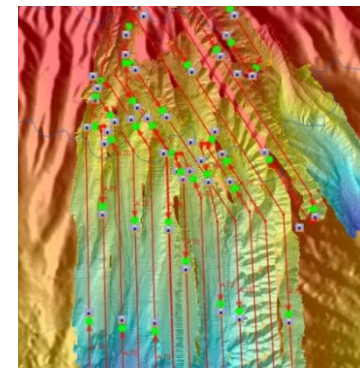
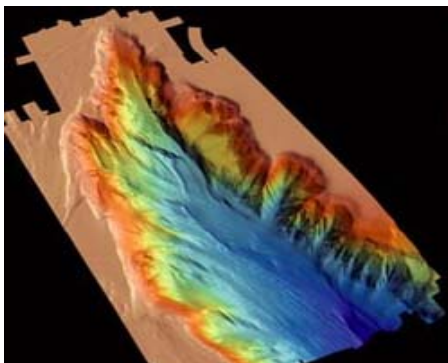


AUV & Research vessel mounted EM 2040 Installation and first results

H. Floch, S. Duduyer

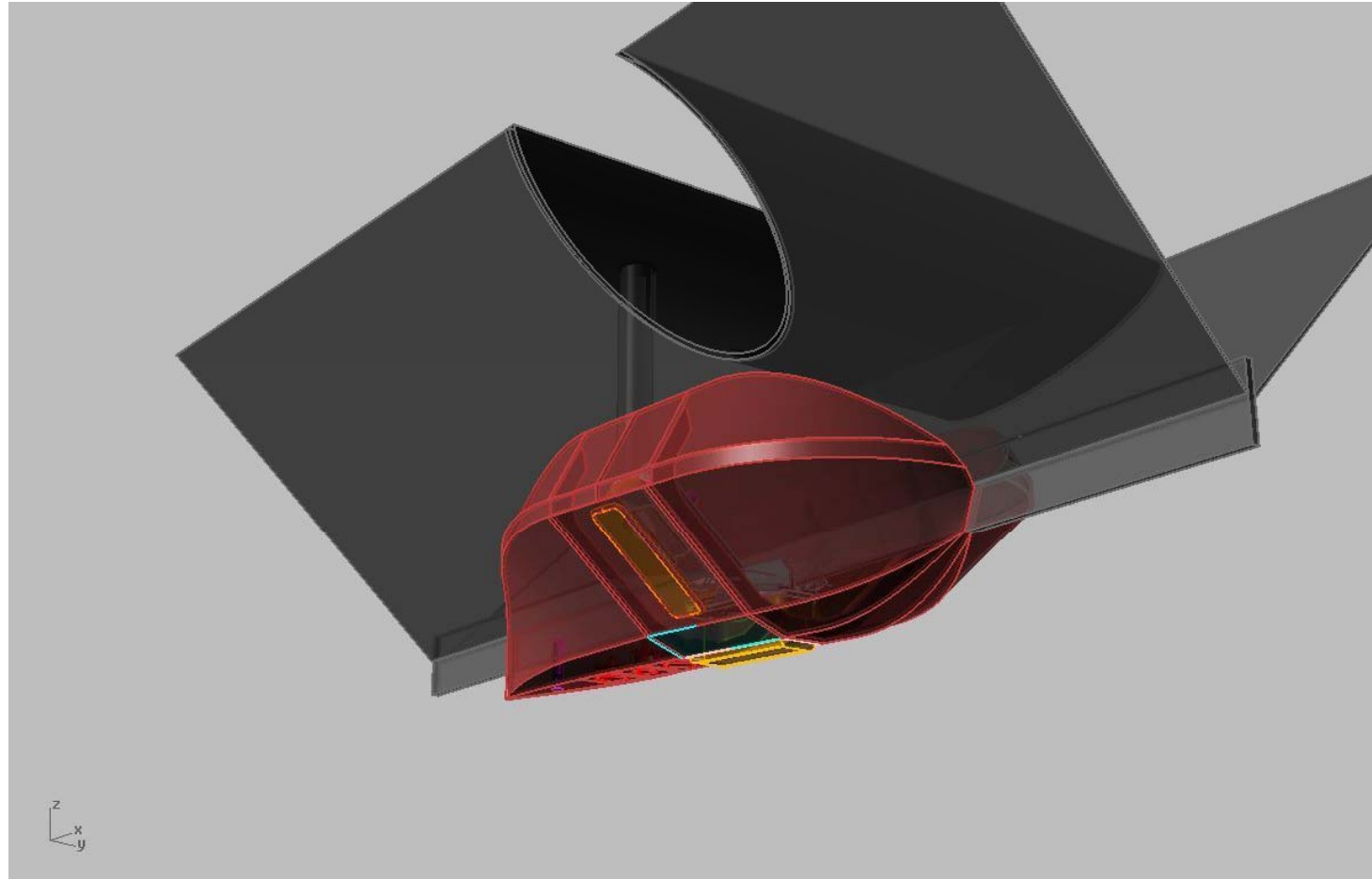


R/V Thalia



A coastal multi-purpose R/V → geoscience, biology, hydrology...
Built 1978 ; 24.5 m, 135 t
6 science + 6 crew

