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MUST- Multi usage system for towed vehicles

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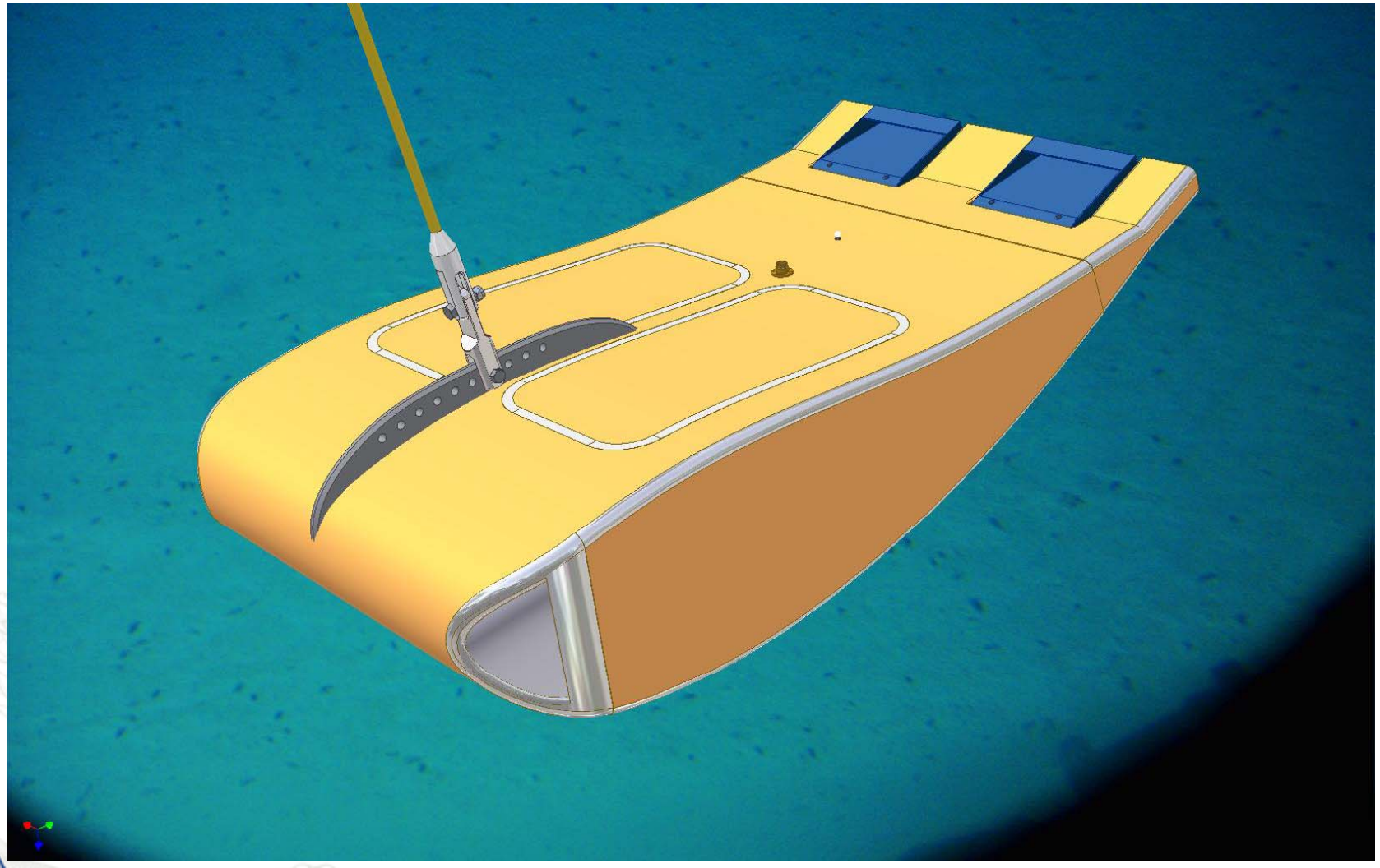
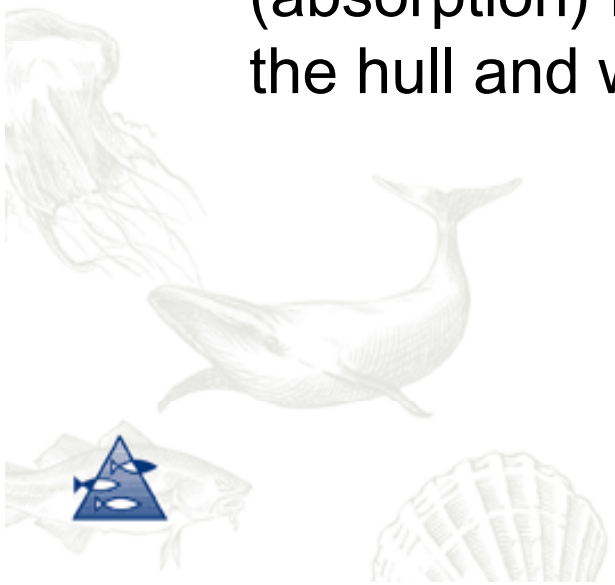
THE MUST TOWED VEHICLE



