

KONGSBERG'S EM304 (INSTALLATION &) RESULTS ONBOARD RV *THALASSA*

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Kongsberg Product Range



EM304 Multibeam echosounder is the successor of EM302
The first system accepted is installed on Ifremer's RV *Thalassa* in Sept. 2018

EM304 installation planning

February 2017 :

Contract signature with Kongsberg

July 2017 :

EM304 antenna during modernization works at at **Piriou Naval Service**, Concarneau (France)



June 2018

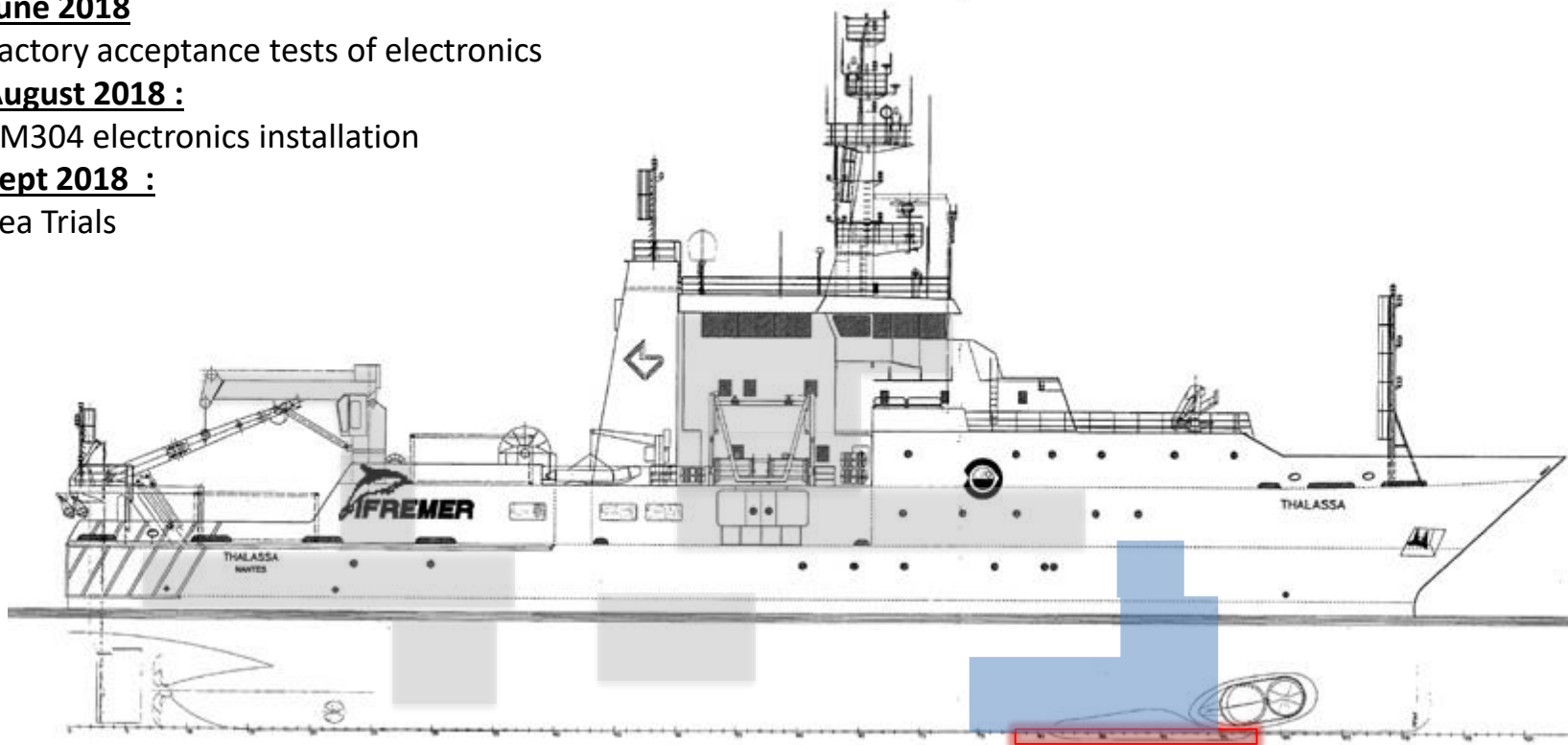
Factory acceptance tests of electronics

August 2018 :