R/V Thalia equipped in 2012 with a EM 2040-D

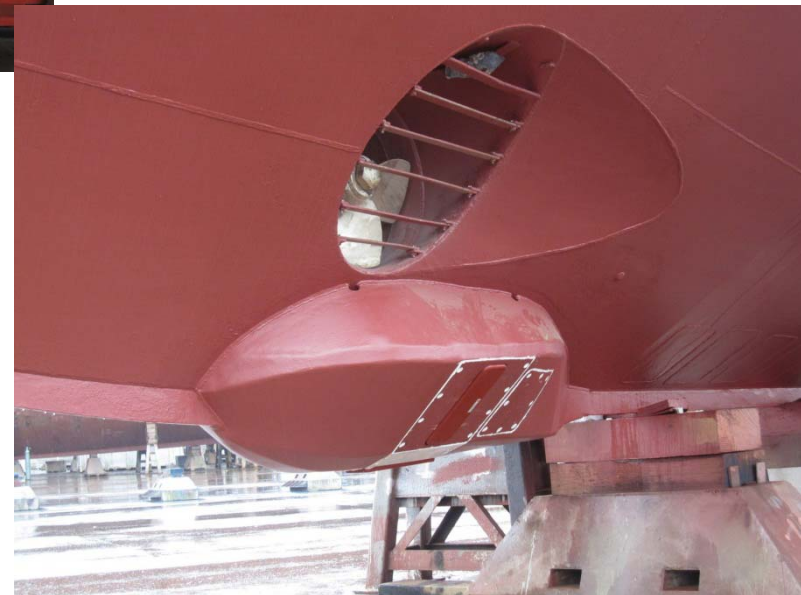


Preliminary studies of the blister hosting the EM2040 dual head

Blister – right from the workshop



Installation of the blister below the ship



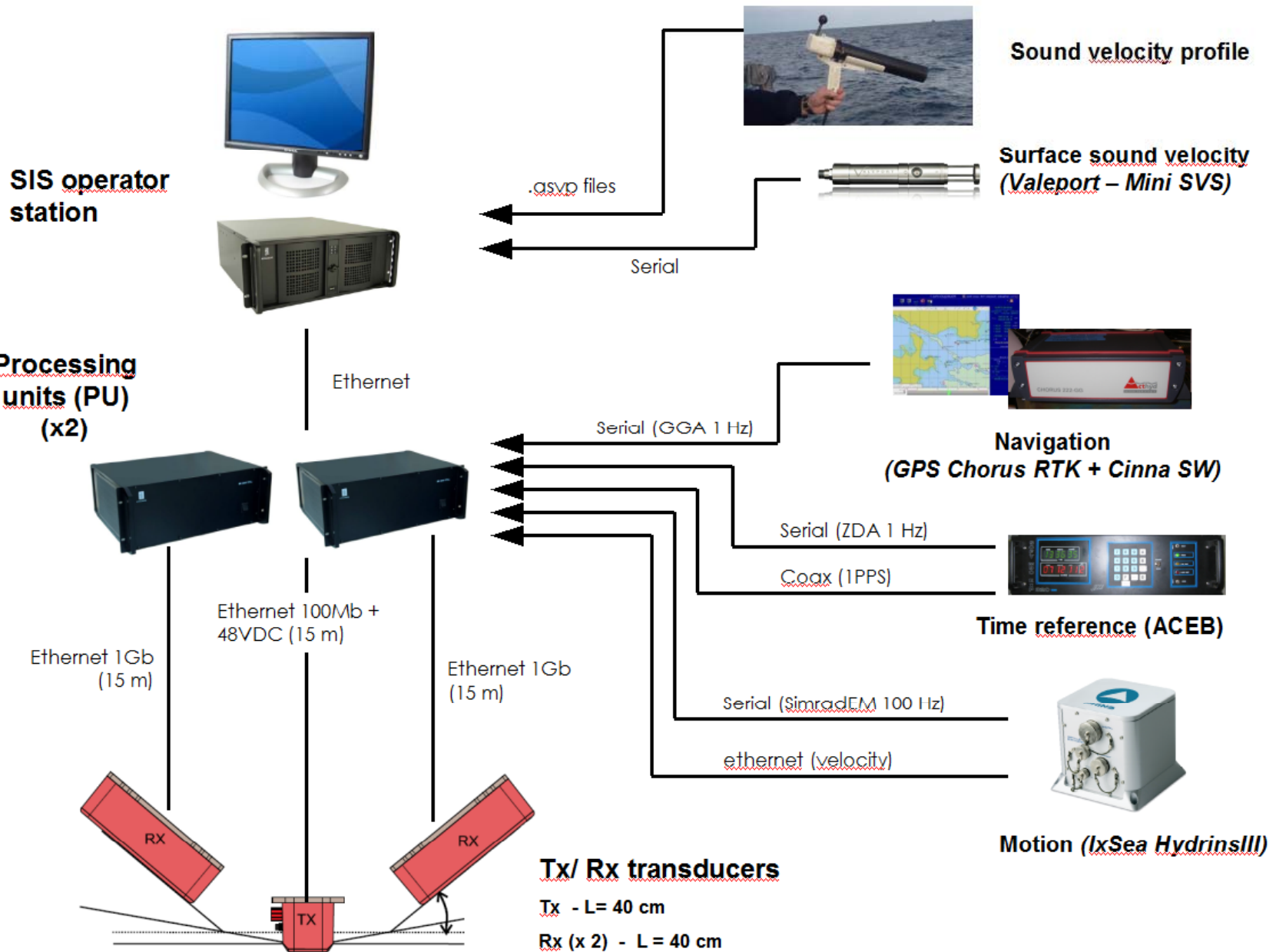
Ready to sail...

