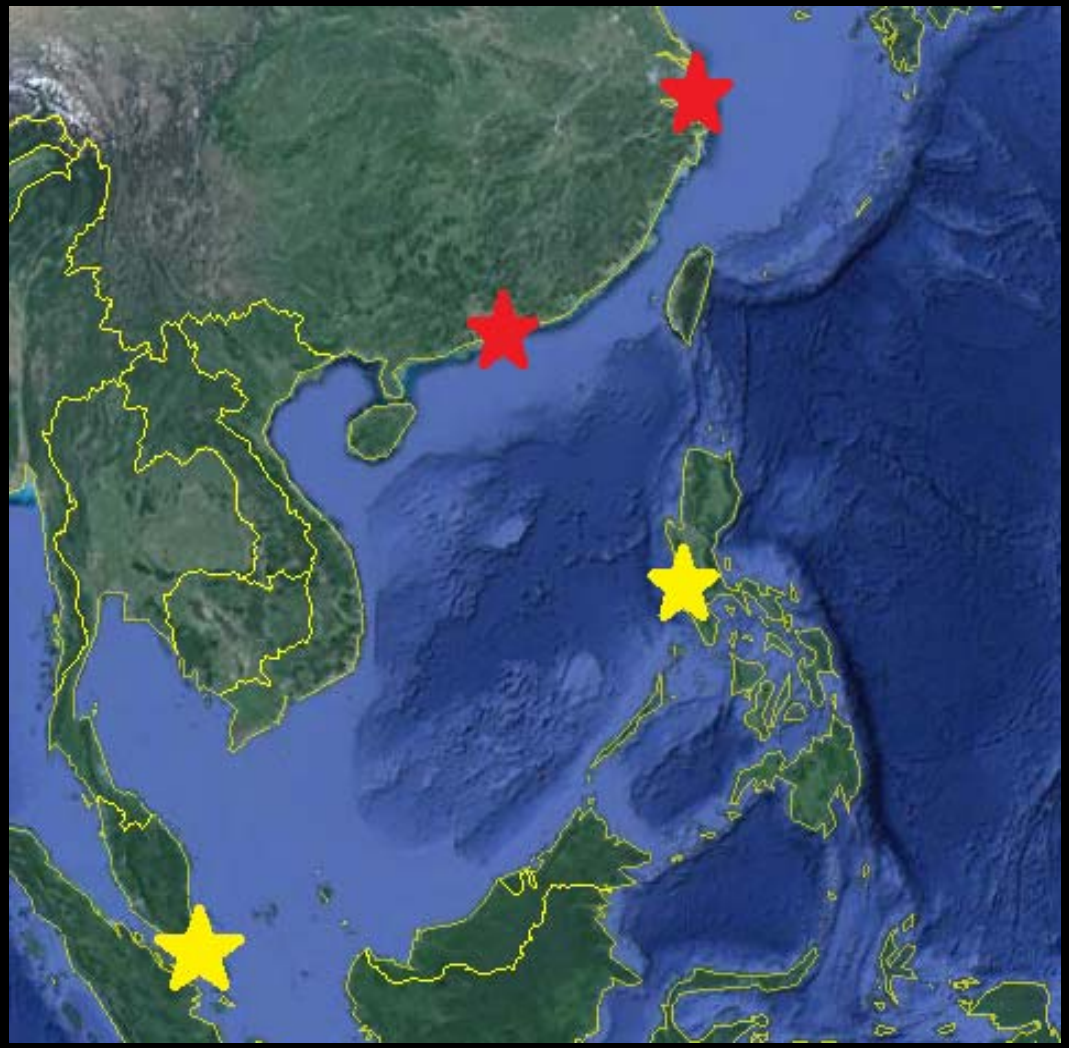
NORBIT iWBMS
Singapore/Subic Bay/Shanghai

November, 2013

The Crew:

The Vessels:

The Locations:

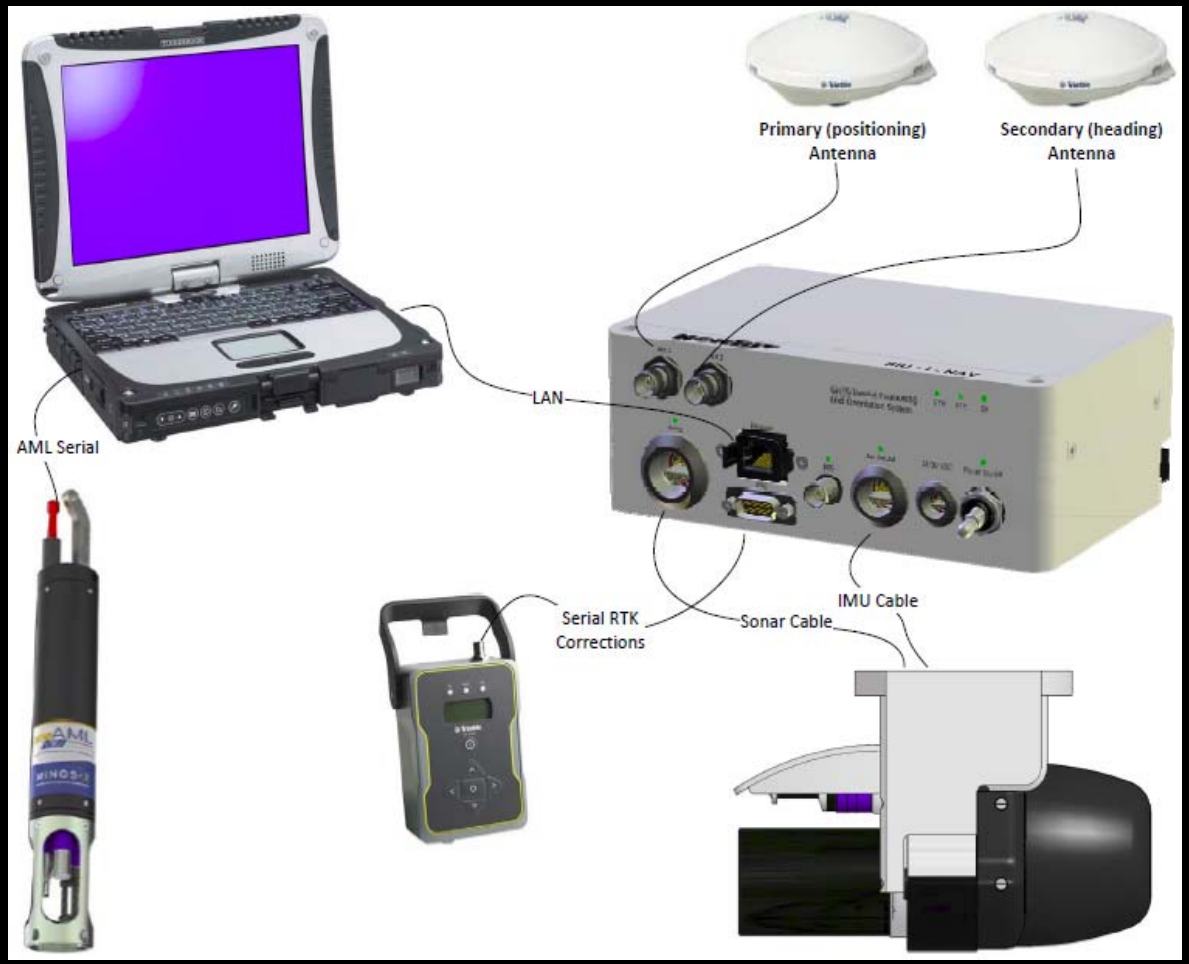


The System:

NORBIT

The Complete Kit:

A tightly integrated positioning, attitude, bathymetric mapping kit.



The iWBMS kit was designed with the operator in mind.