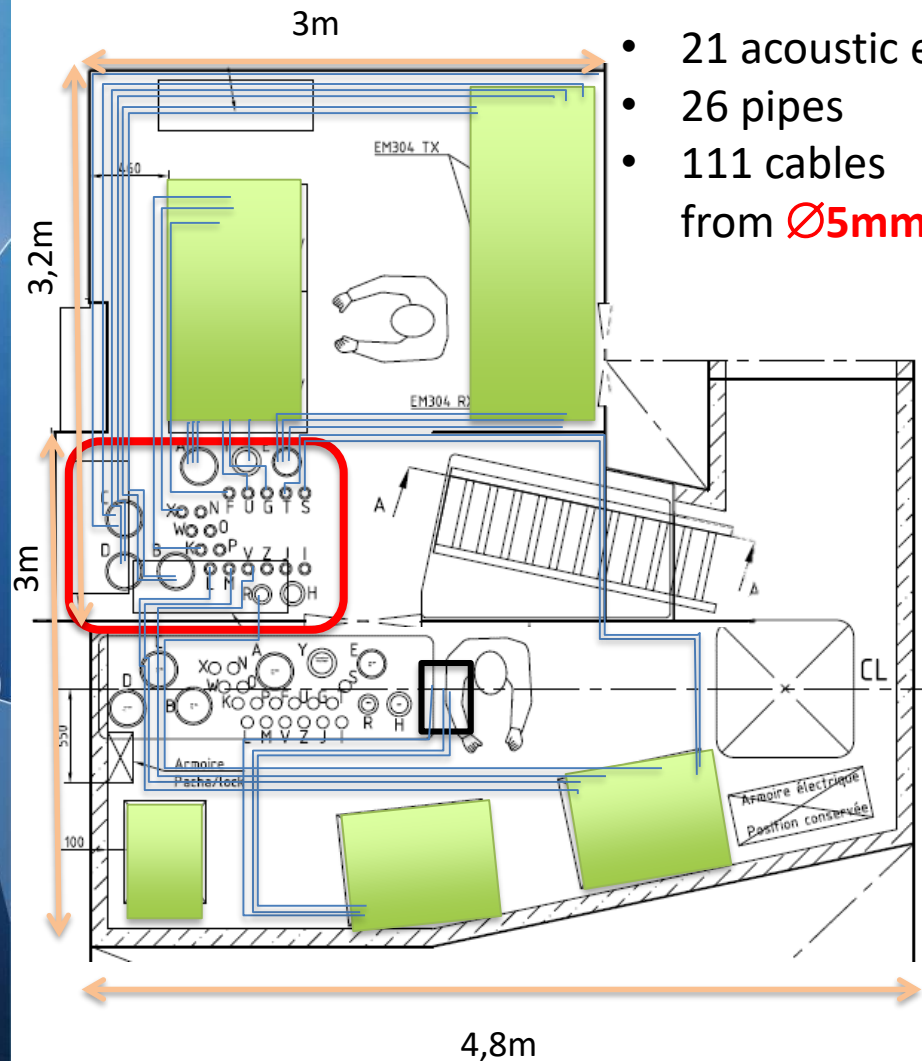
EM304 electronics installation

Sept 2018 :