Transducers
EM2040

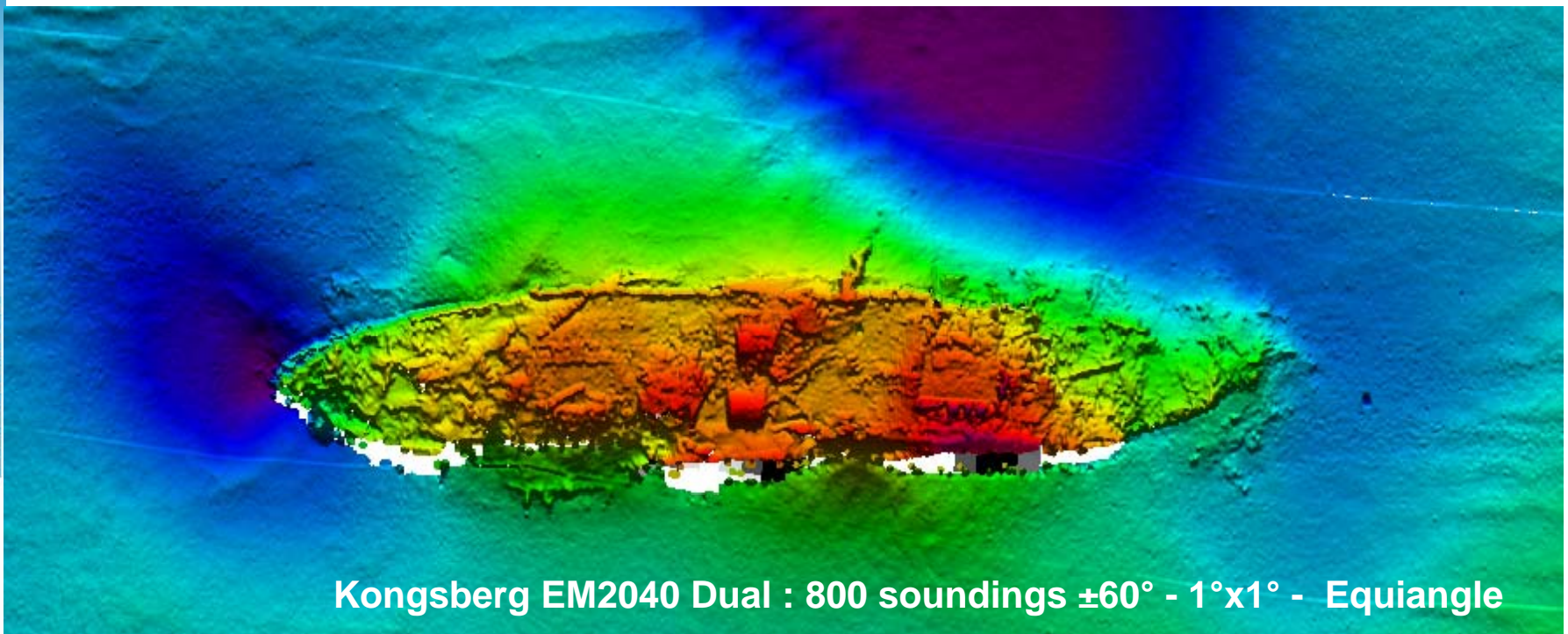
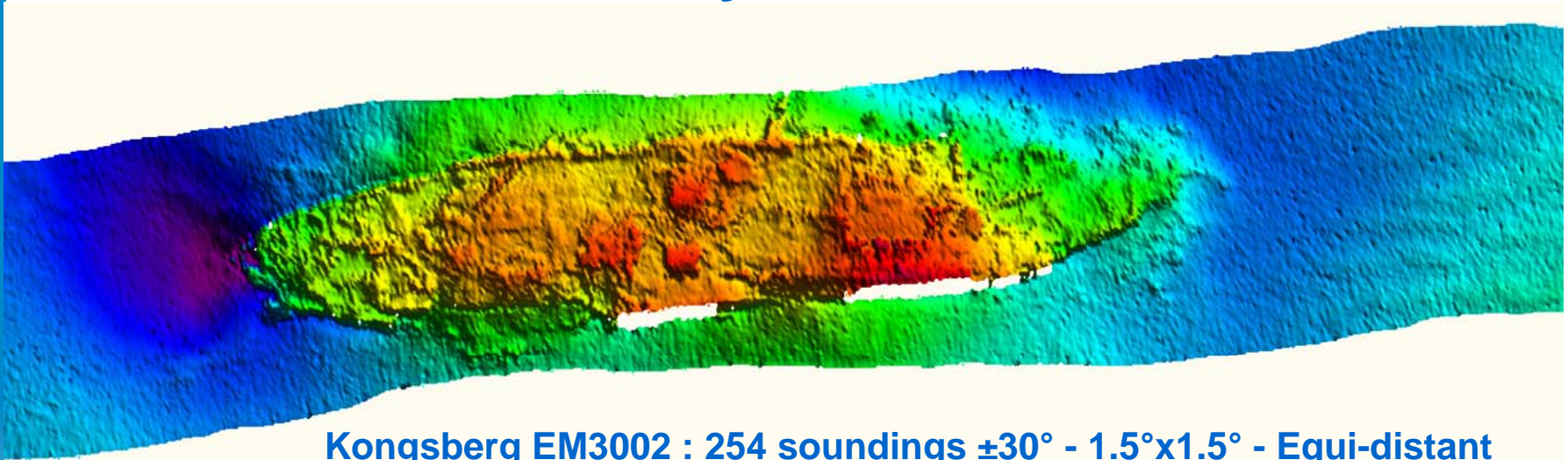


