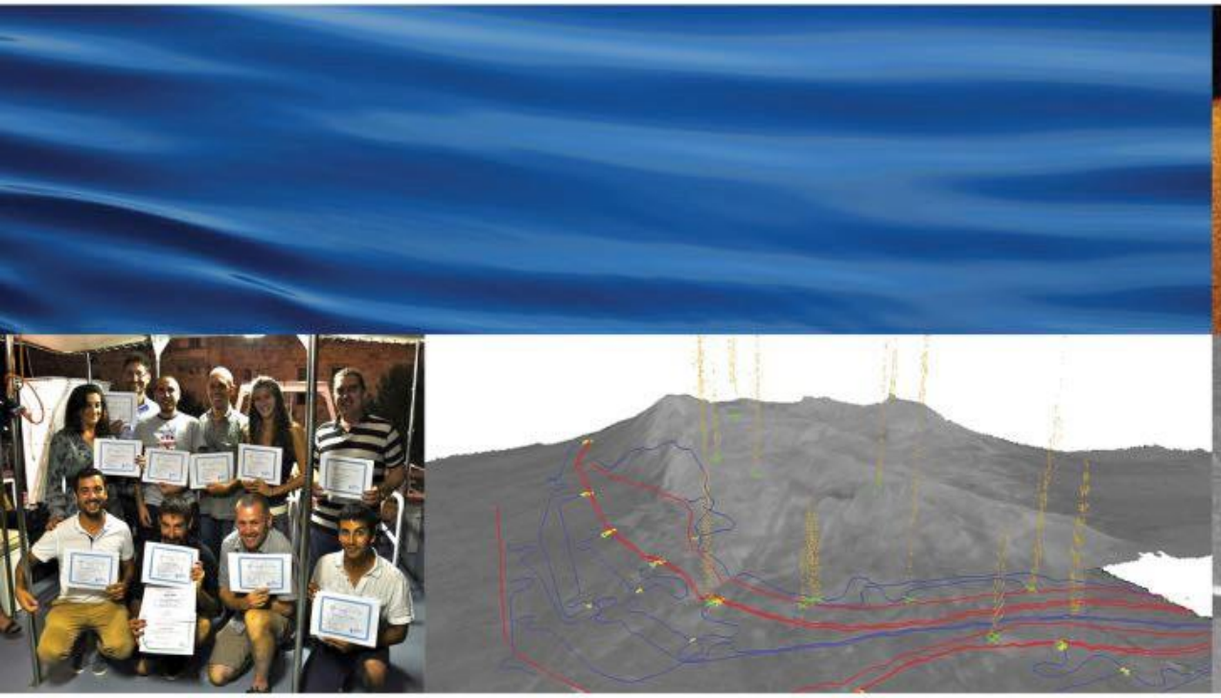
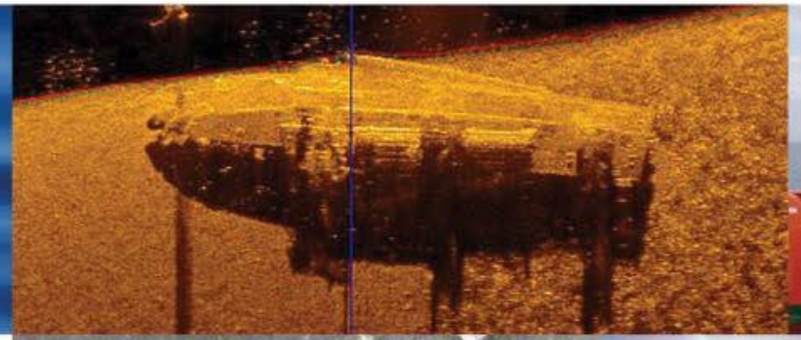
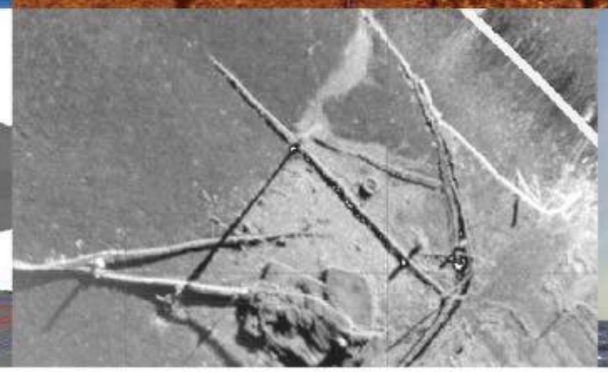
GBT Training iWBMS Long Range
NORBIT – HYPACK, Malta


