

DATA ACQUISITION & PROCESSING REPORT

Survey Year: 2012

Field Unit: USCGC Hickory (WLB-212)

Chief of Party: LCDR B. Krautler

Lead Hydrographer: IT2 B. Poore

Date of finalized DAPR: 13DEC12

Locality: Arctic Ocean

Dates of Acquisition: Arctic Shield Patrol

22JUN12 – 12AUG12

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Introduction

The USCGC HICKORY is a 225-foot sea going buoy tender with a crew of 40 enlisted and seven officers. The crew is divided into three departments who work together to form team Hickory. (Deck, Operations/Support, and Engineering). The HICKORY is a multi-mission cutter which includes: aids to navigation, search and rescue, maritime law enforcement, marine environmental protection and homeland security. Most recently, the HICKORY began acquiring and recording bathymetric measurements to aid in Arctic mapping efforts. The cutter's primary mission is aids to navigation and most of our aids are around the Kenai Peninsula. Hickory also is able to meet any demands from District 17 Command to serve any place in Alaskan waters.

Section A. Equipment

Vessel

The CGC HICKORY, a *Juniper*-class cutter (WLB) was designed to replace the 180-foot Seagoing Buoy Tender. There are two classes of 225' WLBs. Hickory is a B-Class (hulls 206-216 built and commissioned between 2001 and 2004). The cutter is 225 feet long, 46 feet abeam, and commands a 13-foot draft. Length between perpendiculars is at 206 feet with endurance of 21 days un-replenished and 45 days replenished. The vessel displaces 2000 long tons at full load, runs two Caterpillar 3608 engines and is rated to reach 6000 nautical miles at 12 knots.

Positioning Systems

HICKORY uses a MX-Marine MX420 DGPS/GPS receiver, coupled with a Raven Model # 063-0171-924 GPS antenna to acquire positions with a rated accuracy of 5 meters or better 95% of the time, when within the range of a DGPS beacon. Hickory utilizes the MX-420 for GPS and DGPS integration with the Leica MX-525. Hickory technicians configure the MX-420 NMEA 0183 output sentences for DTM, GGA, GLL, GRS, GSA, GST, RMB, RMC, VHW, and VTG. Onboard this equipment is primarily used for the "Positioning aids to navigation and CAPN'S Program Navigation Software". The unit is configured for DGPS in manual mode to pick up the closest DGPS beacon correction signals. These units undergo quality assurance testing ISO 9001 from the Electronics Repair Facility in Baltimore, MD. Unit Technicians verify proper operation by performing a SOVT (system operation verification test) prepared by C3CEN (Command, Control, and Communication Engineering Center) in Portsmouth, VA.



Figure 1 - MX-420 S/N: 00805850

The MX-Marine/Leica MX-525 is a DGPS beacon receiver used in conjunction with MX420, which increases position accuracy within 1 meter. This piece of equipment is verified under the same conditions as the MX420.

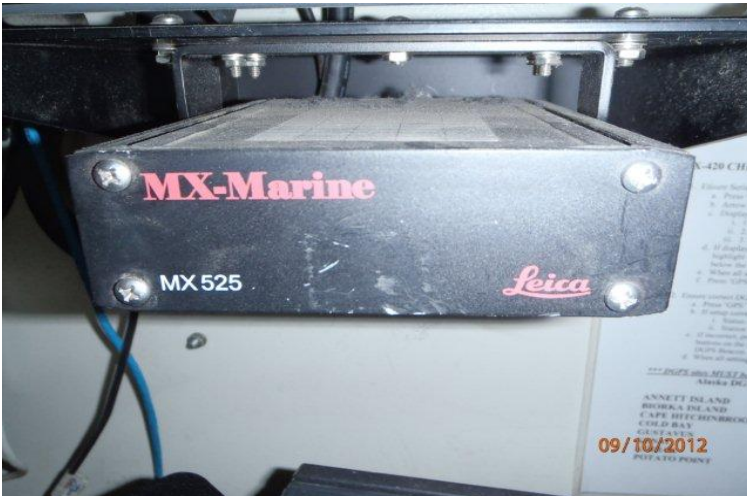


Figure 2 - MX-525 S/N: 0405-13358-0041

Sound Speed Equipment

Sound speed through water was not measured by HICKORY during this project.