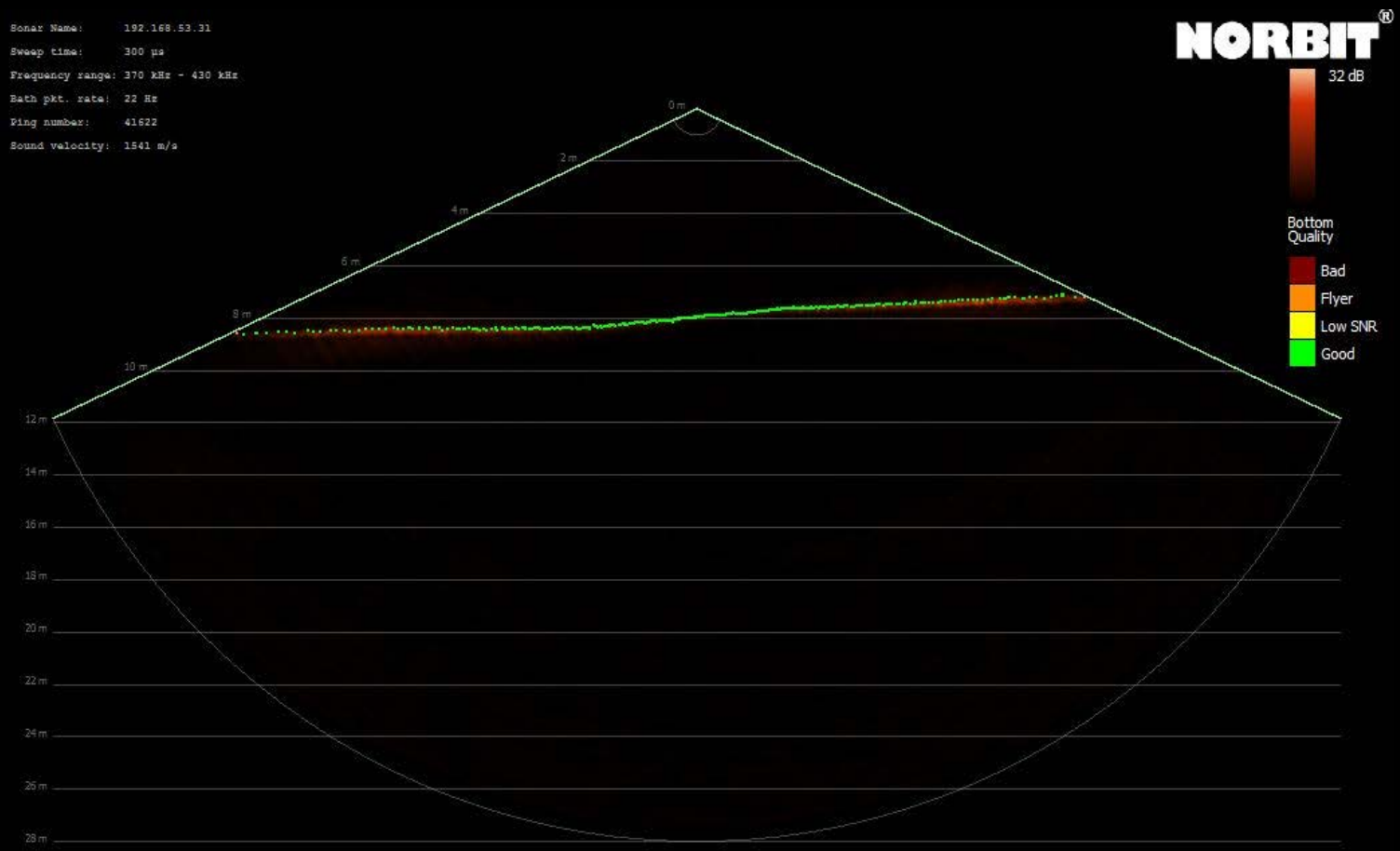
Simple integration and configuration.

It is now possible to be fully setup in less than 2 hours if proper procedures are followed.

These procedures are explained here….

The NORBIT WBMS GUI

The WBMS GUI



November, 2013 SE Asia

Singapore – Retan Darat Channel

Demonstration of Ultra-Fast Multibeam Sensor Suite Mobilization & Survey From Vessel of Opportunity
Singapore - 28th October, 2013

OVERVIEW:

This Three-Pager introduces the simple, ultra-fast mobilization capability of the new NORBIT integrated multibeam sonar kit on an older wooden vessel of opportunity in Singapore on 28th October, 2013. A demonstration was held for public and private survey & engineering groups on behalf of Seismic Asia Pacific and Coastal Diagnostic Services. Installation and demonstration was conducted by Seahorse Geomatics.

SENSOR SUITE INSTALLATION AND SURVEY:

10:30am - Arrive at Vessel Familiarization & Installation

Integration of NORBIT iWBMS multibeam sonar affixed to end of a 55mm dia. stainless steel pole 2.4m below deck level. Three ropes were attached to sonar bracket and run towards bow, towards stern and under keel to opposite gunwale to reduce excessive flexing of sonar with respect to the GNSS antennas. Trimble antennas were affixed with tie-wraps in port/starboard orientation. The WBMS includes an AML speed of sound probe integrated into the sonar.

11:30am - Sensor Offsets (measured to COG for heave)

Offsets measured with tape from antennas to IMU (located at front of sonar) and from IMU and sonar to Center of Gravity. Distance measured between primary (starboard) antenna and secondary (port) antenna then confirmed via Applanix GAMS calibration.

11:45am - Software Setup (WBMS, Applanix, Hypack)

The electronics topside consists of a standard 2-yr old Lenovo X220 laptop, an auxiliary 17" widescreen monitor, iWBMS Sonar Interface Unit (SIU) and a RTK radio receiver (signals were not useable). The setup required a single cable (network) from the laptop to control the NORBIT WBMS sonar and Applanix Wavemaster. Hypack/Hysweep 2013a installed and operated from same laptop. NORBIT WBMS user interface, Applanix POSView and Hypack/Hysweep were then configured with measured offsets and typical tuning.

12:16am - Commence 1st Survey Line

A random area, dredged two years prior, in the Retan Darat Channel was surveyed. Area is heavily trafficked creating a bouncy survey despite area being well protected from weather. Sound speed profiler and RTK GNSS corrections signal not available at the time of the demonstration survey. Only the integrated sound speed probe (surface) values were used. Tide values applied were published predicted values. Sound speeed issue noticable only in shallow areas where lesser current occurs (possibly a temperature differential). Survey depths of 4 to 18 meters with final swath width of >50m and 200% coverage obtained and binned to 50cm. At the end of survey, once a suitable location was found from bathymetry, a multibeam alignment calibration was made from three lines running from the flat area and up the bank. After two hours of surveying (including calibration lines) 37.6 Hectares was surveyed to well within IHO Special Order (and even to US Army Corps of Engineers New-Work recommended specifications: 0.1ft Bia w/ 0.8ft 2-sigma cell deviation) assuming that predicted tides were correct. Performance tests previously made on 8th October – this data available upon request.

November, 2013 SE Asia

The Philippines – Subic Bay

NAMRIA 5.25m Survey Skiff – Second Delivery to The Philippines first repeat customer by Seismic Asia Pacific.

Antennas fixed to sturdy antenna bar 2 meters apart.

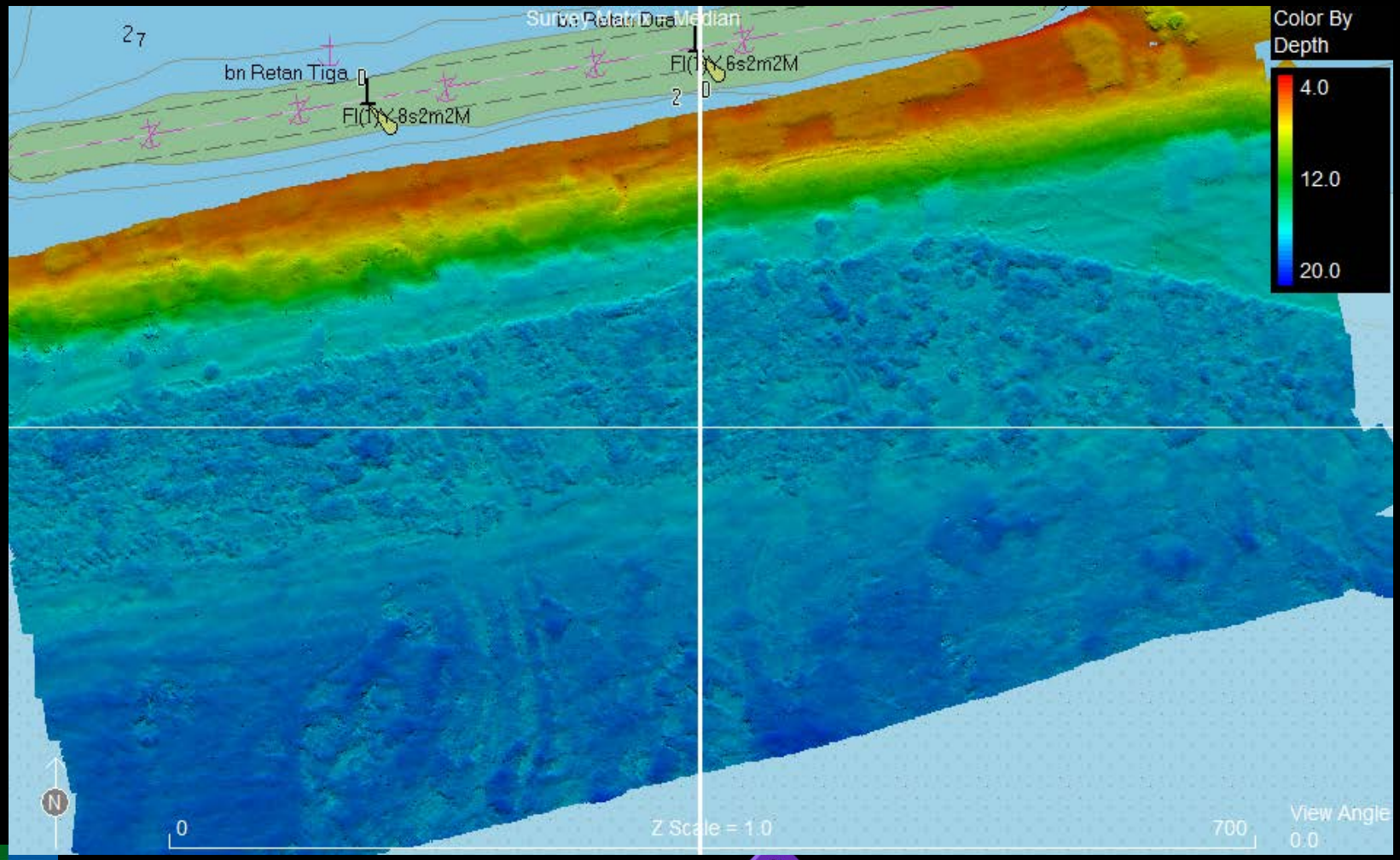
Sonar pole is stout and not flexible. With antennas mounted to same pole assembly, the entire kit maintains rigidity. Also, the pole may be rotated out of water for fast transits and trailering. Alignment (patch) values unlikely to change.