ER60
120-7C

Thalia EM2040D – architecture



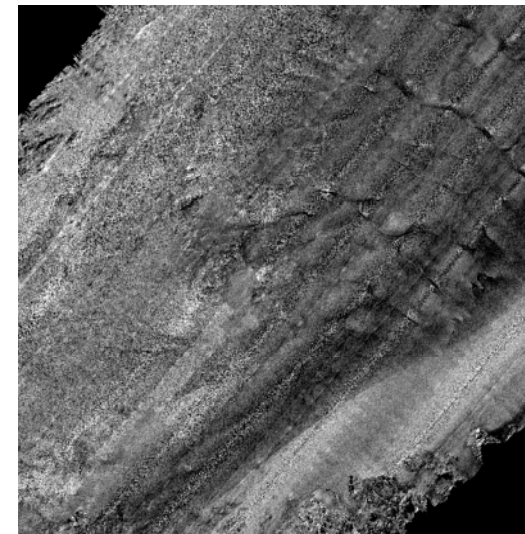
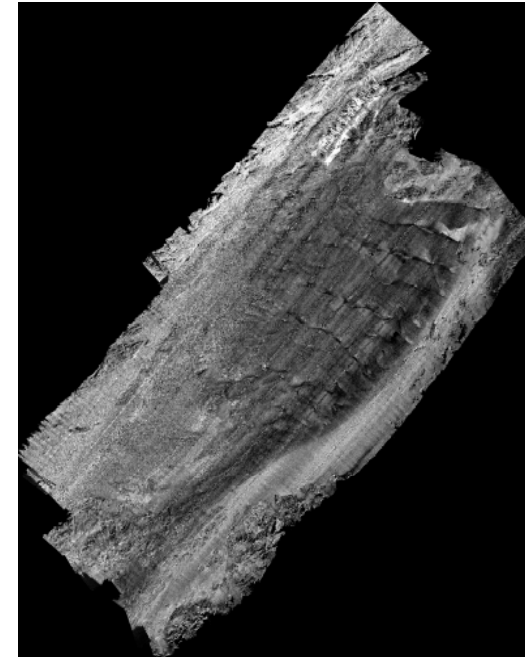
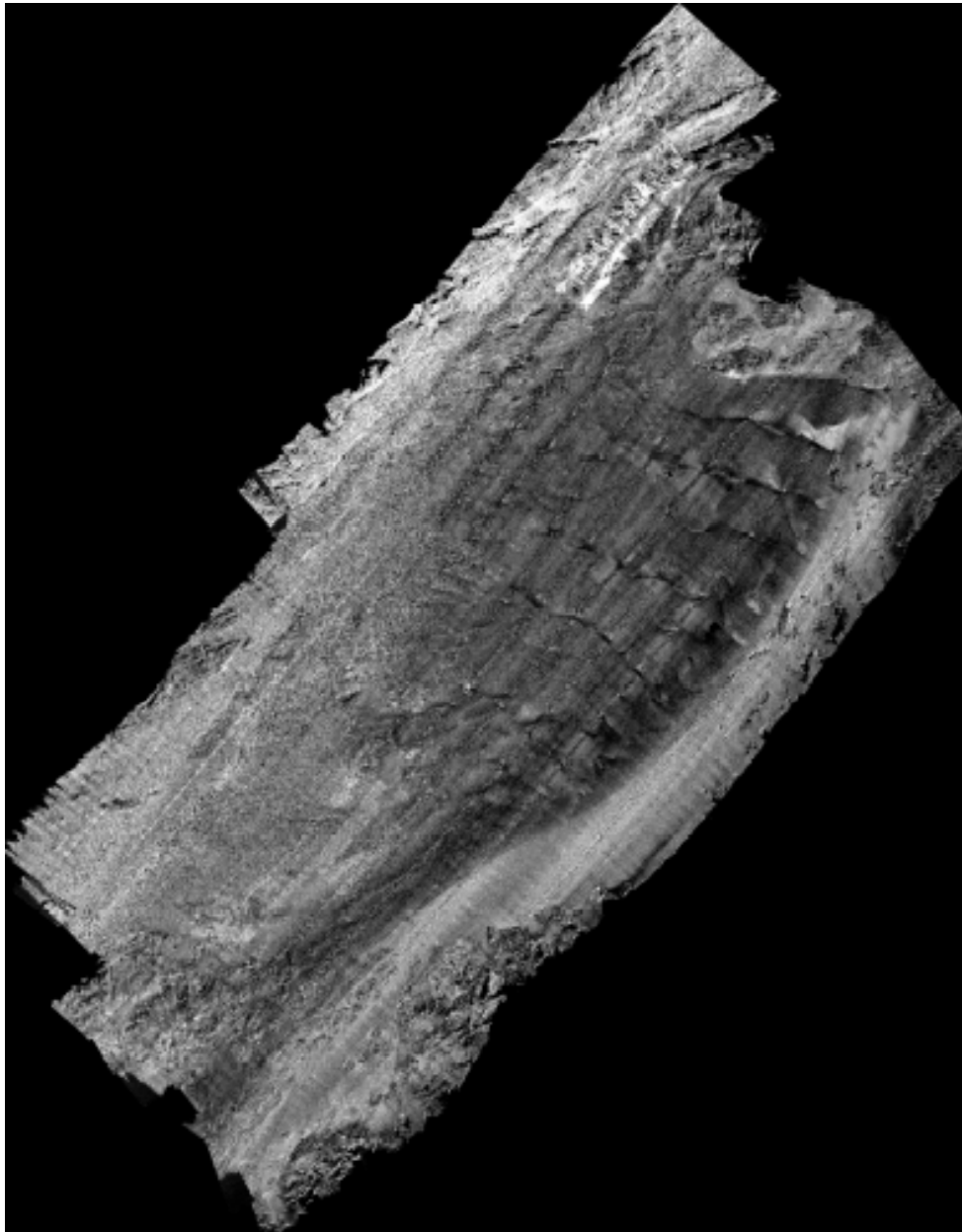
Wreck survey