***If it had been, this will be the place to report it, provide a description of equipment used, reported precision of that equipment, procedures followed to ensure accuracy of measurements, and to provide photos of the equipment.

Bathymetric Measurement Equipment

For bathymetric measurements, the USCGC HICKORY uses DFF1 Transceiver Unit coupled to a hull mounted transducer GEM Electronics Model SS505 to the Furuno RDP 149/1934C. The Transducer operates at two frequencies, LF 50kHz and HF 200kHz, and is rated for depths between 5 meters and 1500 meters for the plotter but limited by the transducer around 600 meters. This is a single beam sounder. This unit is a repairable item through SFLC's mandatory turn in process. The repairable item is QA (Quality Assured) to ISO 9001 standards. Upon installation the system will be SOVT'd by onboard competent technicians. Hickory uses lead line comparisons to the sounder to create offsets as appropriate. The last comparison was completed on 07AUG12 at Nome, AK Pier.



Figure 3 - RDP-149 Sounder S/N: 4345-9917

***This is also a good place to include discussion about rated precision, accuracy, and any other manufacturer's specs based on supplied manufacturer's manual. Attached Furuno Document Chapter 4.

Computers and Software

Bathymetric data is collected by the DFF1, then passed on to Windows based PC via NMEA string, and recorded in Hypack, Inc.'s Hypack Software [version of Hypack used] Hypack 2010 Version 10.0 10.0.0.21, as raw files (.raw) the files are then edited for tide corrections and sorted. The Hypack software used is installed on 3 Panasonic CF-19 ToughBooks. The processing computer is a HP Compaq DX2400 Microtower. Raw bathymetry was then processed in Hypack 2010. The final product was bathymetric data, delivered in the .edt file format and sorted files (.xyz) for viewing. Processing variables and parameters include sorting soundings by radius and filtering minimal and maximum depth to account for anomalies. During the editing process the soundings are corrected for tides and offsets. During this data collection no tide corrections were used, as there were no tide stations available.

Mobile Laptop Specifications

Equipment details

Manufacturer / model/ series: Panasonic CF-19 ToughBook

Serial numbers: # 8LKSB31790 # 8LKSB331445 # 8LKSB31417 Specifications:

OS version: Windows XP Professional SP2 (5.1.2600)

Processor: Intel Core2 Duo U7500 @ 1.06Ghz

Video: Integrated Mobile Intel 965 Express Chipset W/ 384 MB RAM

HD: 74.5 GB @ 4800 rpm

RAM: 3GB

Processing Computer Specifications

Equipment details

Manufacturer / model/ series: HP Compaq DX2400 Microtower

Serial numbers: # MXL9040F29

Specifications:

OS version: Window XP Professional SP2 (5.1.2600)