Sonar/IMU are located 92cm below water surface

November, 2013 SE Asia

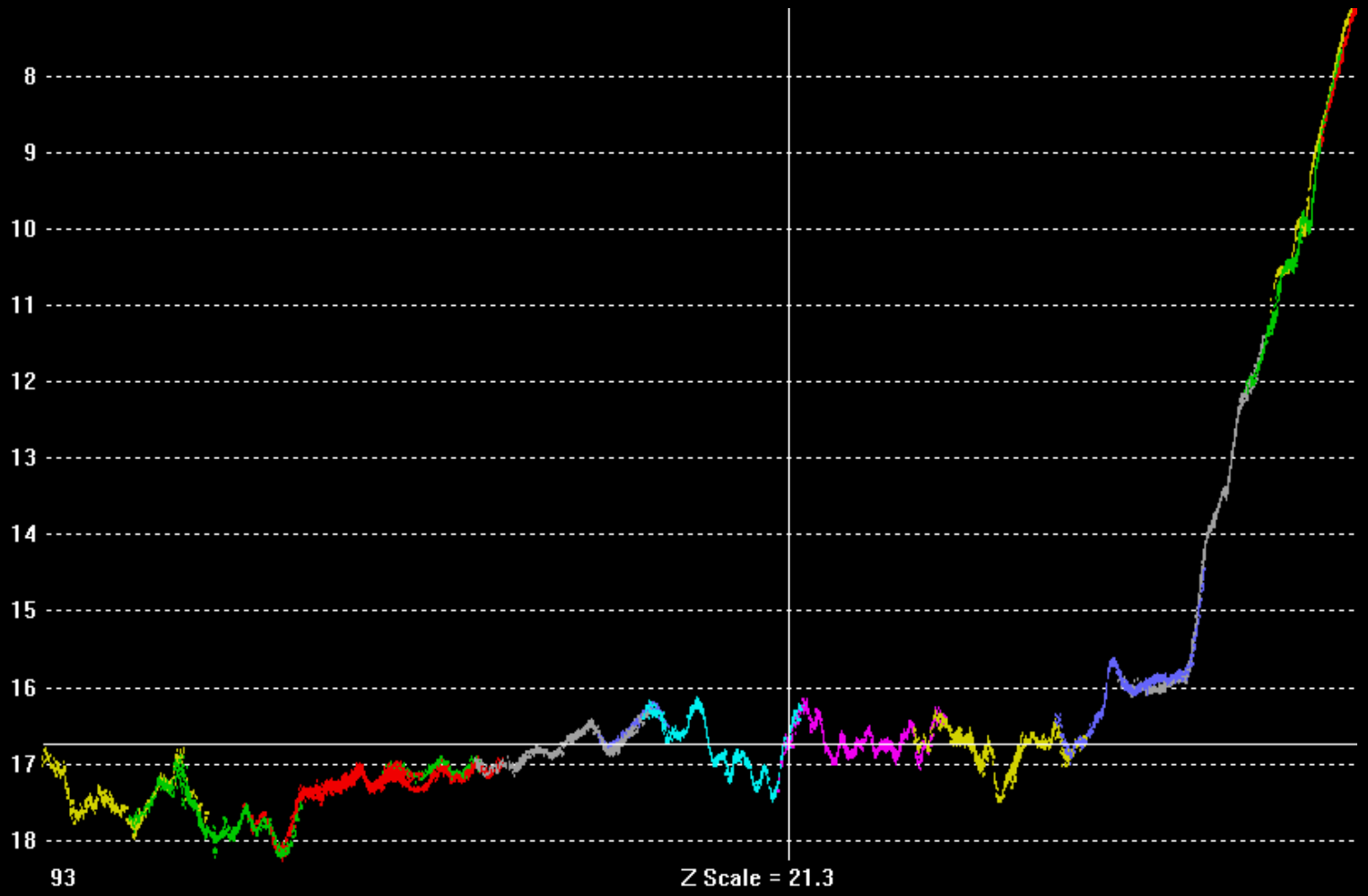
Singapore – Retan Darat Channel

Demonstration Survey – Predicted Tides and No Sound Speed Profiler



Singapore – Retan Darat Channel

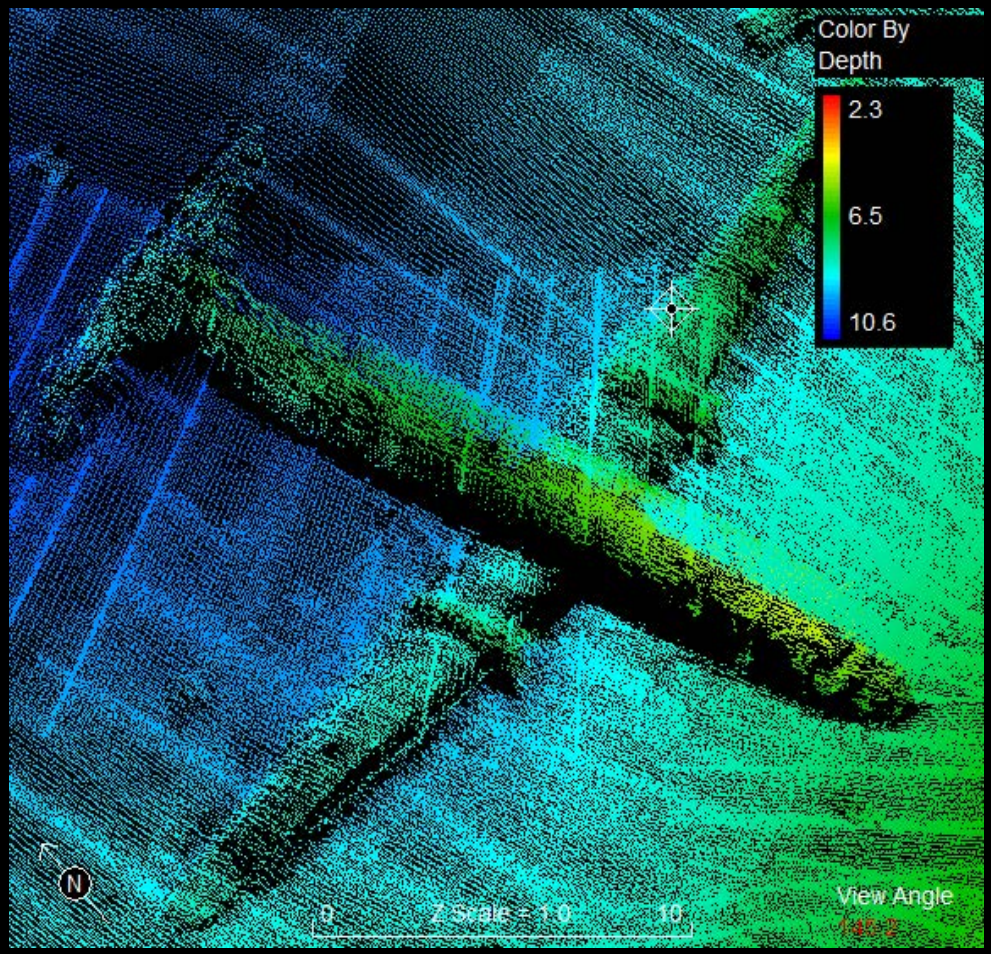
Demonstration Survey – Predicted Tides and No Sound Speed Profiler