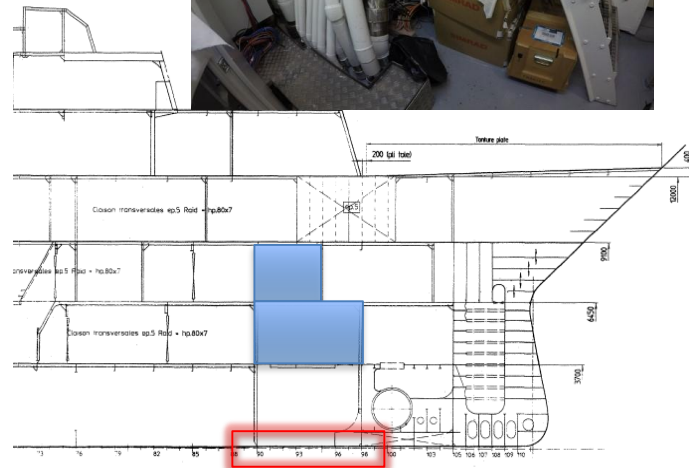
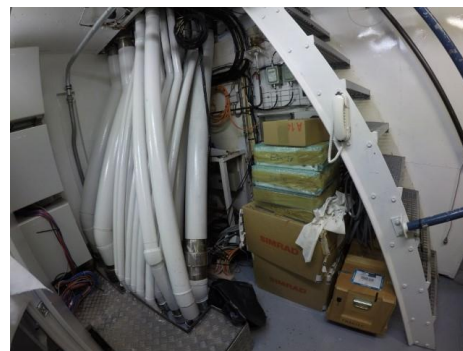
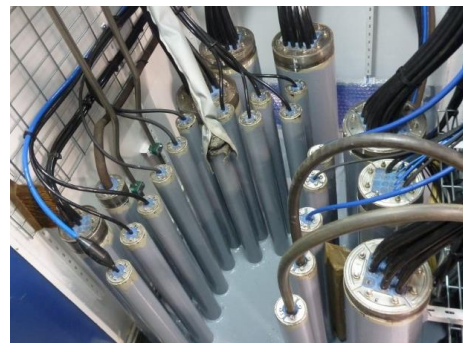
Sea Trials



A Sonar room on 2 decks!



- 21 acoustic equipments
- 26 pipes
- 111 cables from $\varnothing 5\text{mm}$ to $\varnothing 20\text{mm}$