Malta, 29 June – 05 July 2018

Alessandro Nemola, ***Senior Surveyor & Data Processor***

Geological & Biological Team
Your Offshore Solution Partner

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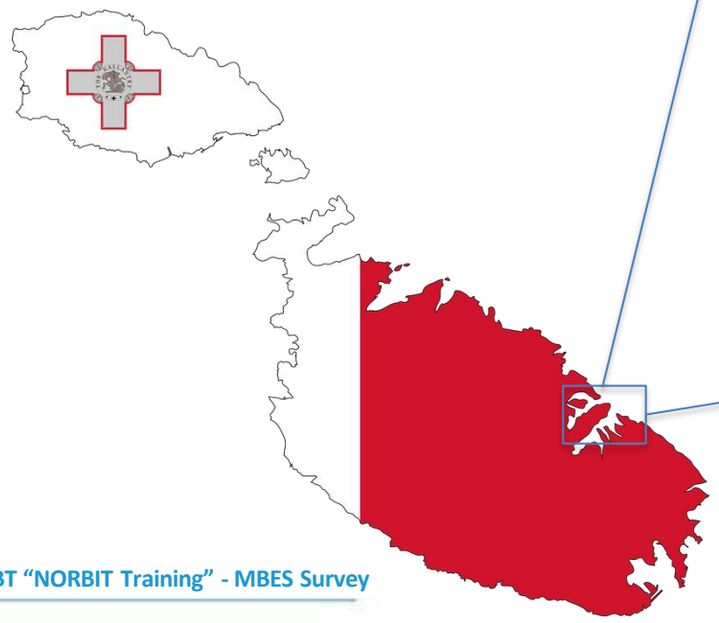
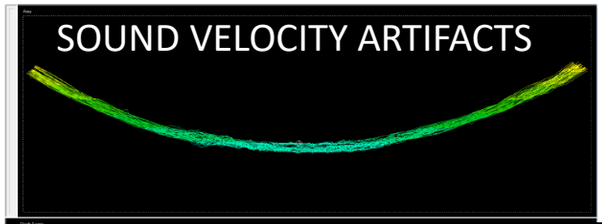
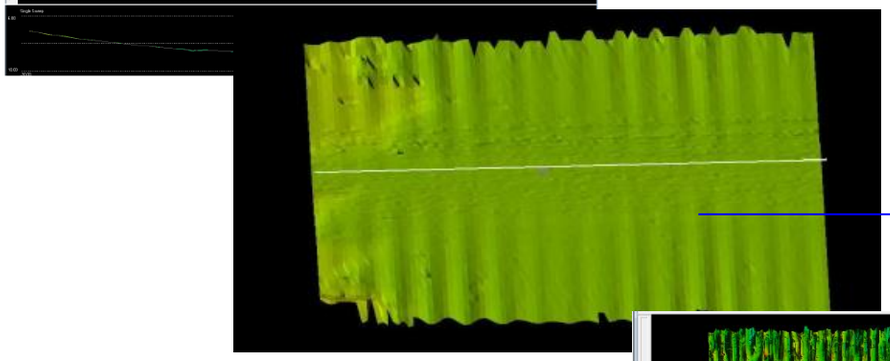
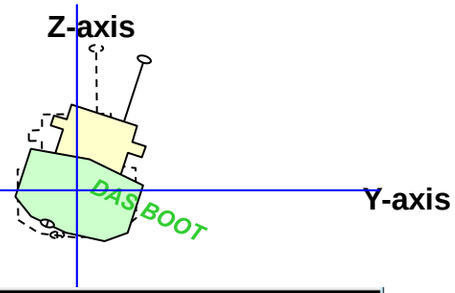
From June 29th to July 5th 2018 GBT ltd carried out a training with the NORBIT iWBMS Long Range system (0.9°x 1.9° Tx, 200 kHz) for TransportMalta Company (Malta). The Systems were interfaced with HYPACK– HYSWEEP Software for data acquisition and processing. The Survey demo was performed inside Valletta port.

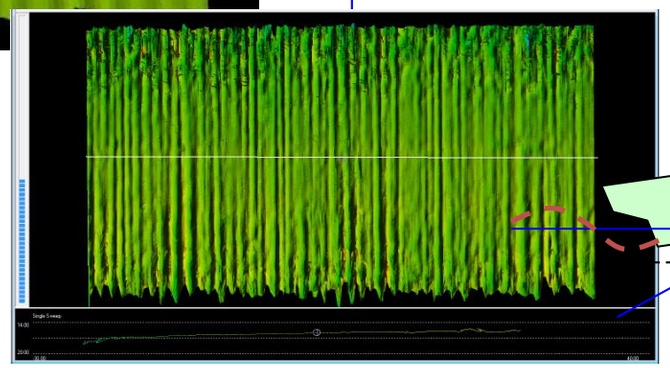


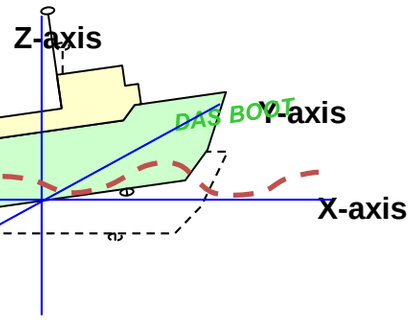
Before installation and survey demo, the Theory of Multibeam was discussed.
Focusing on how multibeam systems work, ancillary systems, patch test, errors and accuracy according to the Norbit iWBMS Long Range purchased by Transport Malta.











Range performance of a system - the sonar equation

To work effectively the echo from a distant target must be sufficiently stronger than the background noise level.

The Signal to Noise ratio (SN)

$$SN = SL - 2TL - NL + BS + DI$$

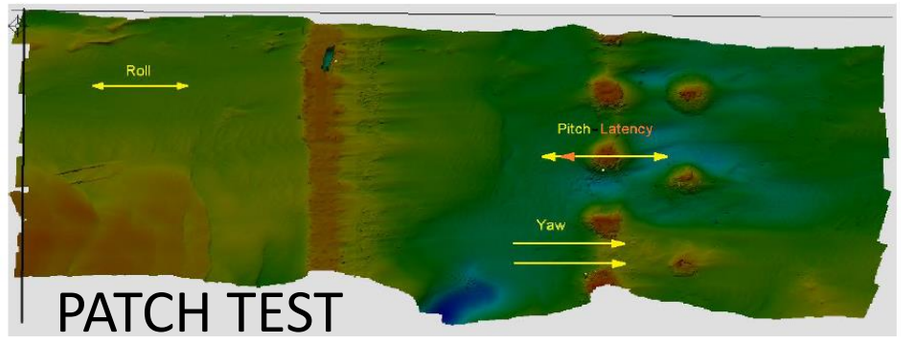
Source Level
power
$SL = 20\log(P \text{ re } 1\mu P \text{ at } 1m)$

Noise Level
Seastate, ship noise
Receiver Bandwidth
electrical interference
$NL = N_c + 10\log W$

Directivity Index
how focussed the energy is toward the target and how sensitive is the receive in the target direction
$DI = 10\log(I_h/I_n)$

