRT4 office computers.

See Appendix I for a listing of software installed on the SSS acquisition computer, as well as a list of the software installed on all processing computers, used during this project.

A.9 PERSONNEL

The following persons were involved in survey operations for this project:

SURVEY DEPARTMENT			
Name	Current Position	Years of Hydrographic Experience	Notes
Lucy Hick	Team Leader	11	USCG AUX "America's Boating Course"
Dan Jacobs	Physical Science Technician	2	USCG AUX "America's Boating Course"
John Doroba	Physical Science Technician	2	USCG AUX "America's Boating Course"

No personnel listed in the S1211 2008 HSRR were involved in this project.

B QUALITY CONTROL

NRT4's processing flow diagrams for both VBES & SSS can be found in Appendix VIII.

No filters or smoothing were used in CARIS.

While, both 100kHz & 500kHz SSS data were acquired, only 500kHz data were processed.

C CORRECTION TO ECHOSOUNDING

C.1 STATIC OFFSETS

Static offsets of S1211 were confirmed in 2008 by NRT1. Details of this can be found in the S1211 2008 HSRR. NRT4 did not conduct additional static offset measurements.

Reports of the CARIS vessel configuration files (HPVs) can be found in Appendix II.

C.2 DYNAMIC OFFSETS

Dynamic offsets (settlement & squat) for S1211 were obtained by NRT1 personnel in April 2008. Information about these offsets can be found in the S1211 2008 HSRR.

New dynamic offsets were obtained by NRT4 on October 10, 2008, after the installation of the new outboard engines.

The optical level technique was used, as described in the Field Procedures Manual (05/2008). Measurements were taken in Lake St. Clair, on a clear and calm day. The optical level was set up on pier of the Lake St. Clair Light, and the vessel was driven line, parallel with the level's line of sight. The vessel was loaded as close as possible to how it would be on a typical survey day. The fuel tank was full, and both engines were trimmed level.

New dynamic offsets were added to the CARIS HPV and applied to all soundings collected after September 20, 2008.

Results from the settlement and squat measurements can be found in Appendix IX.

C.3 WATER LEVEL CORRECTORS

All soundings were reduced to Low Water Datum (LWD) with verified water levels and final TCARI grids. Field personnel made no changes these data.

The operating water level stations at Algonac, MI (9014070), St. Clair State Police, MI (9014080), Dry Dock, MI (9014087), Mouth of the Black River, MI (9014090), Dunn paper, MI (9014096), Fort Gratiot, MI (9014098), St. Clair Shores, MI (9034052), Gibraltar, MI (9044020), Wyandotte, MI (9044030), Fort Wayne, MI (9044036), Windmill Point, MI (9044049), Toledo, OH (9063085) and Fermi Power Plant, MI (9063090) provided water level reducers for this project. Six-Minute verified water levels (in UTC) for this station were downloaded from the CO-OPS website, <http://tidesandcurrents.noaa.gov/olddata> .

Water level corrections were generated using the TCARI function in Pydro and applied to the soundings using CARIS HIPS and SIPS.

APPROVAL SHEET

OPR-W408-NRT4-08

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Michigan

All calibrations and measurements described in this report were conducted under my daily supervision with frequent checks of progress and adequacy. This Data Acquisition and Processing Report, and all accompanying records and data are approved.

Respectfully,

Submitted:

Lucy Hick

Team Leader, Navigation Response Team 4