Processor: Intel Core2 Quad Q9400 @ 2.66 Ghz

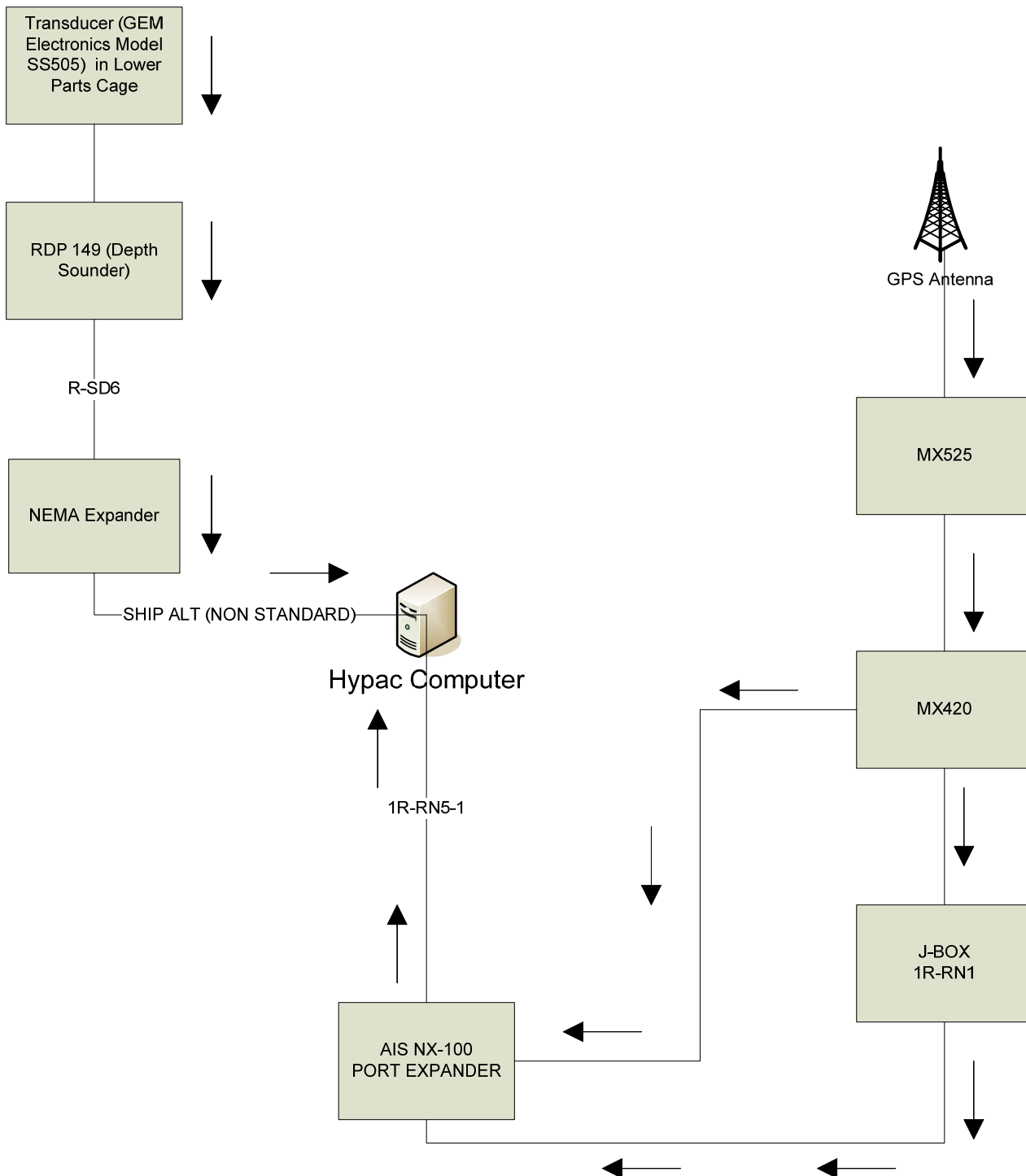
Video: ATI Radeon HD 5500

HD: 500 GB @ 7200 rpm

RAM: 3.25GB @ 1.9Ghz

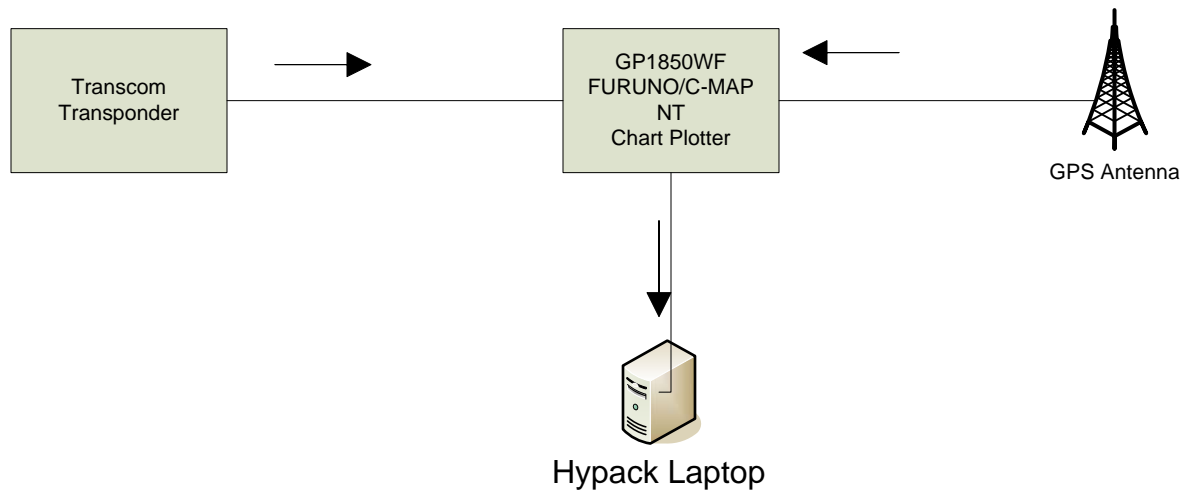
A1

LINE DRAWINGS

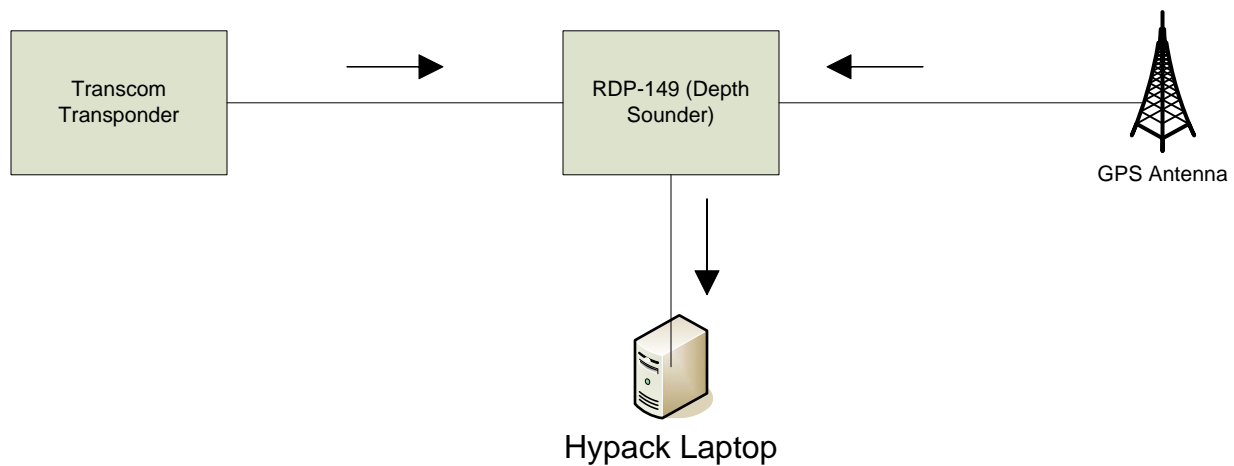


A2

Hickory (WLB-212) Small Boat 231020



Hickory (WLB-212) Small Boat 24232



Section B. Quality Control

B1 Single Beam (CGC Hickory and CG 241020)

Incremental adjustments to the Furuno RDP-149 for sounding data included changes in range and gain were made during acquisition to ensure acquisition of the best quality bathymetric data. Vessel speed was adjusted in accordance with the limitations of the sounder in the small boat. Typical windows in Hypack for monitoring raw sensor information included, vessel motion, GPS quality, intensity, and satellite coverage. Single beam lead line checks were conducted to confirm sounding accuracies in Nome, AK. LTJG Halsig and LT Blankenship completed the comparison on 07AUG12.