Thalia EM2040 D Reflectivity

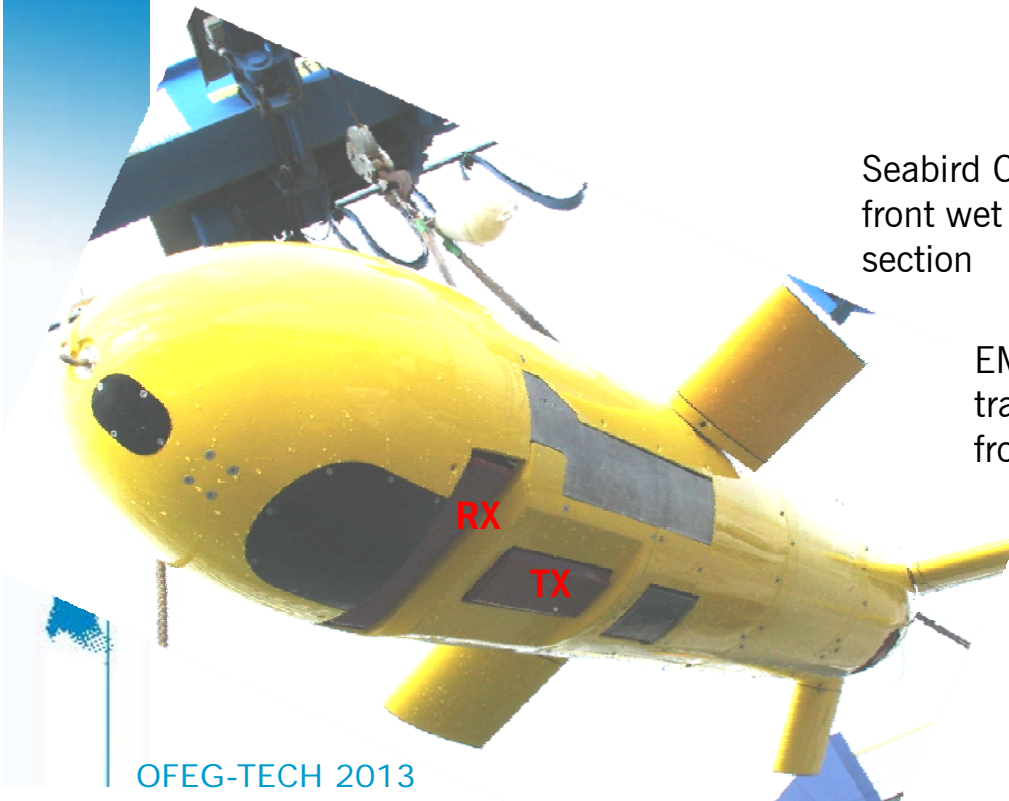
Mosaicked Sonar Image (@50cm)