Step 4: Software Configuration

The Philippines – Subic Bay

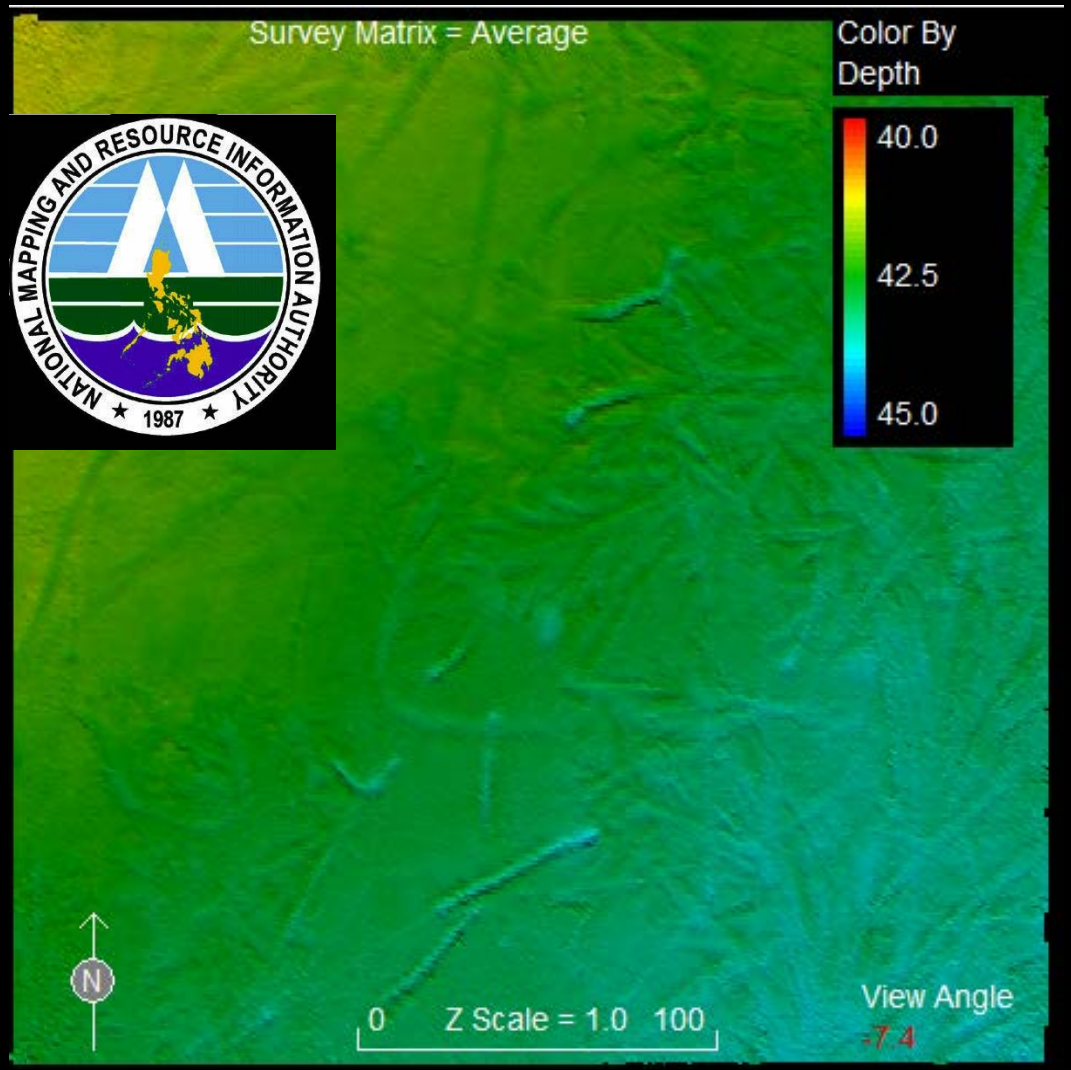
Quick survey of plane wreck (sunk for recreational diving)

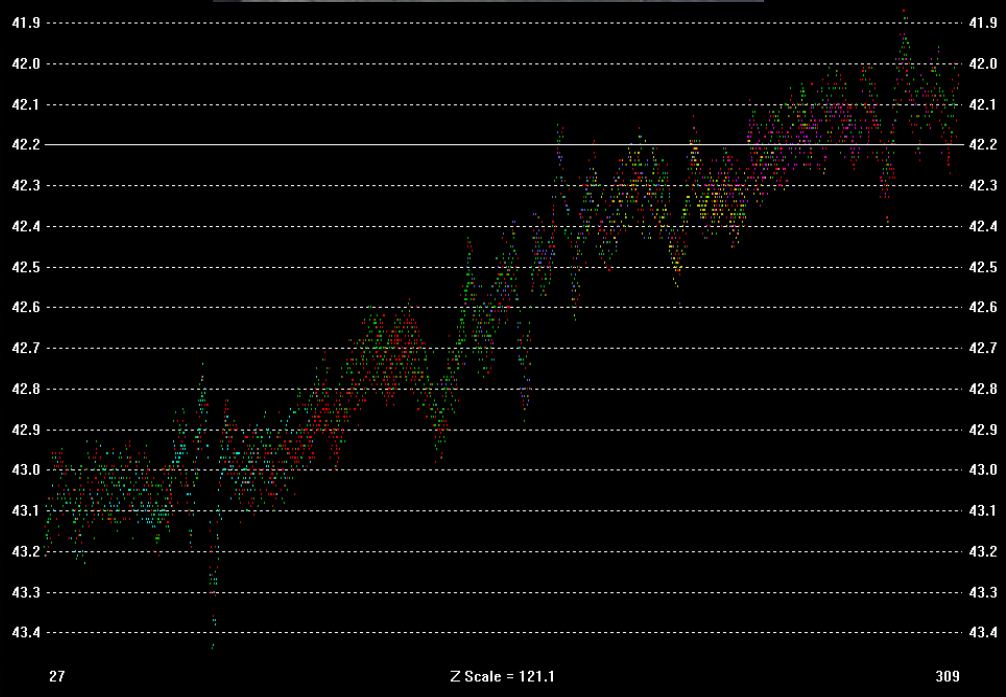


November, 2013 SE Asia

The Philippines – Subic Bay

Deeper Water Test – no GNSS or Tide corrections….

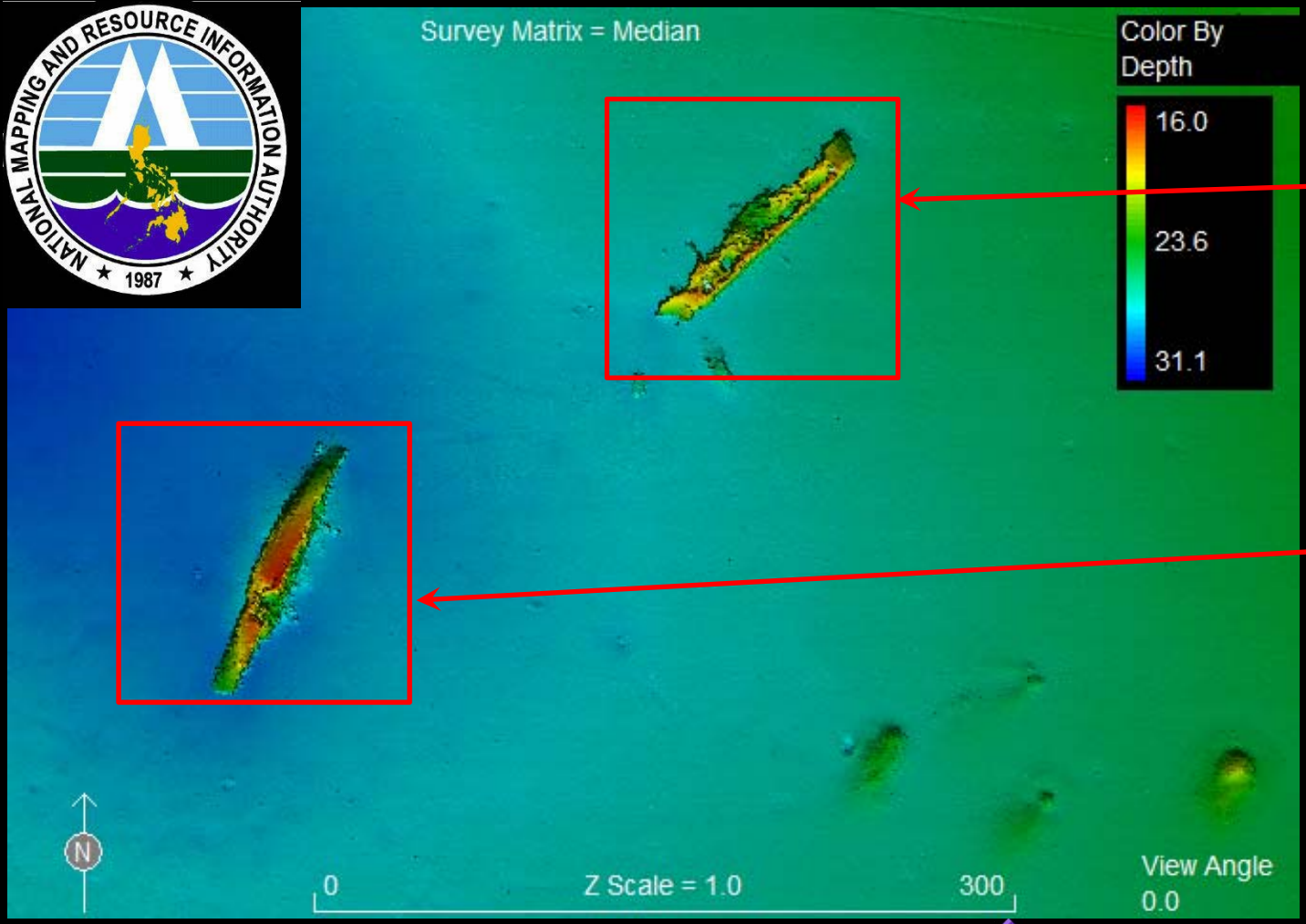




Step 4: Software Configuration

The Philippines – Subic Bay

Heart of Subic Bay Wrecks.