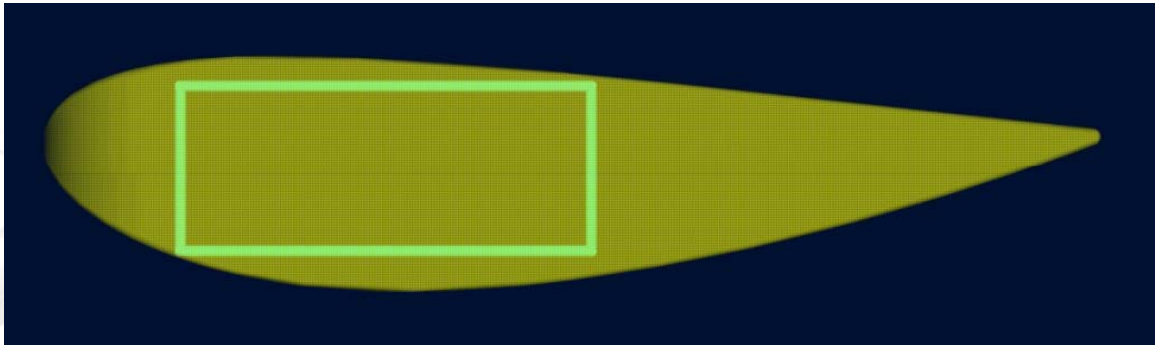
MUST history 1

- The project started in 2003
- The project's procurement is to develop a system based on integrated technology for mapping fish and plankton.
- Collect data through the whole water coloumn – from shallow to deep water during ”all” weather conditions.
  - ”Bad weather vehicle” – to get rid of the influence (absorption) from air blocking of the transducers below the hull and wind induced bubbles in the upper 10-20 m