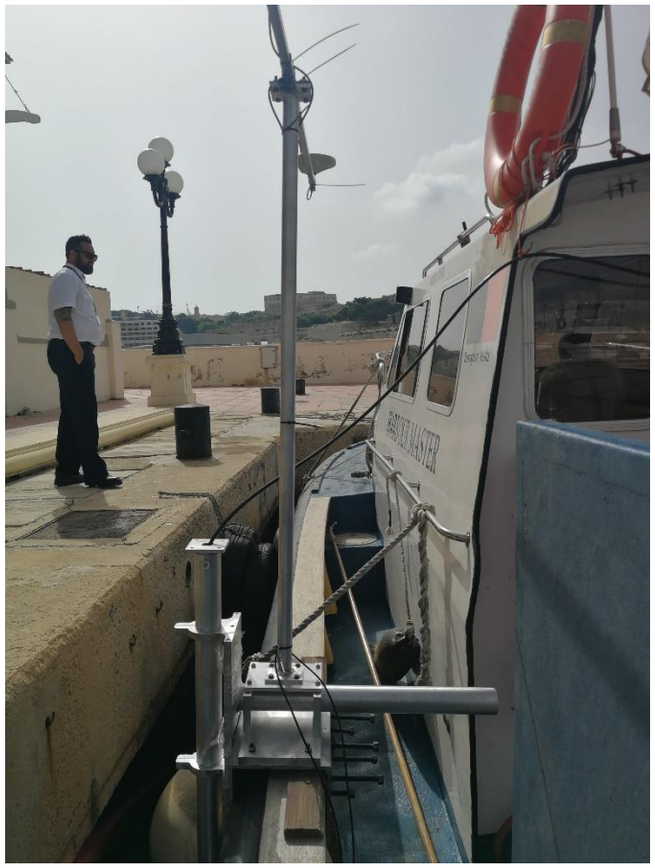
Transmission Losses
(2x here to there *and back*)
spherical spreading
attenuation – *frequency*
$40\log R + 2\alpha R$

Backscatter Strength
backscatter coefficient (sediment type)
grazing angle
ensonified area (pulse length – beam width)
$BS = S_s(\theta) + 10\log(A)$



The T-Bar aluminum pole was designed by GBT and delivered to the client prior the training.

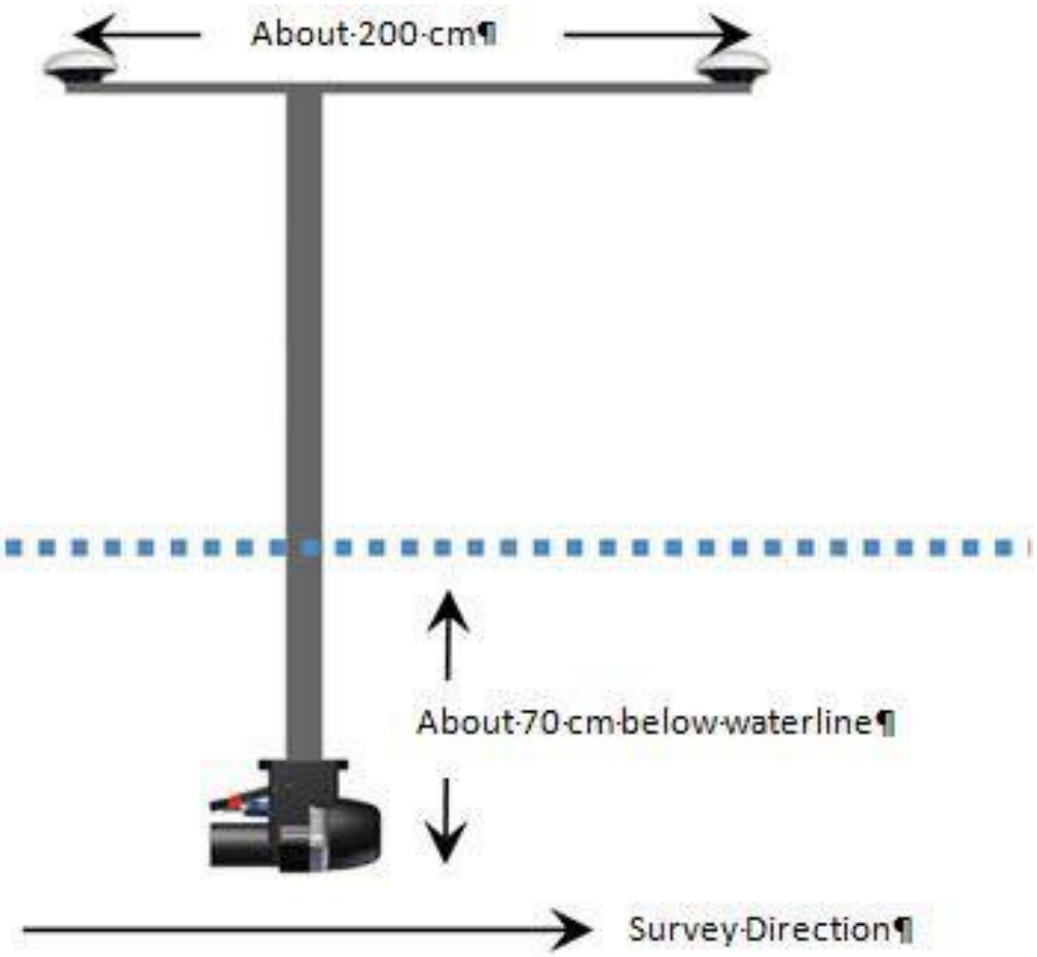
The Norbit iWBMS Long Range System was installed on a T-Bar pole on port side of a 11.22 m vessel.
Mobilization of the whole system took about 2 hours (Pole, Norbit iWBMS Applanix integrated, Primary and Secondary GPS antenna).



Thanks to this pole design, we are able to install the antennae T-bar in two different positions according to the type of job.

1. If it’s not needed to recover the sonar every day, we can install the mast straight on top of the sonar pole (avoiding the small offset);
2. Otherwise, if we have to recover the pole every day, we can install the mast on a secondary flange ready for this purpose (offset needed in this case).