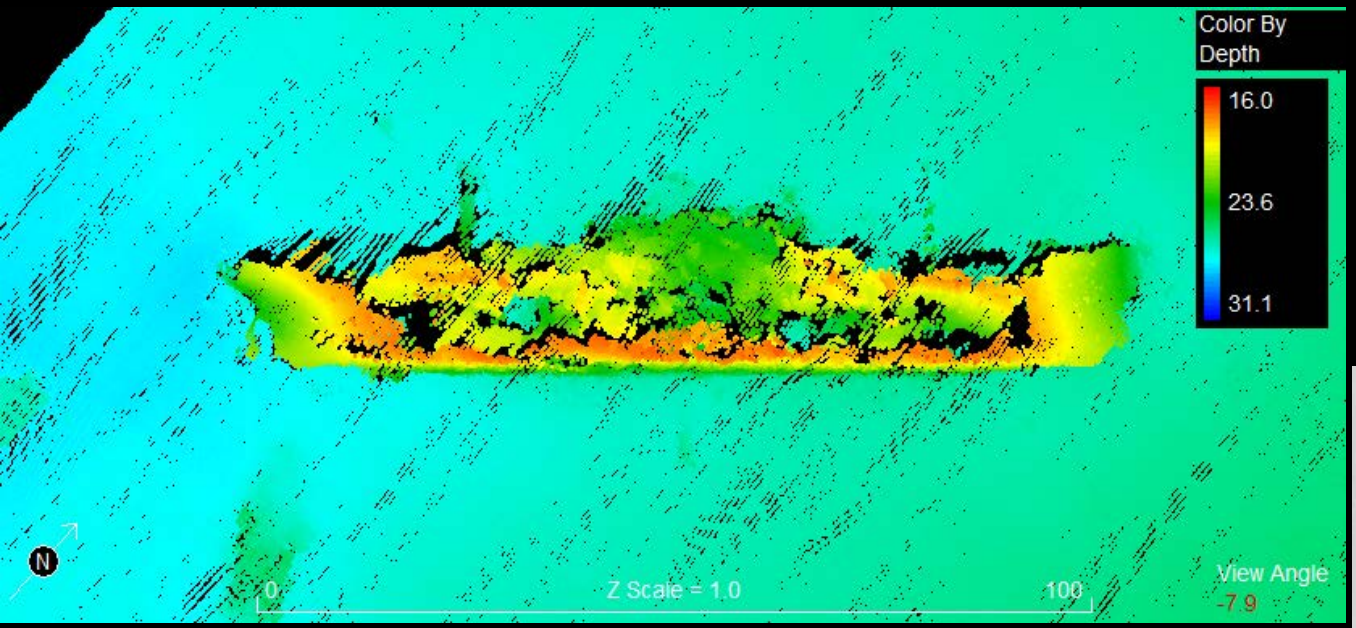
Oryoku Maru "The Hellship". Carried 1620 US and British POW's. Sank accidentally by US warplanes on Dec. 1944

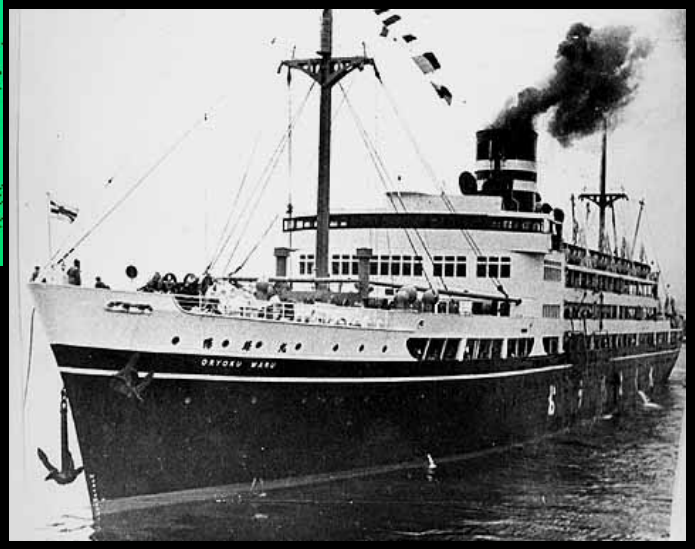
USS New York. Armored Cruiser built in 1891. Flag ship of US Asiatic Fleet. Scuttled by US Navy to halt her from falling into enemy hands.