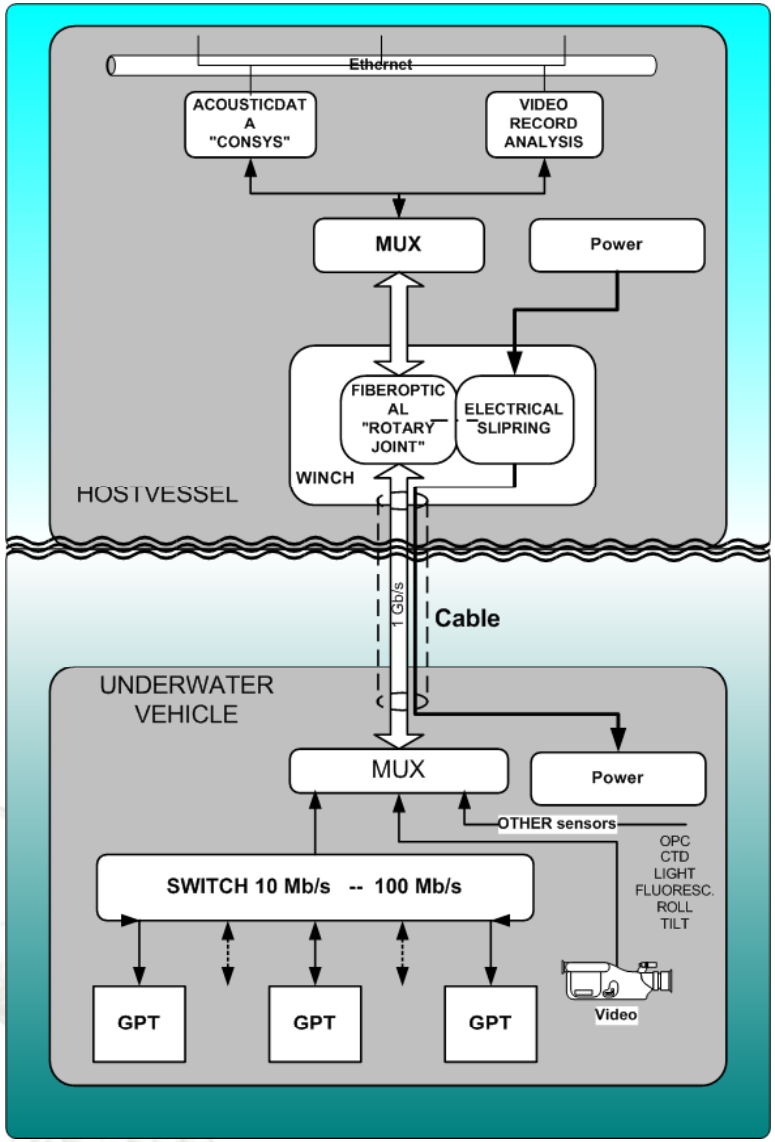


MUST history 2

- Challenges due to vehicle design:
  - built as an ”up side down” aircraft wing.
  - design the depressor profile to producing sufficient downward directing force and minimizing cavitation likely to disturb the received backscattered energy in the echosounders.



System overview



System diagram as blocks and data flow

MUST Towed vehicle system

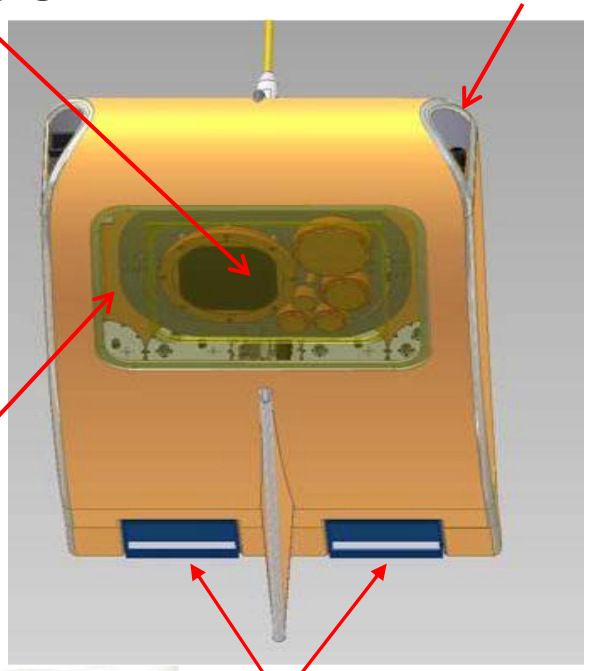
- 7 frequency echosounder (GPTs) and transducers:
  - 38, 70,120, 200, 333, 710 kHz, (1200 kHz)
- Sensor units - Laser optical plankton counter (LOPC), video plankton recorder (VPR), CTD, fluorescence & light sensors, pitch and roll sensors, compas
- Telemetry for communication between the vehicle and deck unit, using Fast Ethernet and single modus fibre technology
- Navigation
- Control and monitoring system (CONSYS) for safe operation of the vehicle
- Power system
- Hybrid towing cable, 2 for electric power and 4 fibre ones