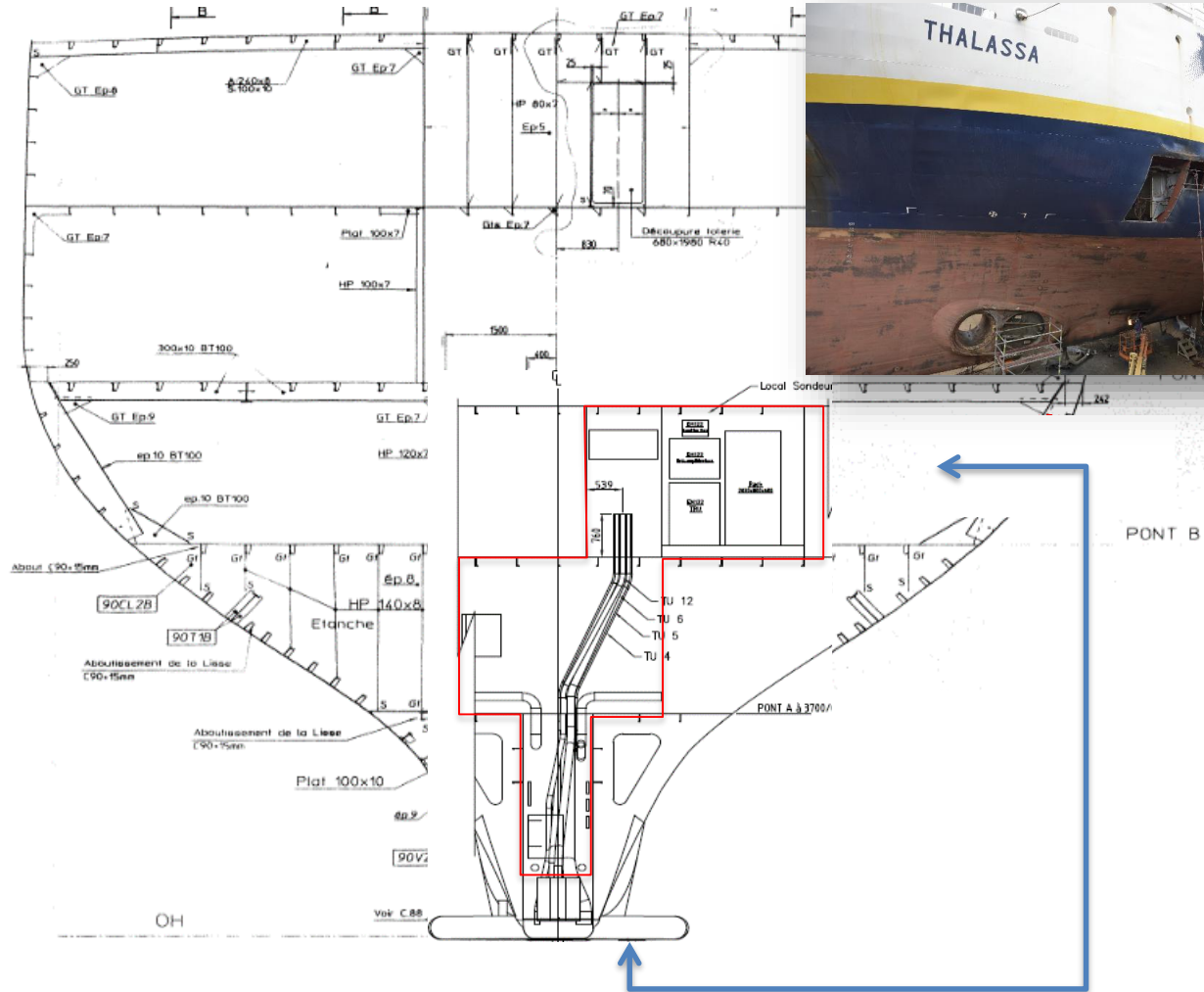


A Sonar room on 2 decks!

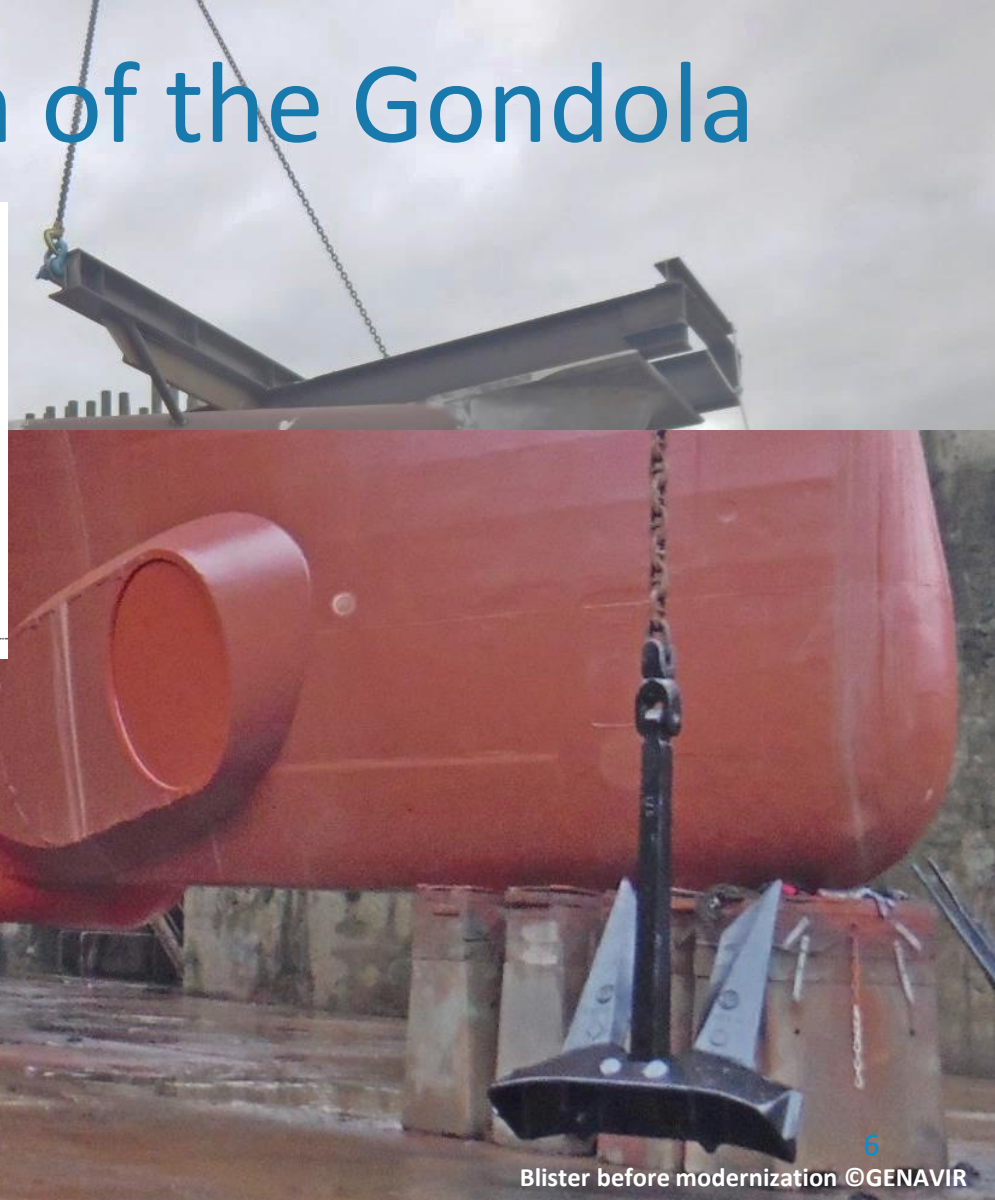
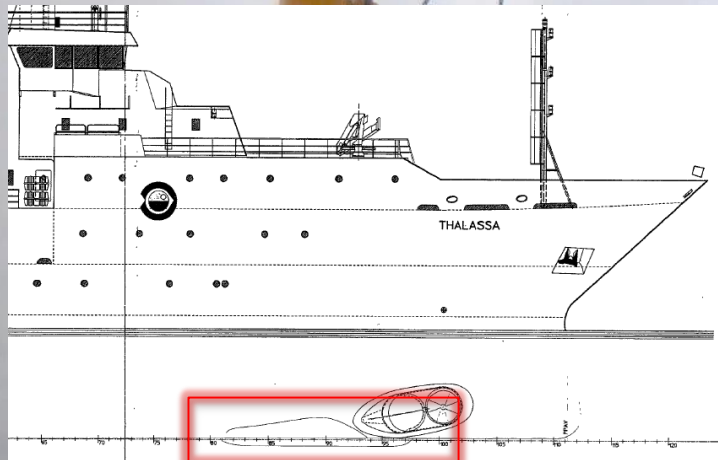