Step 4: Software Configuration

The Philippines – Subic Bay

Heart of Subic Bay Wrecks. The Oryoku Maru

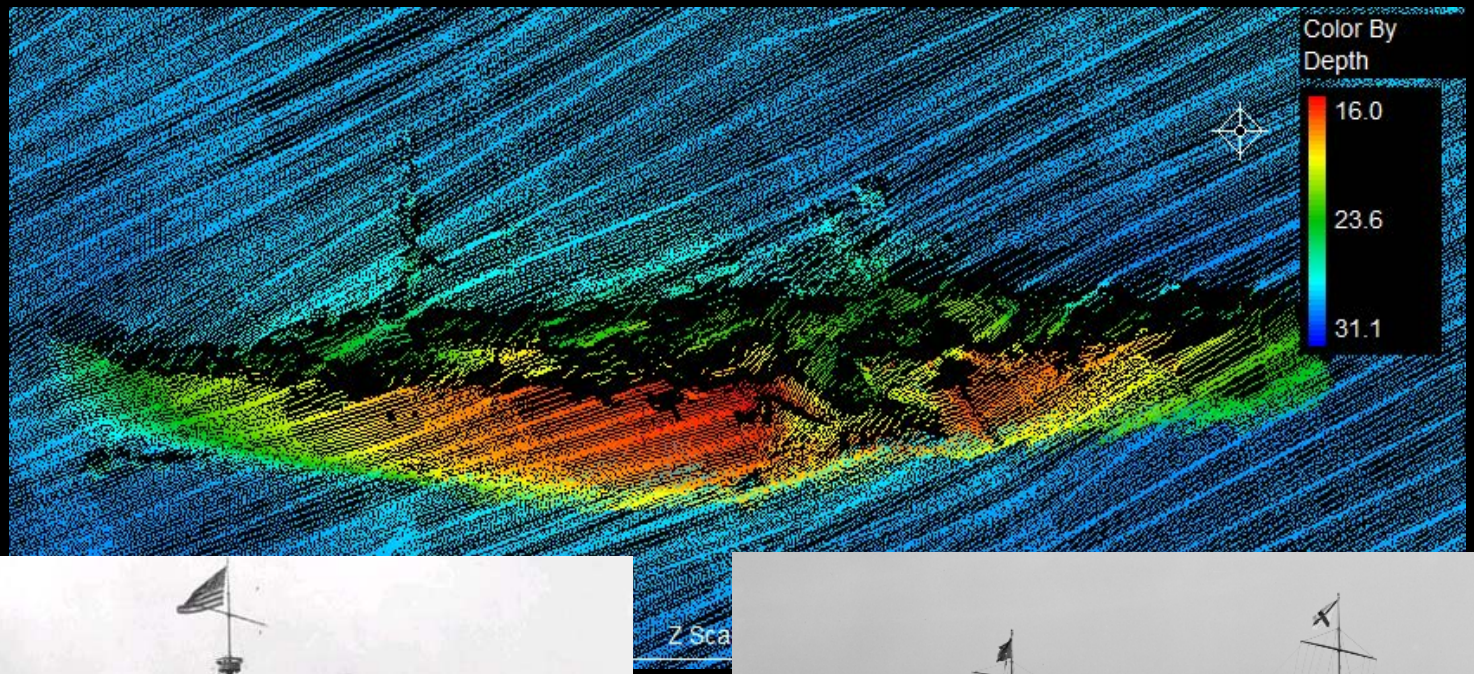


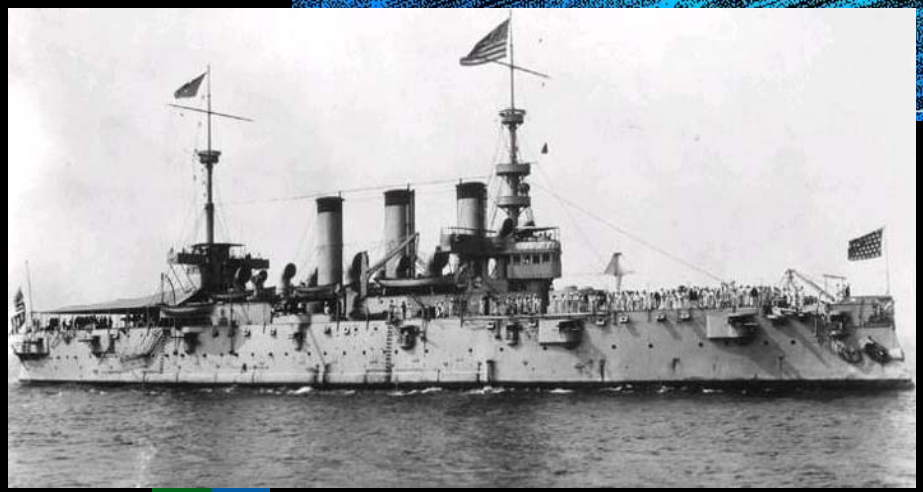


Step 4: Software Configuration

The Philippines – Subic Bay

Heart of Subic Bay Wrecks. The USS New York





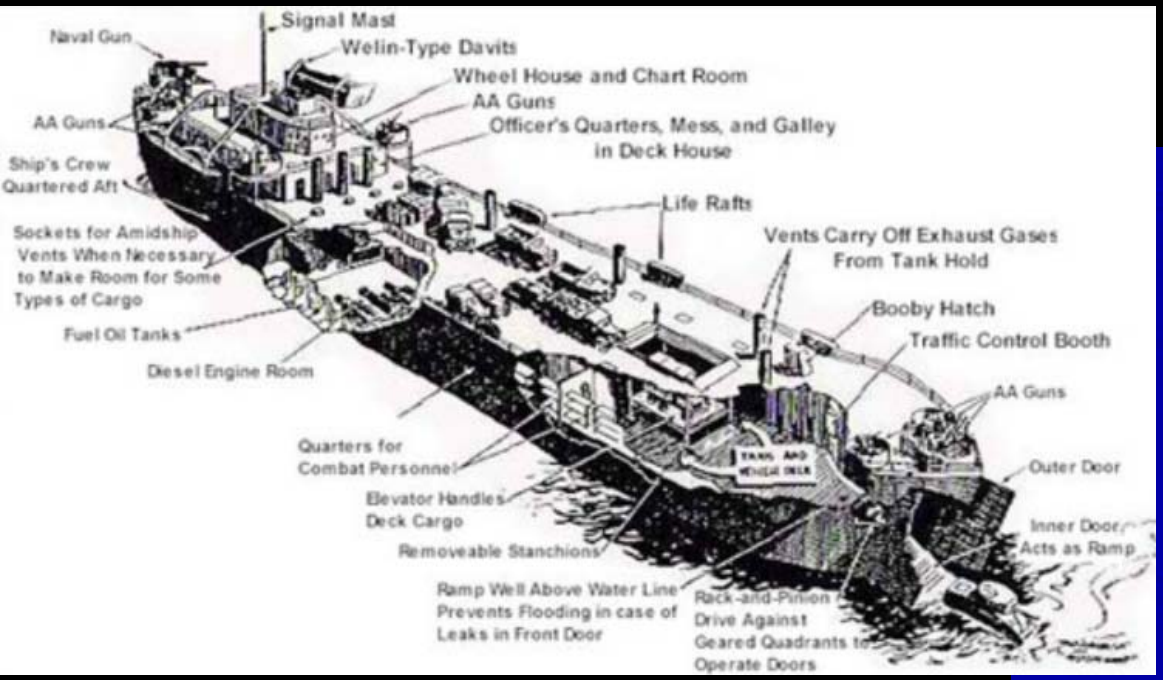
November, 2013 SE Asia

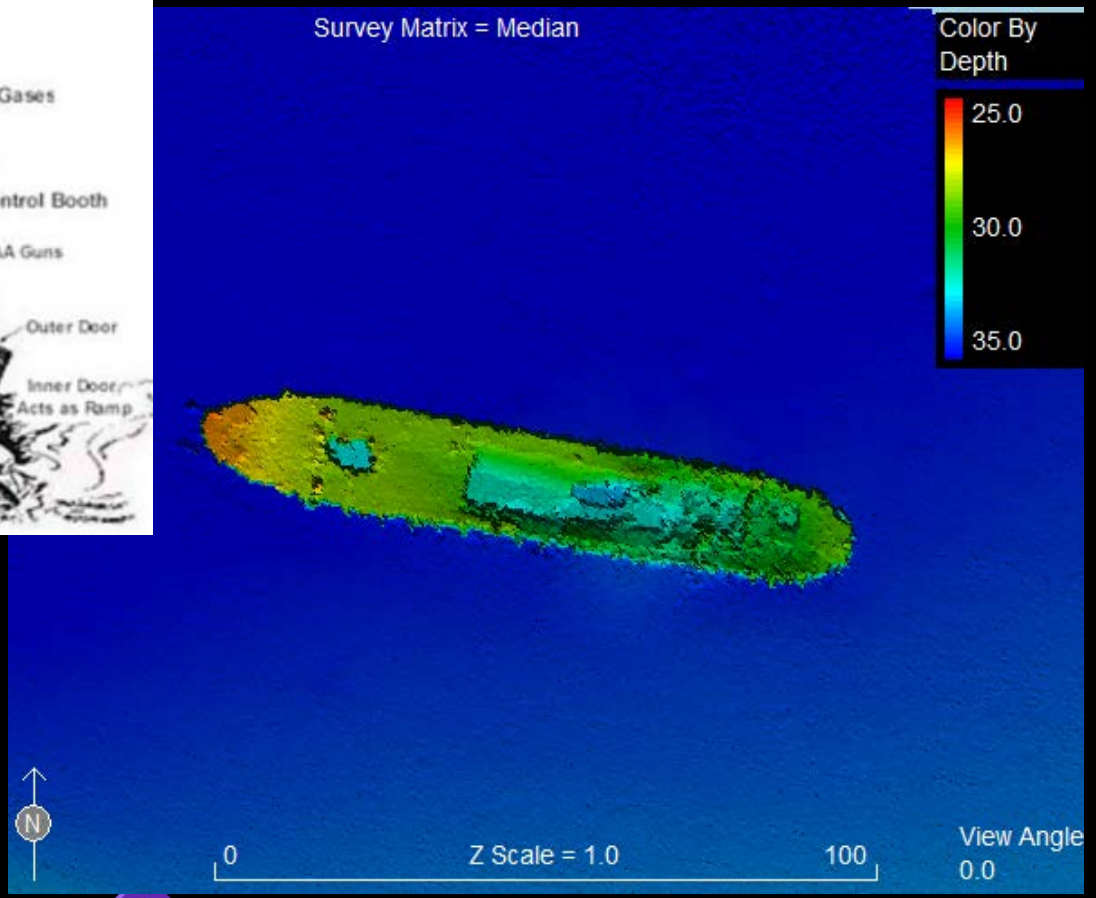
The Philippines – Subic Bay

Subic Bay, The Philippines, Landing Ship Tank Wreck Survey - 34m Depth

Scuttled in 1946 by US Navy.

On flat seafloor. 4 survey lines (90° swath) map the wreck.