MUST Towed vehicle: insides and unit mounting

Transducers

38 kHz
70 kHz
120 kHz
200 kHz
333 kHz
710 kHz

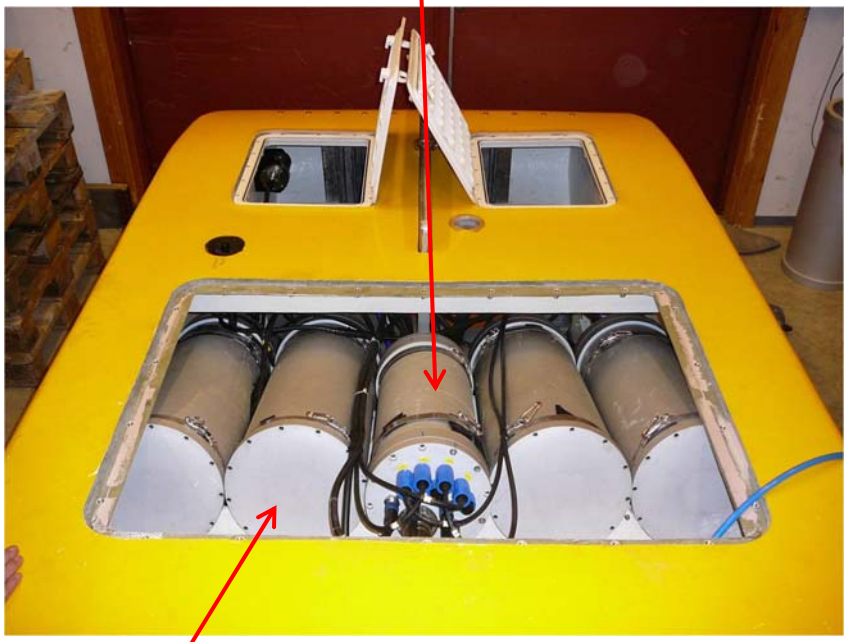
Sensor units



Acoustic window

Elevators

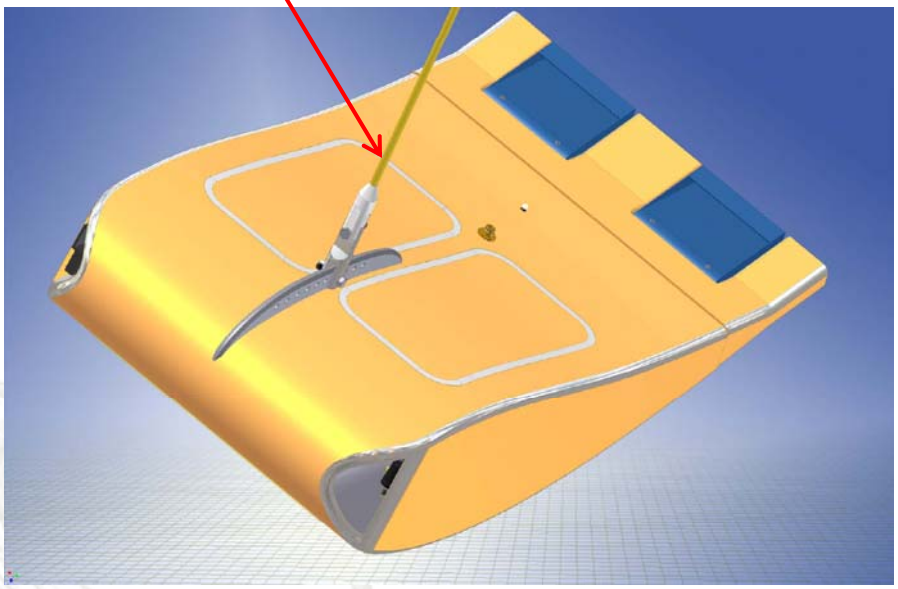
Electronic housings - power, sensor interfaces, communication units



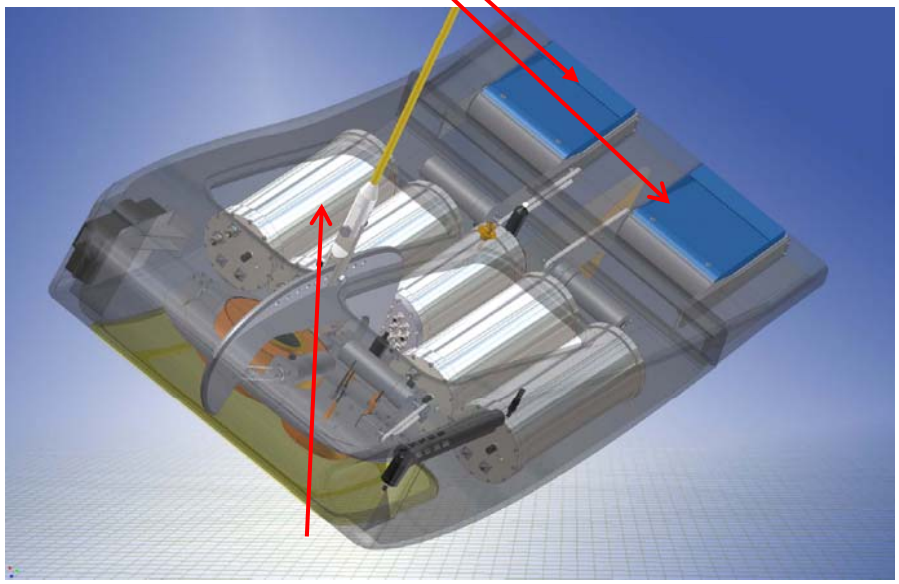
GPT housing

MUST Towed vehicle

Towing cable, (4 fibres & electrical cable)