Typical Survey Configuration

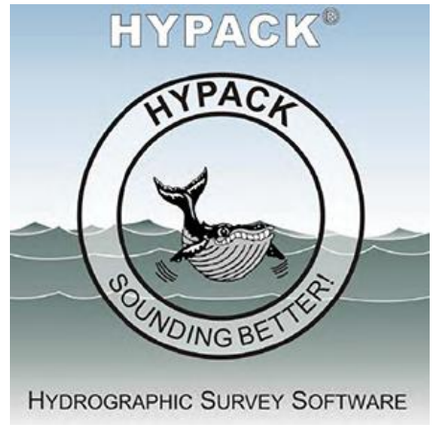


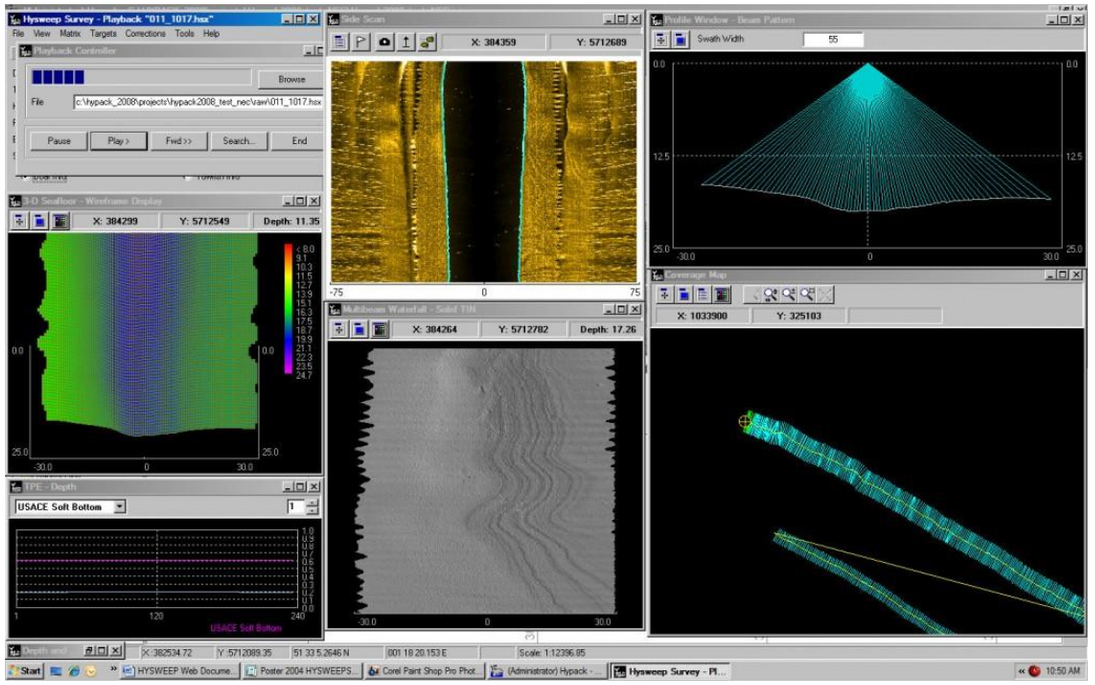
Data Acquisition Software:

- HYPACK-HYSWEEP 2018
- NORBIT GUI 10.3

•Data Processing Software:

- •HYPACK-HYSWEEP MODULE

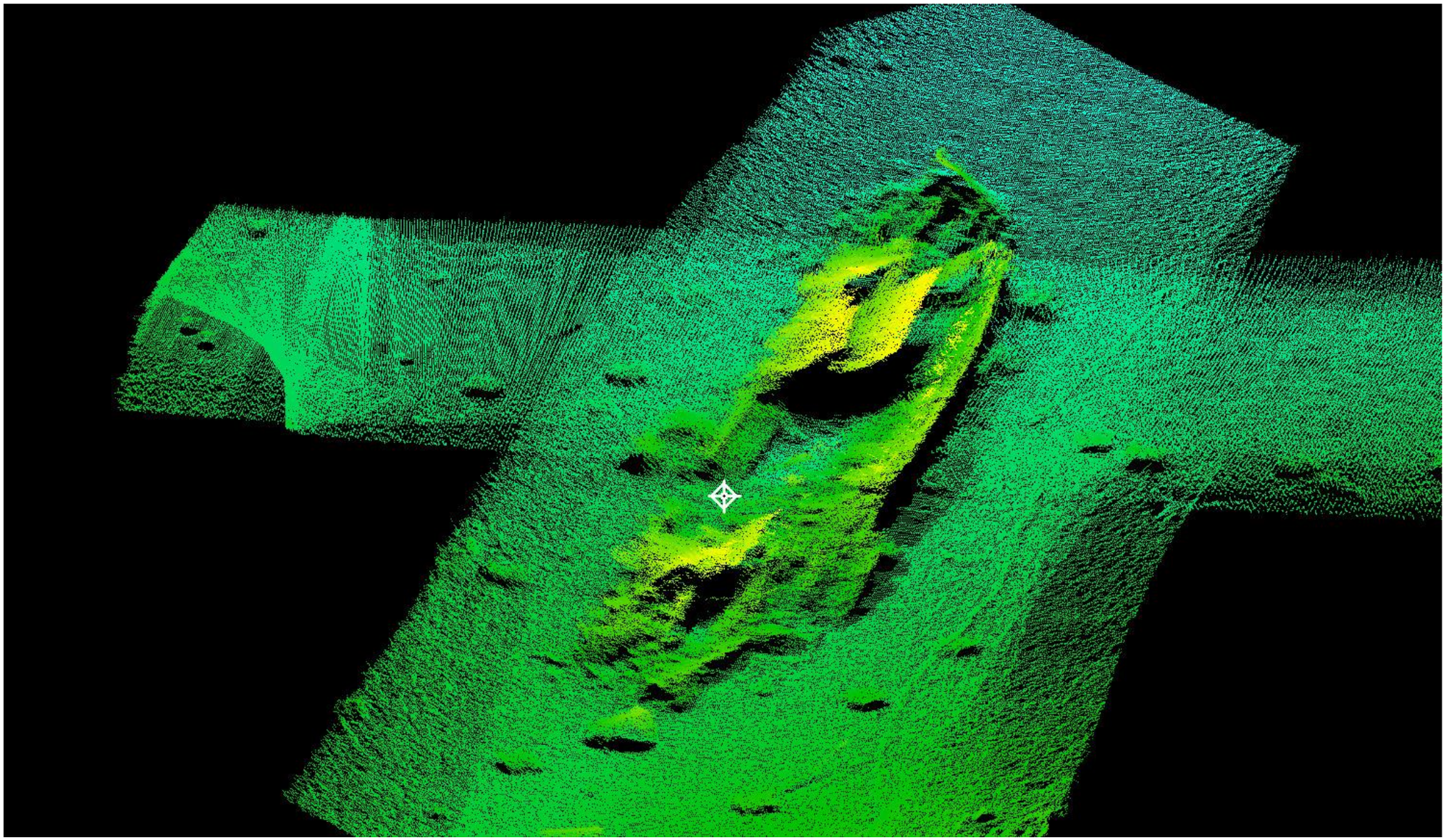




Multibeam Data - HYPACK Cloud View

Frequency 400 kHz
FM 80kHz BW
Swath angle 120°

Vertical Exaggeration 1.00



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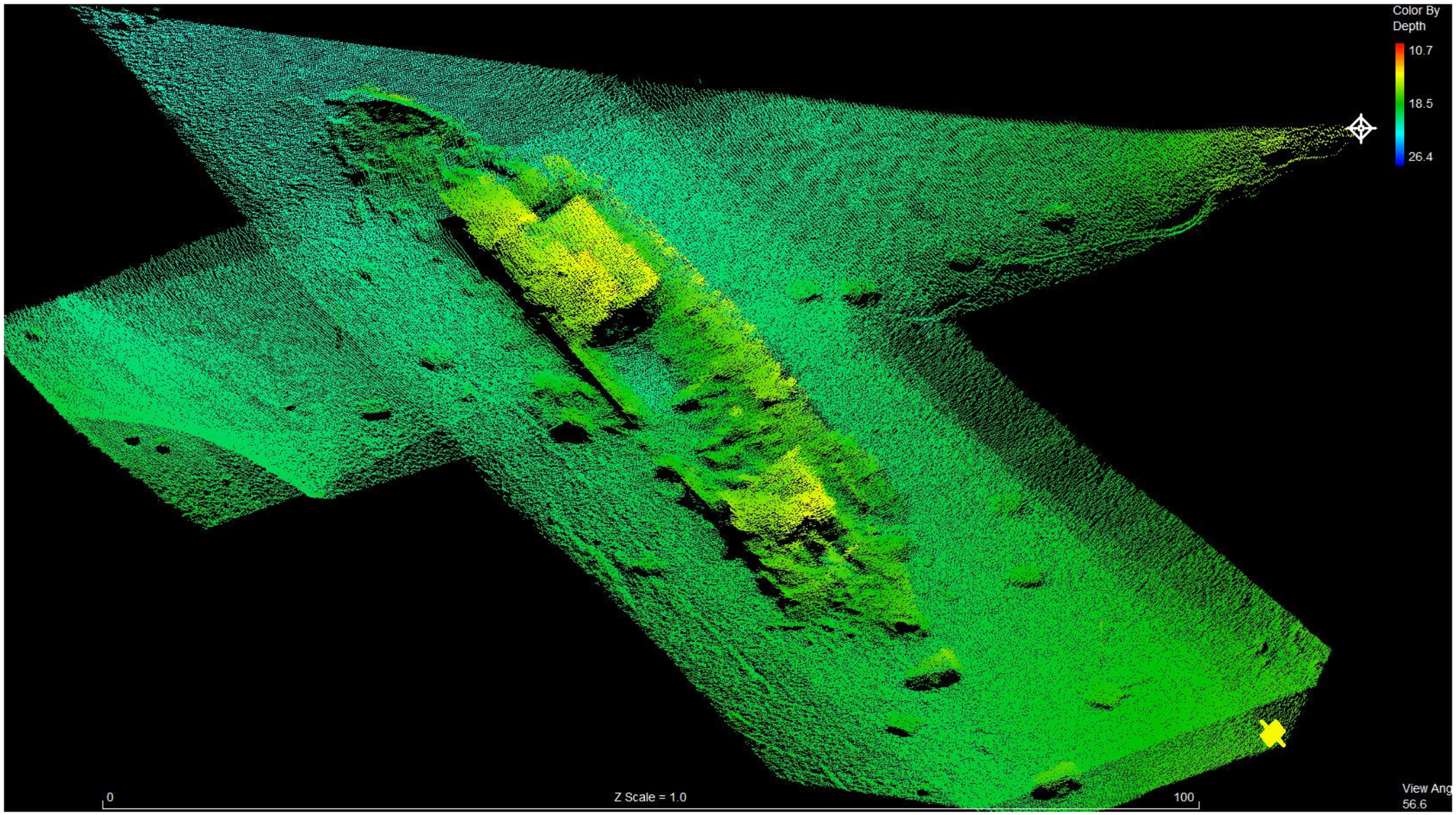
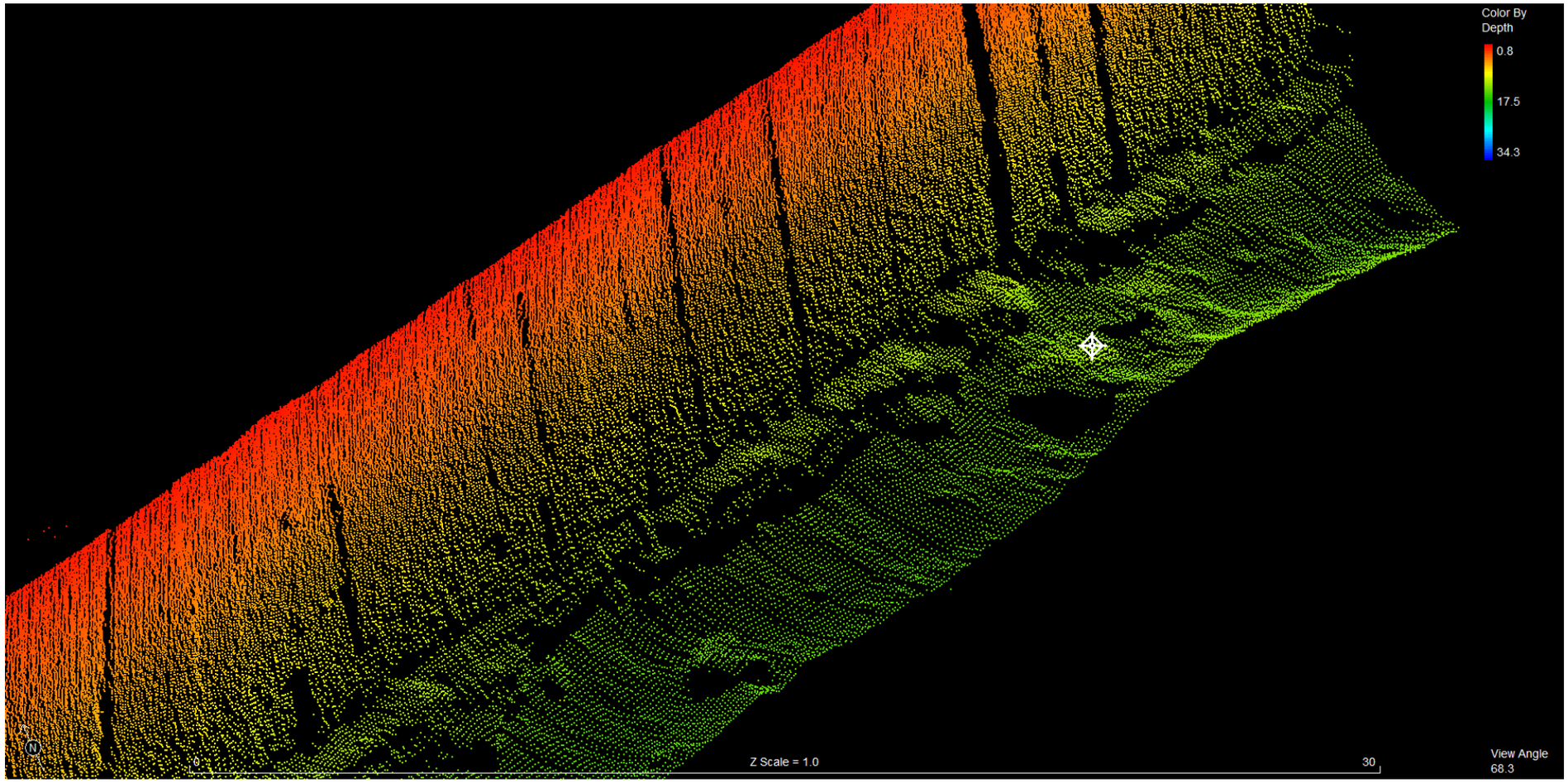