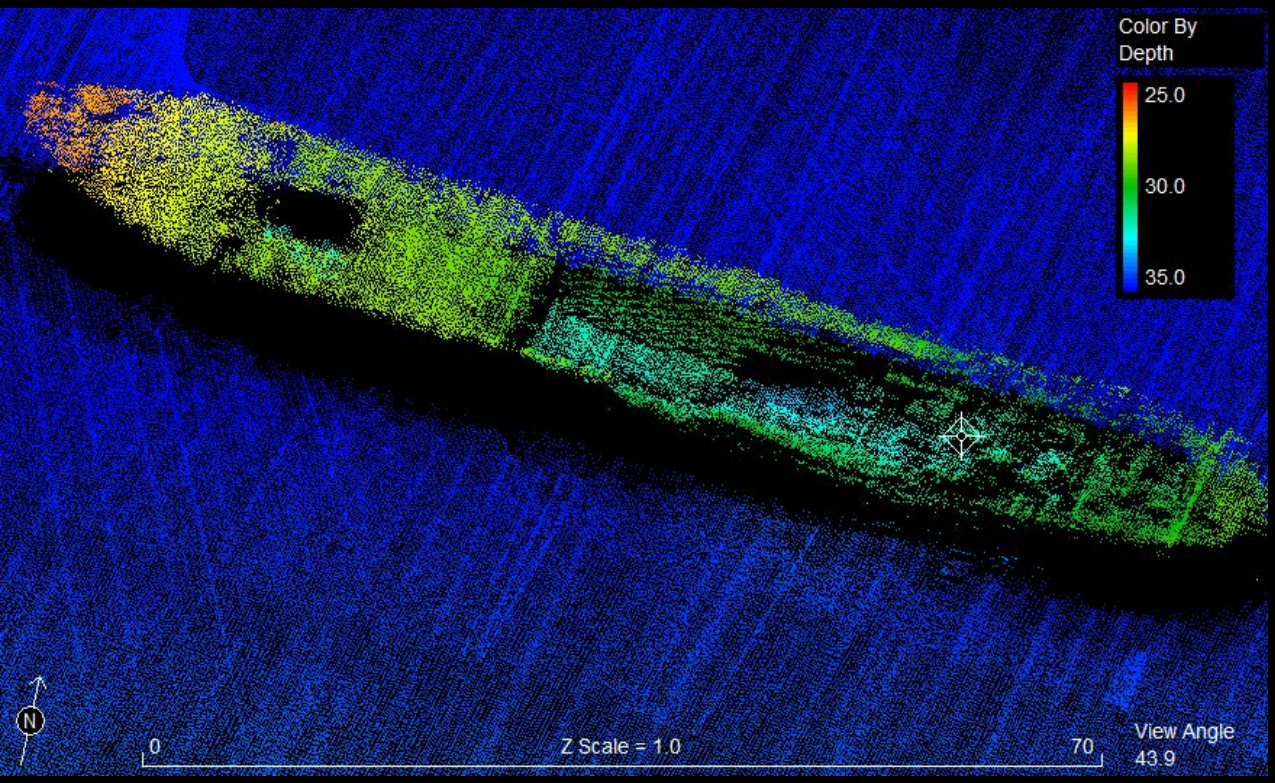




November, 2013 SE Asia

The Philippines – Subic Bay

Subic Bay, The Philippines, Landing Ship Tank Wreck Survey - 34m Depth



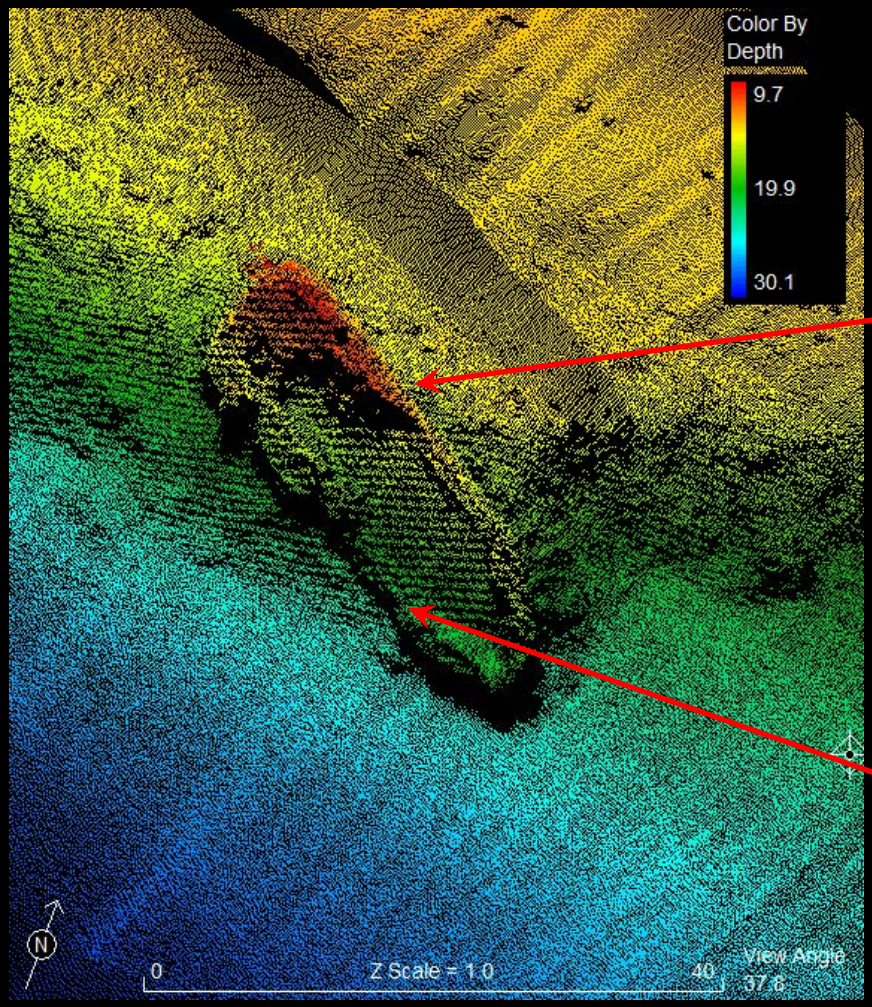
From recreational dive website:

"Her forward gun platforms remain in place. The top decks of her stern section have collapse structurally, although the tangled wreckage attracts a wealth of marine life…." Web Link

November, 2013 SE Asia

The Philippines – Subic Bay

Subic Bay, The Philippines, Japanese Patrol Boat - 16-26m Depth



From recreational dive website:

"…this vessel sank during the Japanese occupation of Subic during WWII." "…is structurally intact."

Web Link

November, 2013 SE Asia

China - Shanghai

China Maritime Safety Administration

GNSS Antennas mounted port & stbd. This is Secondary Ant.