Compensated



New acoustic imaging and multibeam sonar on AUV

- AsterX initially equipped w/ EM 2000 2004
- EM2040 retained from Europ. tender 2009 - while EM2040 in design phase
- EM2040 shipped end 2010 - 1st EM2040 delivered to customer !
- Integration on AUV : 2011 - autonomous survey down to 2300m
- 1st operational cruise : 2012 - commercial contract



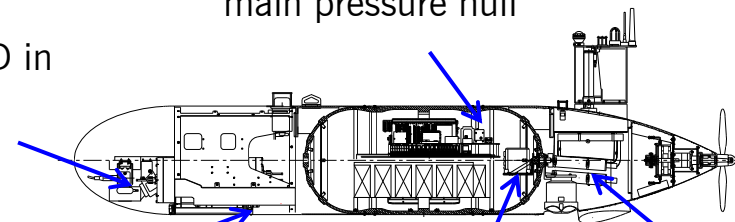
Seabird CTD in front wet section

EM2040 transducers in front wet section

EM2040 PU in AUV main pressure hull

Inertial unit Phins in main pressure hull

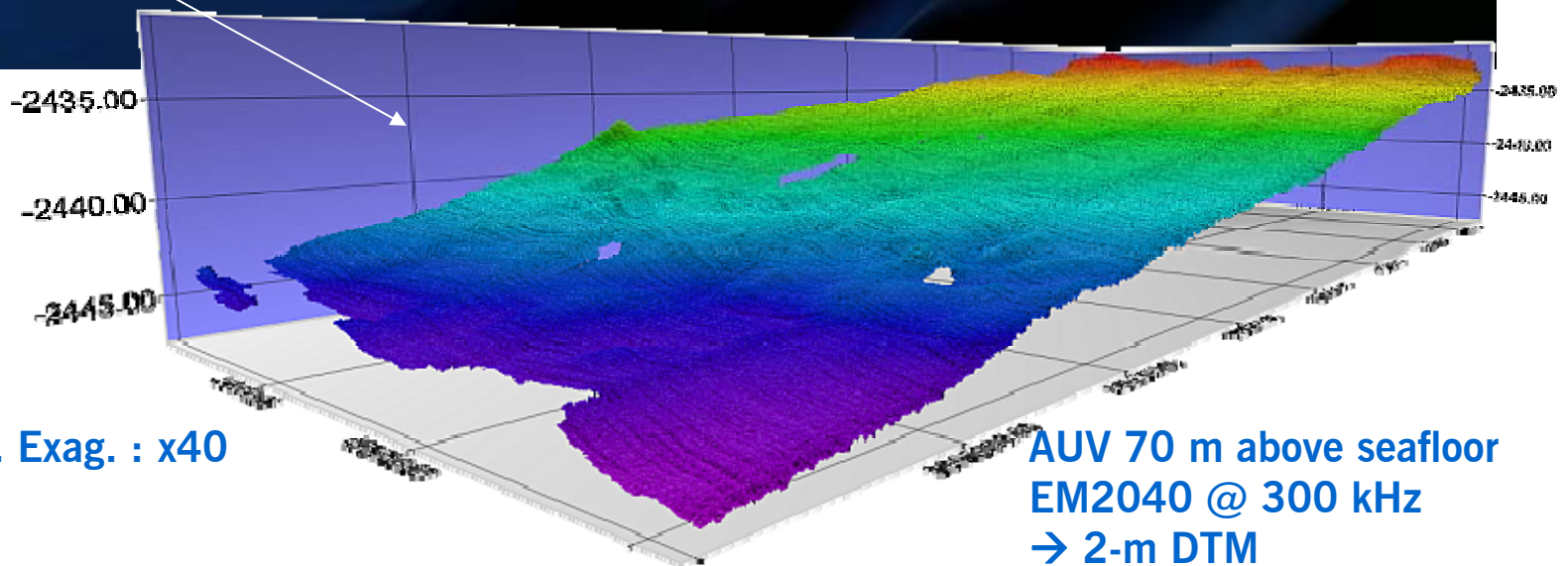
Depth sensor in aft wet section



First deep-dive attempt, offshore Toulon

- 2000 m depth
- 6 km² area surveyed

New MEUST deep-sea neutrino telescope planned site

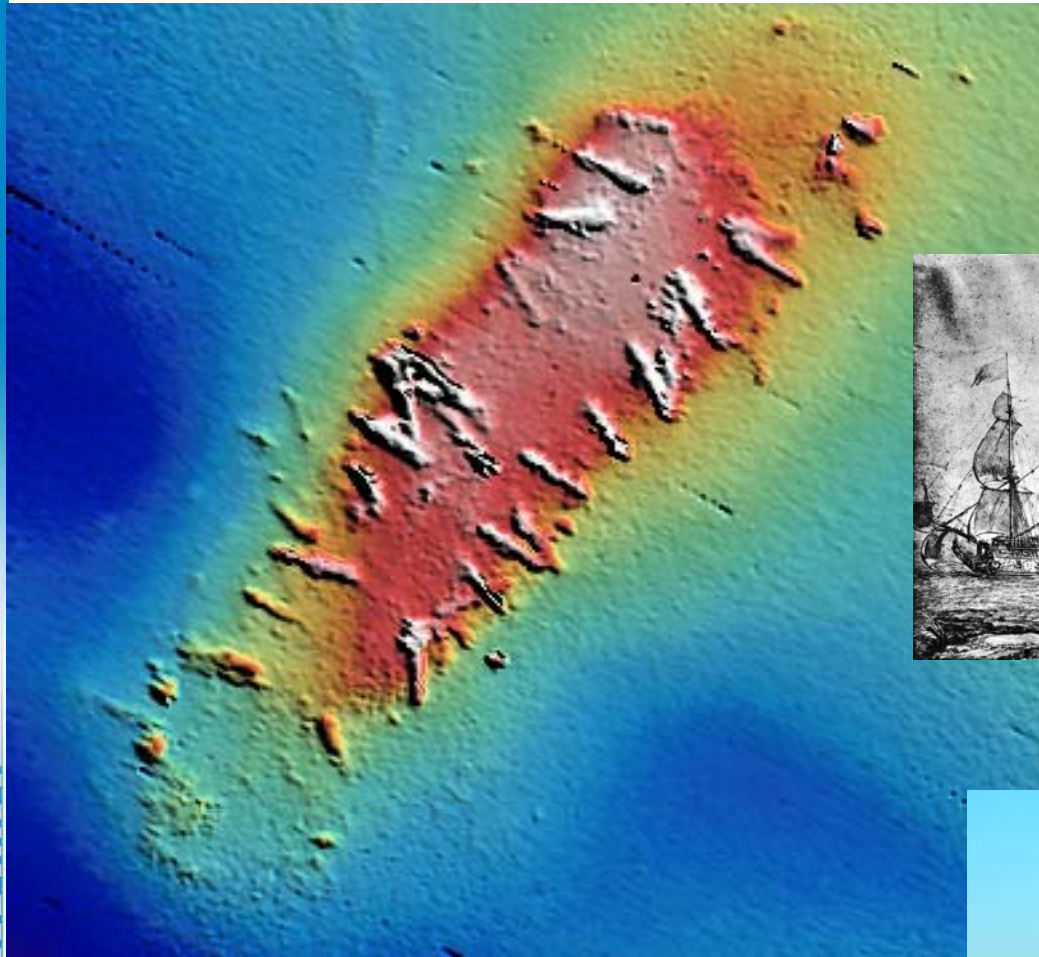


Vert. Exag. : x40

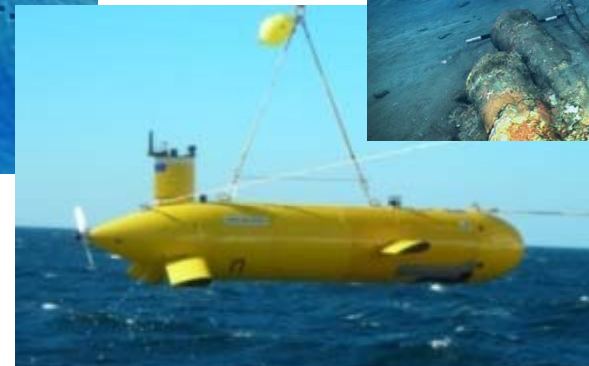
AUV 70 m above seafloor
EM2040 @ 300 kHz
→ 2-m DTM