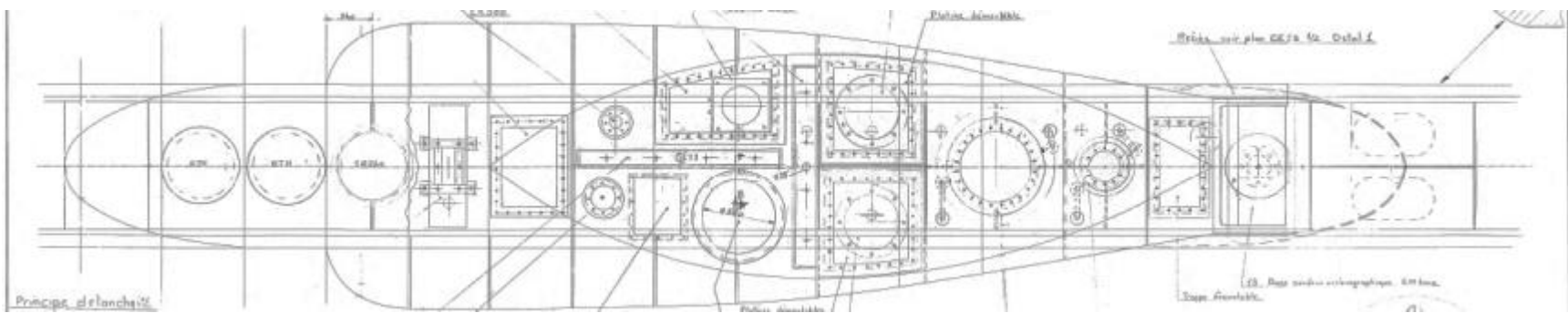
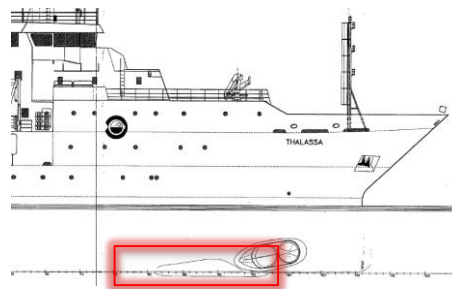
Deck B