Elevators

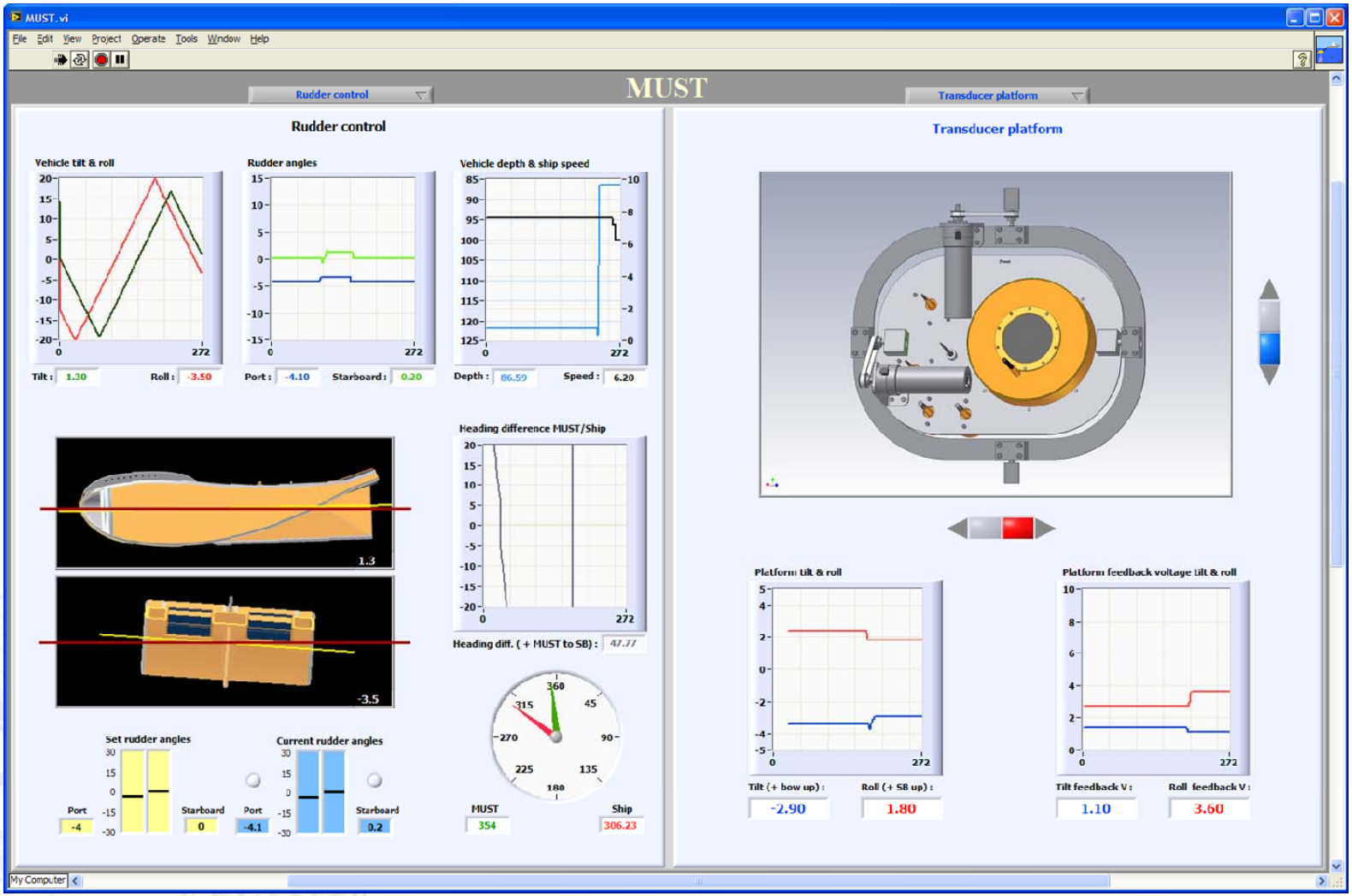


Towing cable and centre plate with fastening holes

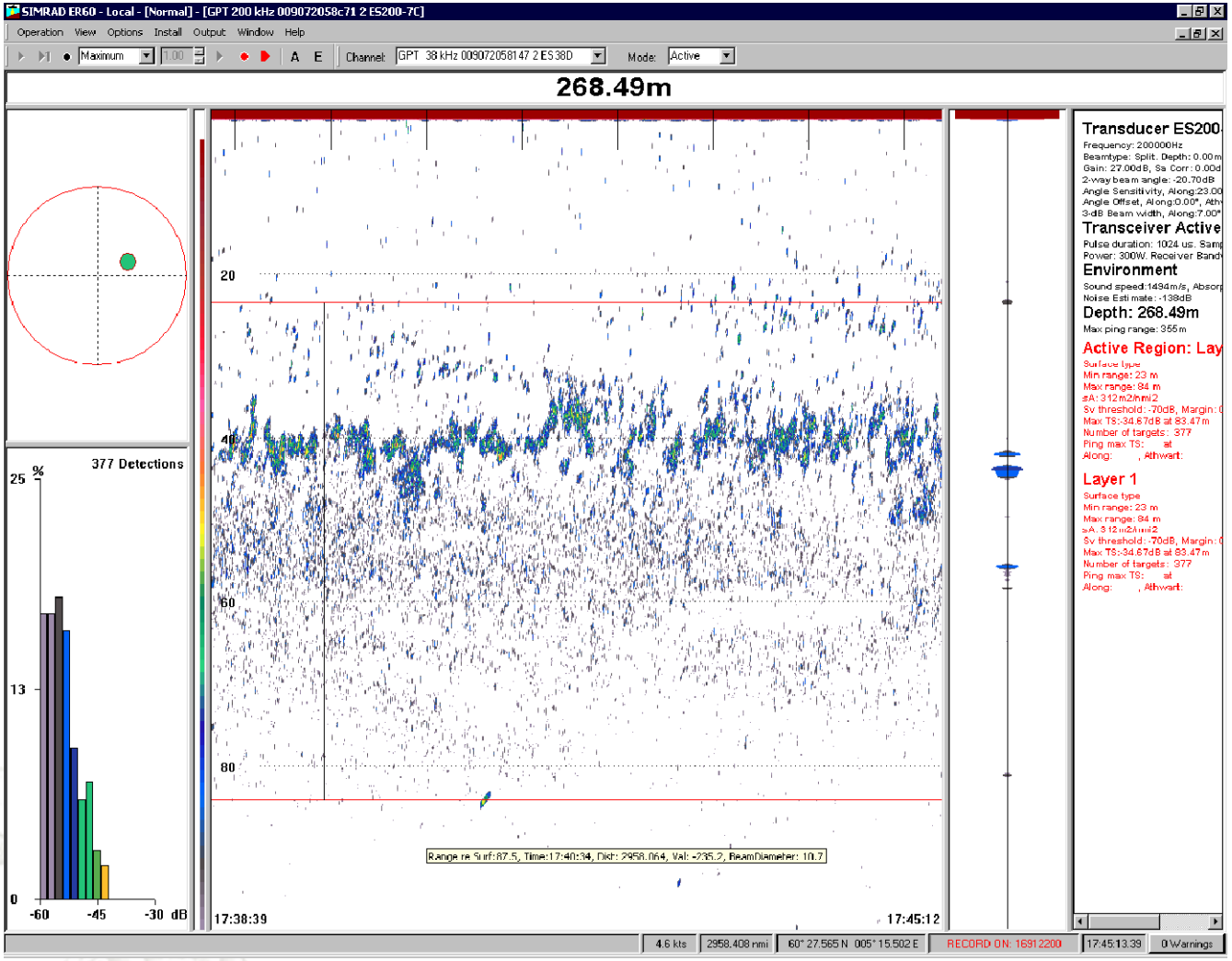
Deck units and operation

- Collect and present data from:
  - Echosounder system, LOPC, VPR, other sensors
  - Control system
  - Communication system
  - Vessel's GPS
  - Towing cable, winch
- Power; 600 VAC

Control and steering system; elevators and transducer platform



Echosounder with echogram - 38 kHz



Launching the MUST from RV ”Johan Hjort”’s A-frame

In sea: Ready to be towed

Towing speed:
2-8 knots

Weight in air:
1300 kg

Weight in sea:
600 kg


The vision of the Institute of Marine Research:
Knowledge and advices for a clean and rich ocean
Thank you for your attention!