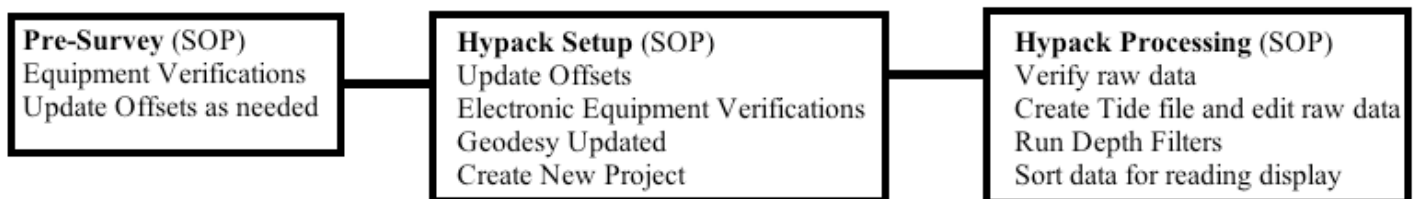
B2 Data Processing

A systematic approach to tracking data has been developed to maintain data quality and integrity. IT2 Poore created an SOP (standard operating procedures) and implemented a Hypack data collection logbook to identify and track the flow of data as it is collected and processed. Pre-survey checklists are completed to ensure correct NMEA sentences; hardware settings, geodesy and offsets are set up in the Hypack project. All survey tracklines are planned perpendicular to the depth contours or along the trackline by CGC Hickory. During the survey process the Electronics Division verifies NMEA sentences, sounding data, speed, heading and position. After the survey has been completed surveying an area and stopped logging, the Hydrographer will pull the RAW file (raw soundings just obtained) off of the survey vessel/ownship and begin Post Survey Processing. Before processing a tidal file (.tdx) is created using the closest tide station. Processing variables and parameters include sorting soundings by radius and filtering minimal and maximum depth to account for anomalies. During the editing process the soundings are corrected for tides and offsets. During this data collection no tide corrections were used, as there were no tide stations available. The final edited file is then sorted which HICKORY to parse down the data gathered so it can be easily readable when overlaid on a .kap chart and on an S 57 ENC.

B2.b Static Draft

Draft was measured before departing ports from draft marks on the side of the vessel's hull. The Engineering Officer before every departure provides this information, which is used for updated vessel file offsets.

B3 Flowchart



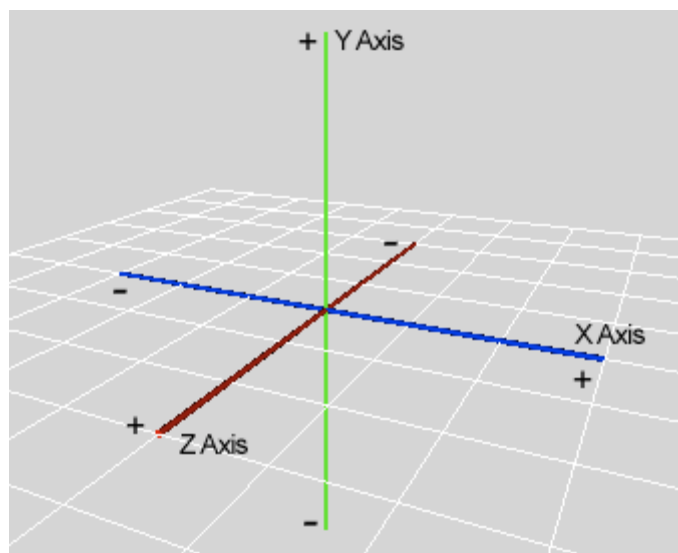
Section C. Corrections to Echo Soundings

C1

OFFSET MEASUREMENTS
(IN INCHES)

<i>USCGC HICKORY WLB 212</i>		
<i>Z</i>	<i>X</i>	<i>Y</i>
<i>280 ¾ in</i>	<i>-52 ¾ in</i>	<i>822 ½ in</i>

<i>231020 Small Boat</i>		
<i>Z</i>	<i>X</i>	<i>Y</i>
<i>-133 ½ in</i>	<i>-24 ¼ in</i>	<i>78 ¼ in</i>



SB TIMING / LATENCY TEST RESULTS**N/A****SB AND LEADLINE COMPARISON RESULTS****Location: Nome Pier****Date: 07-August-12****Time: 1615U**

Port	Starboard
Lead line: 7.2M	Lead line: 7.21M
Sounder: 10.7'	
Lead line offset w/ draft of 13'	
-.37'	-.34'

Section D. Approval Sheet

As Commanding Officer, I have ensured that standard field surveying and processing procedures were followed in producing this examination. I understand that these data are considered reconnaissance in nature until further validated by NOAA's Pacific Hydrographic Branch for survey quality in accordance with the Office of Coast Survey Hydrographic Surveys Division's Field Procedures Manual, and NOS Hydrographic Surveys Specifications and Deliverables. Field operations for this basic hydrographic survey were conducted under my daily supervision with frequent checks of progress and adequacy.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to N/CS33, Atlantic Hydrographic Branch.

The Data Acquisition and Processing Report for OSD-PHB-12 are attached and contain additional information relevant to this survey.

Approved and Forwarded:

LTJG Daniel Halsig, USCG
Operations Officer

LCDR Brian Krautler, USCG
Commanding Officer

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

LTJG Joel Wright, USCG

ET1 Kevin Erickson, USCG

IT2 Benjamian Poore, USCG