Multibeam Data -
Head Tilted 45°
HYPACK Cloud View

Frequency 400 kHz
FM 80kHz BW
Swath angle 70°

Vertical Exaggeration 1.00



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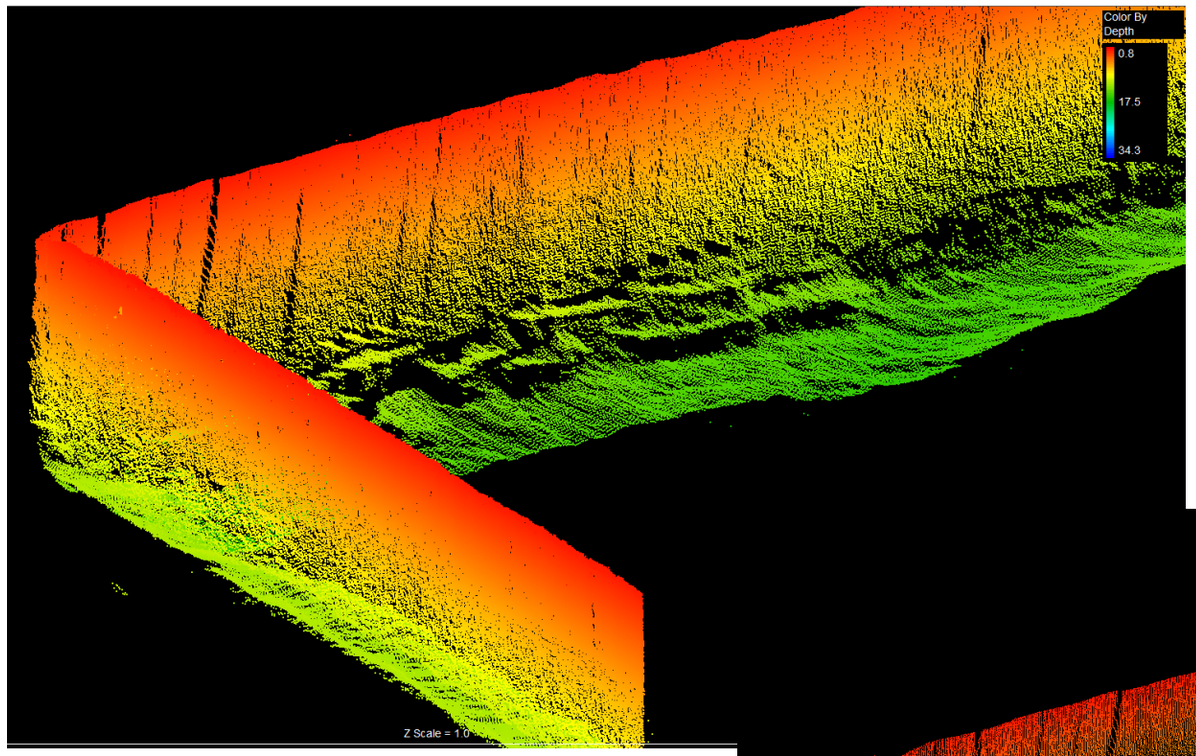