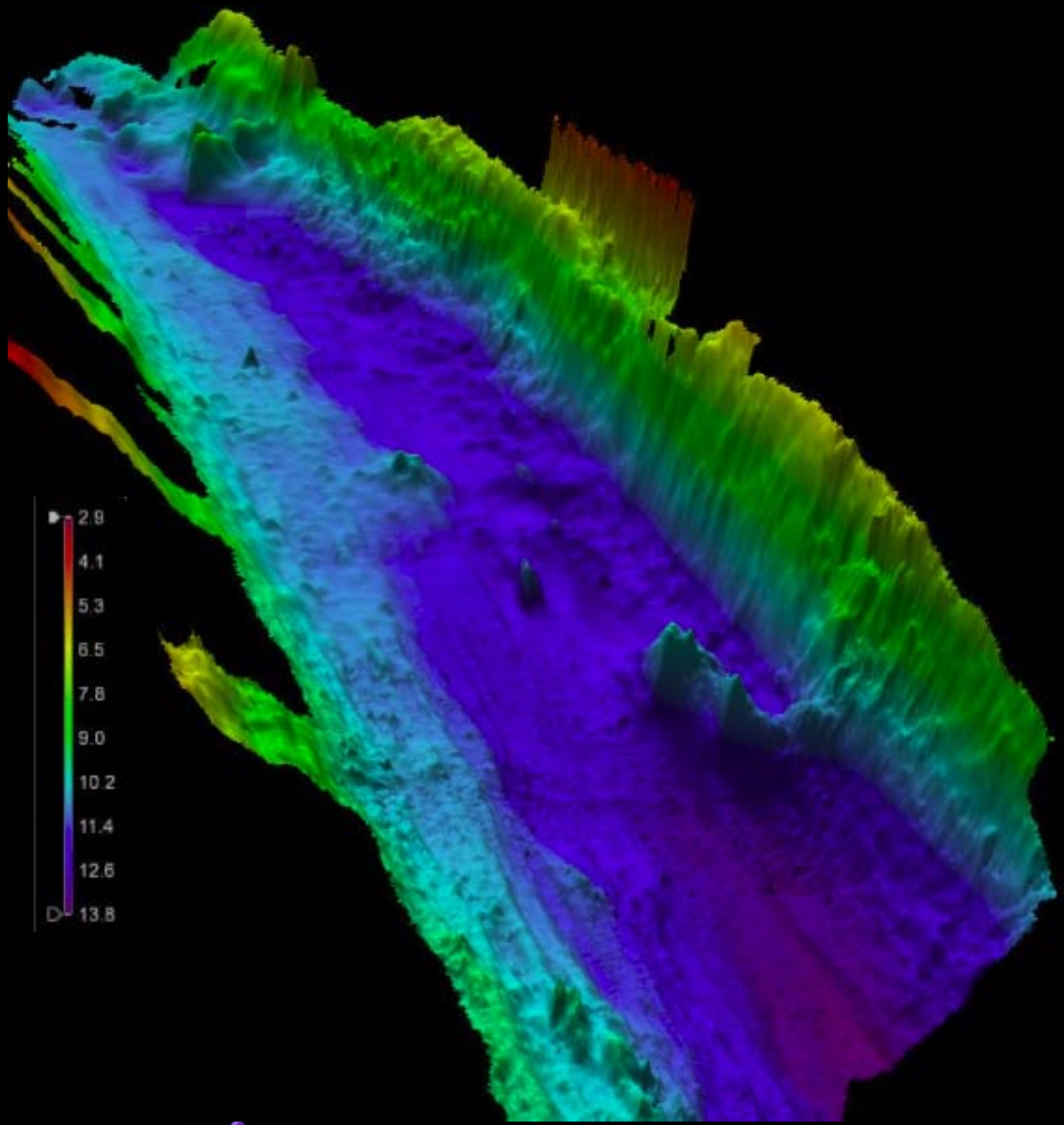
NORBIT Sonar in Fwd moonpool

November, 2013 SE Asia

China - Shanghai

China Maritime Safety Administration

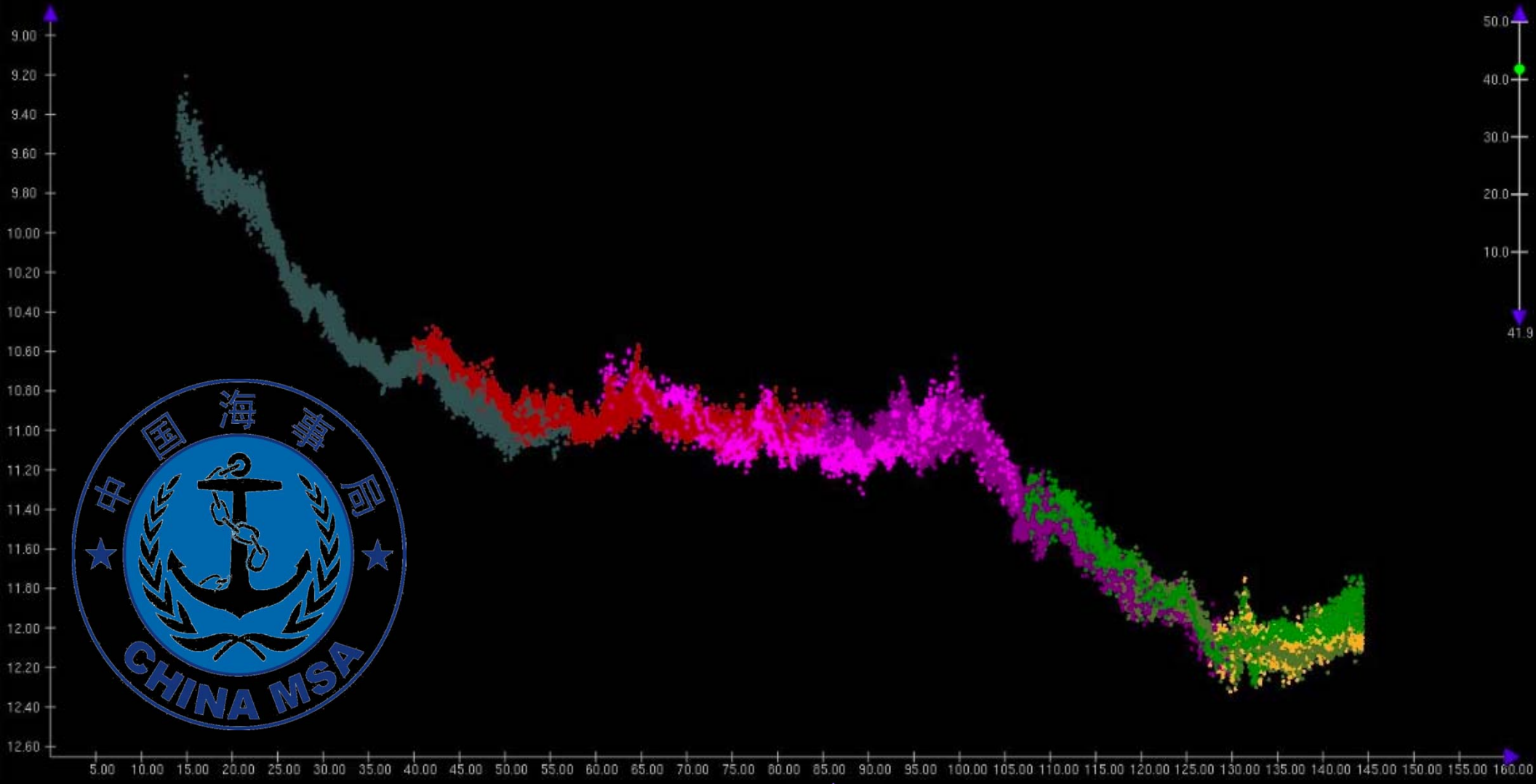
Data from China MSA survey vessel “Hai Heng Yi”. Processed by China MSA using CARIS HIPS with large vertical exaggeration.



November, 2013 SE Asia

China - Shanghai

China Maritime Safety Administration – Tides from tide station & Omnistar for positioning



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China - Shanghai

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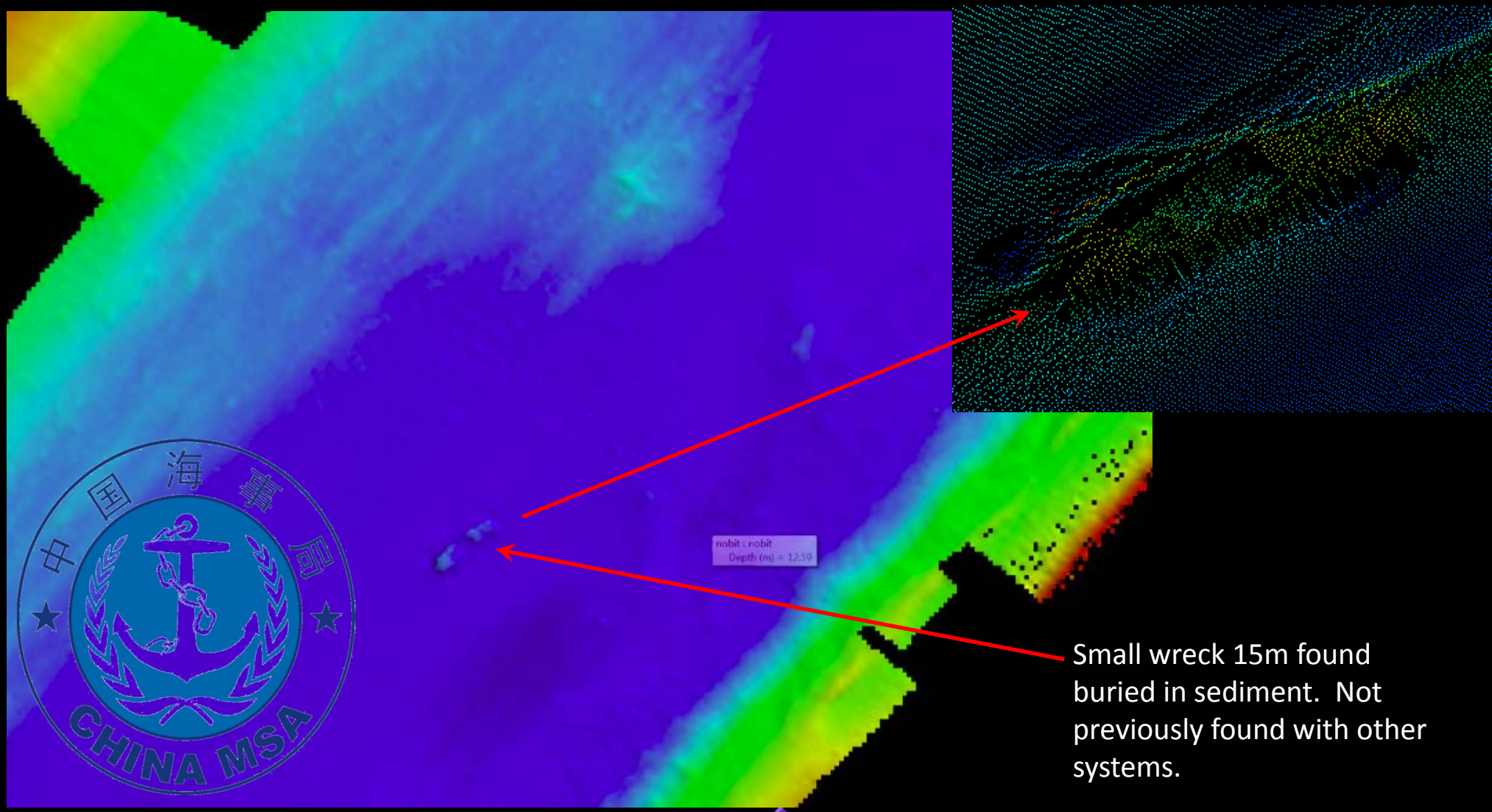

Small wreck 15m found buried in sediment. Not previously found with other systems.