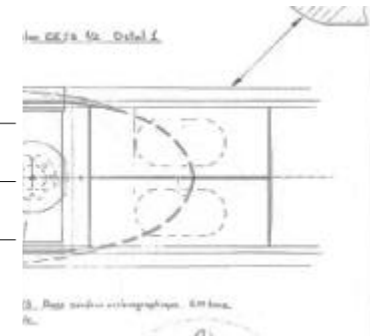
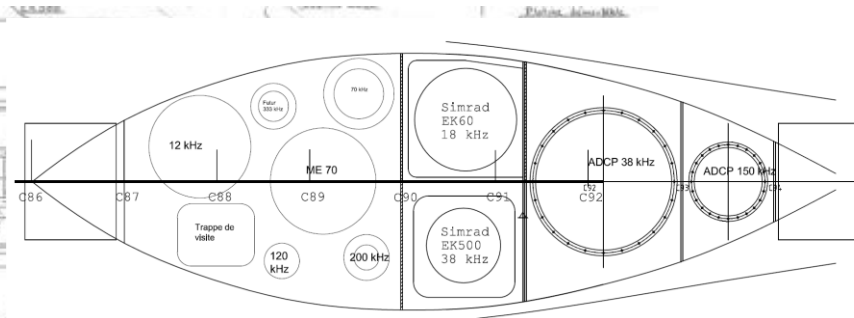
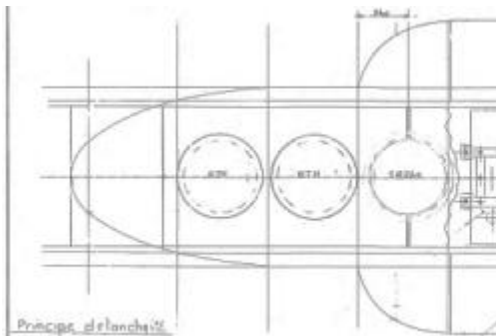
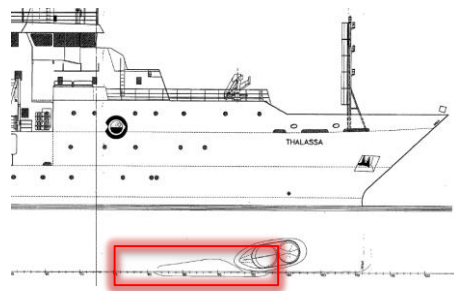
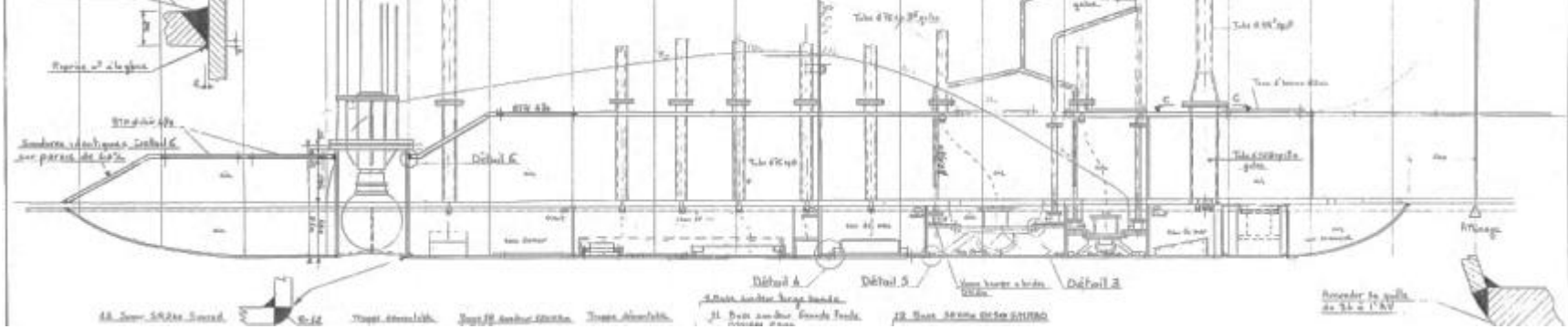
Deck A