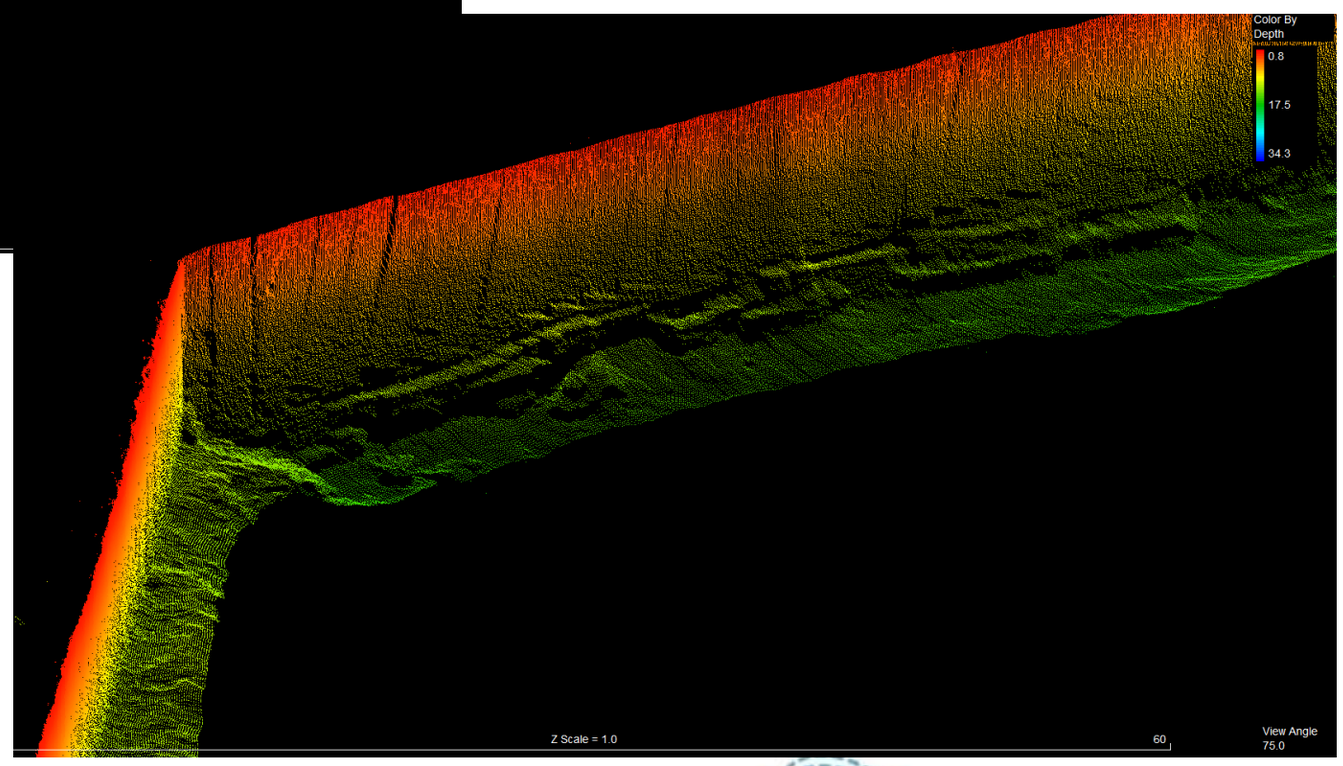

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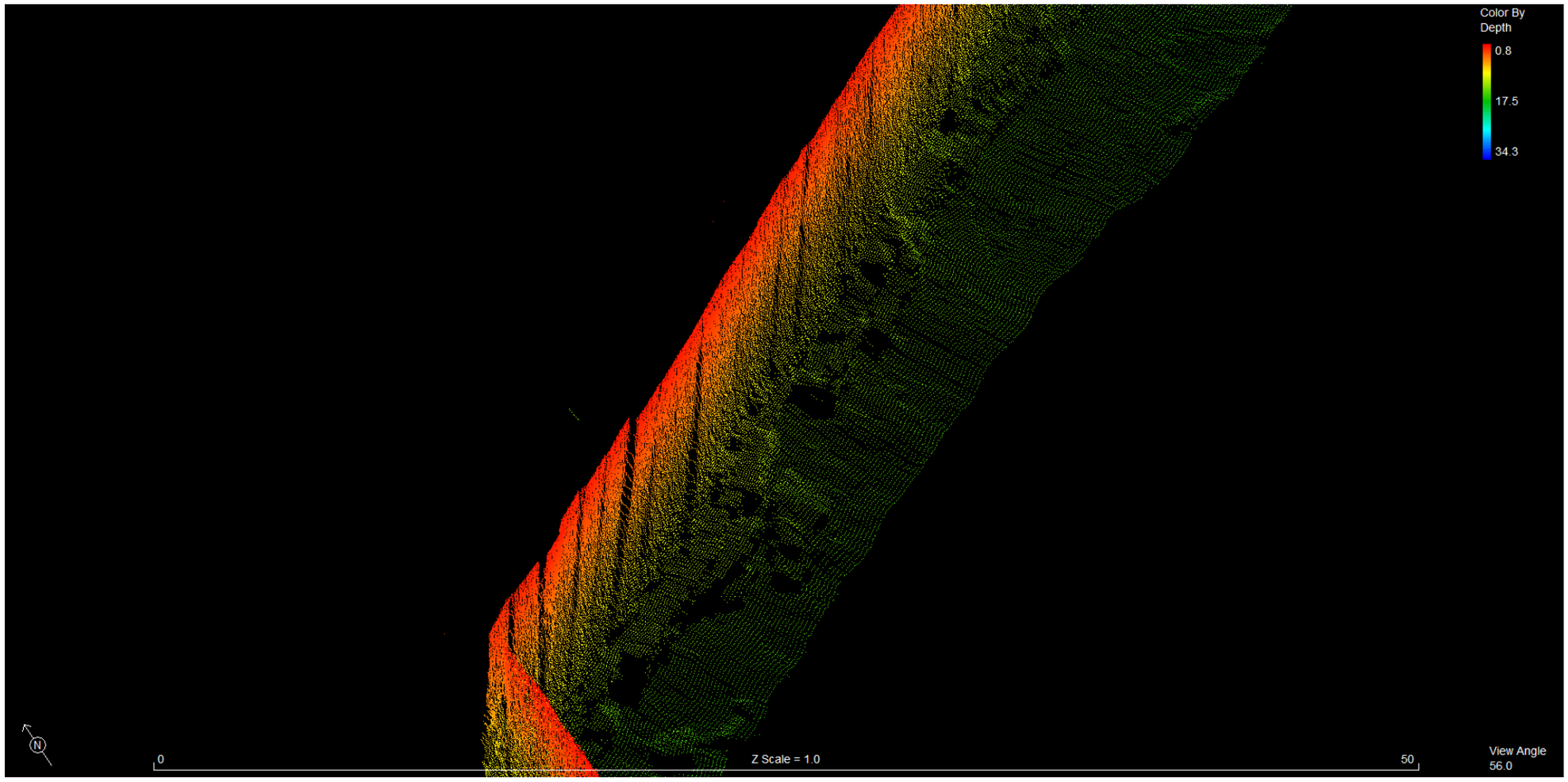