High resolution bathymetry - EM2040 on AUV

For the French Government Submarine Archeologic Department



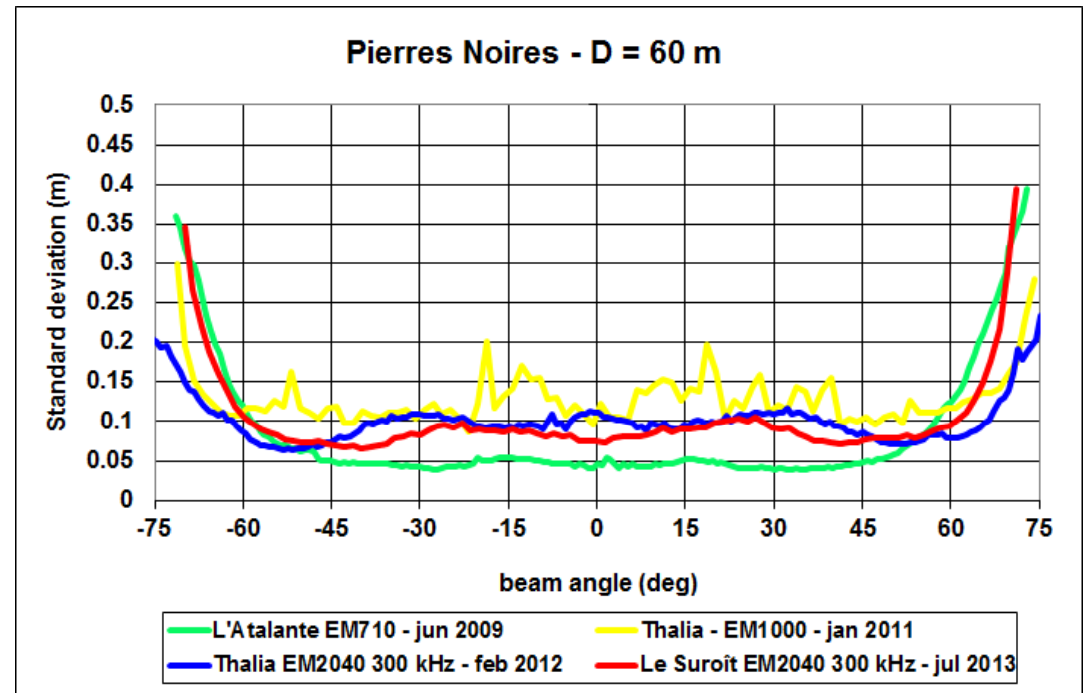
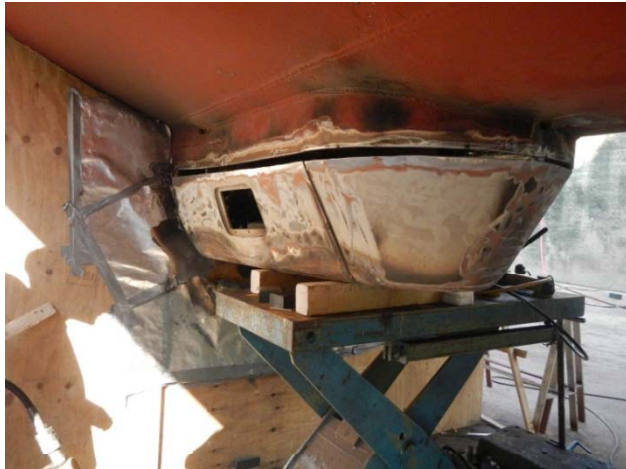
The vessel *La Lune* sank in 1664, the wreck was discovered off Toulon at 90-m depth by *Nautilie* in 1993 on a technical trial



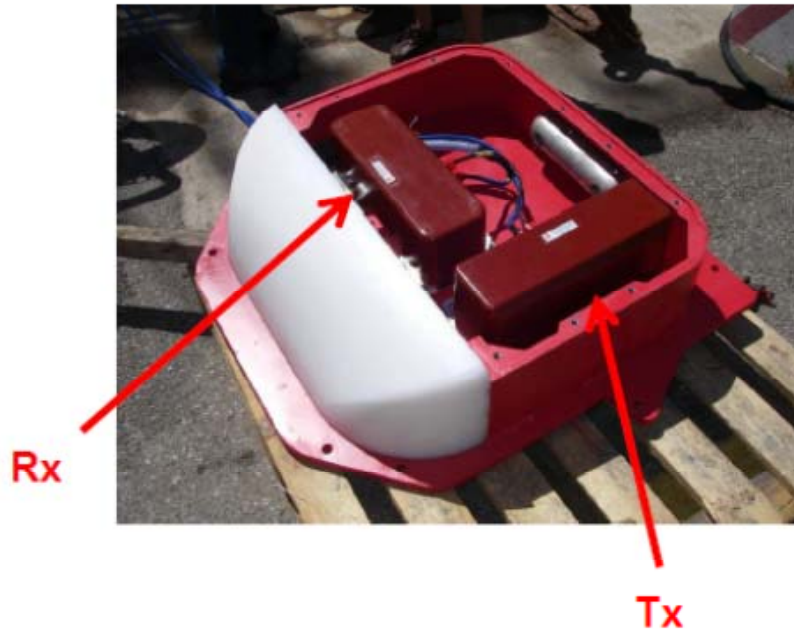
Wreckage mapped by AUV Aster^x
From 10-m height, grid 10 cm, cannons $\phi \sim 0.5\text{m}$

EM 2040 on R/V Le Suroît

- Replacement (2013) of the former EM 1000
- Design in the 1st semester 2013
- Sea-trials and SAT in July 2013
- Major improvement of the ship's capabilities for:
 - Shallow-water surveys
 - Water-column data logging



Mobile EM 2040 on R/V L'Europe



- Replacement (2013) of the EM 1000 mobile
- Design, sea-trials and SAT april to august 2013