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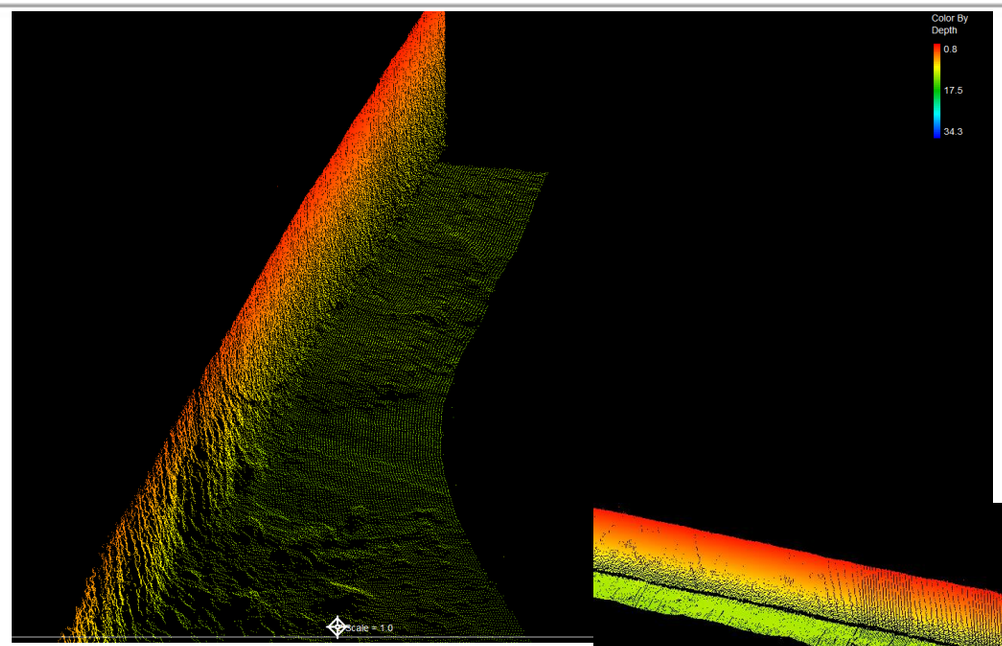

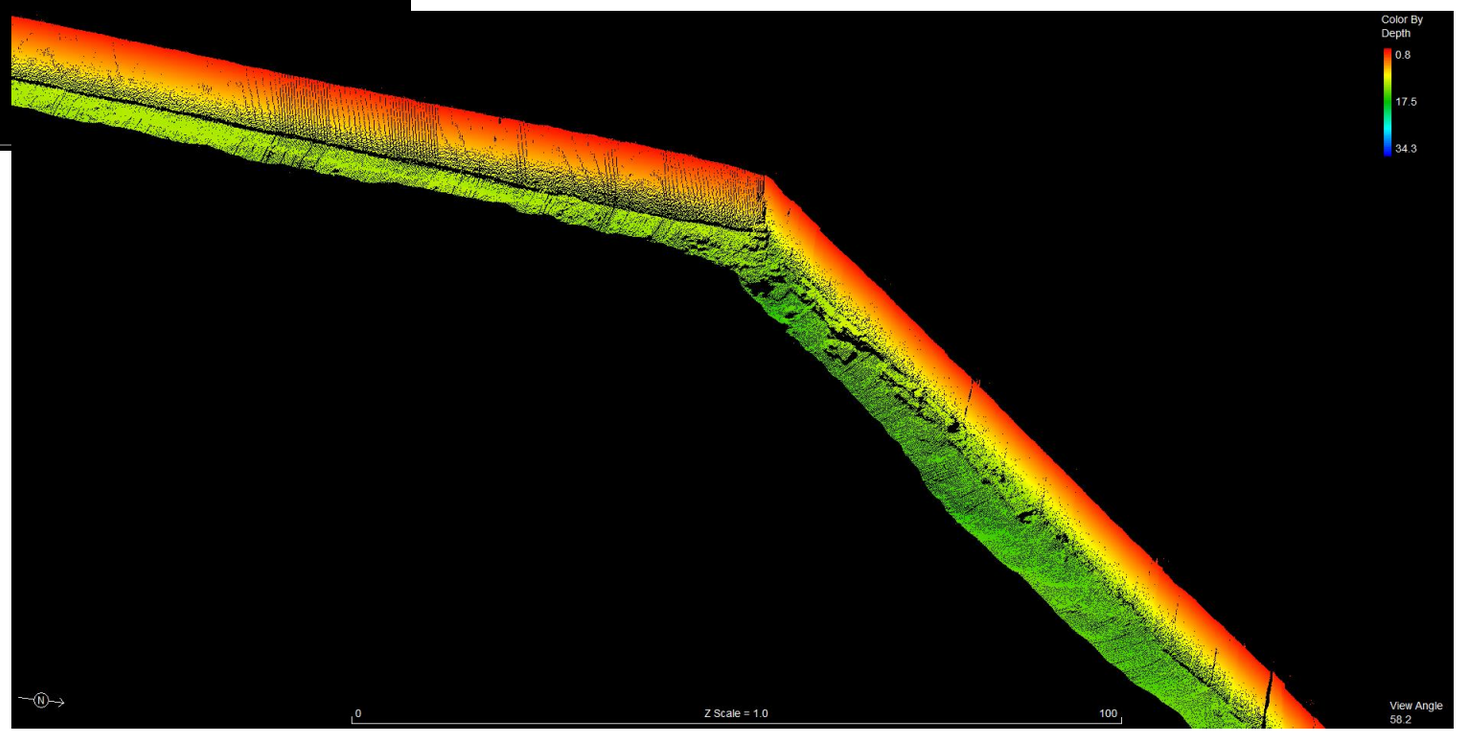

Multibeam Data – Grid View (0.5m cell size)

Frequency 400 kHz FM
80kHz BW
Swath angle 120°

Vertical Exaggeration 1.00