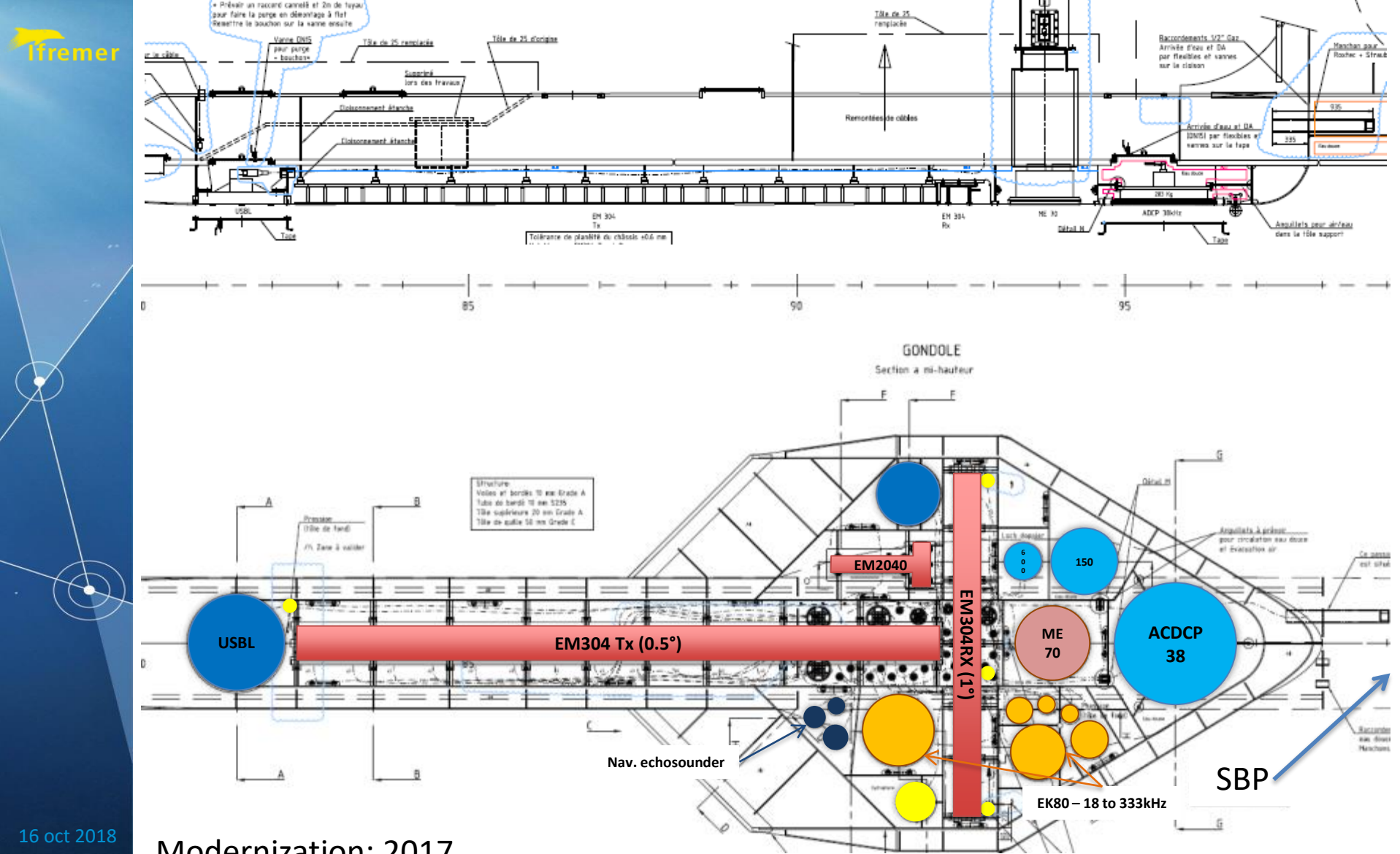


Integration of the Gondola















Iremer

GREAT JOB!



Size : 11m*4m, + 4m for SBP, 9 Tons.
Tilt of 5mm on the back
Rolling 2cm between port & starboard
No bending "banana" effect on wings

16 oct 2018

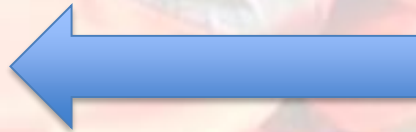
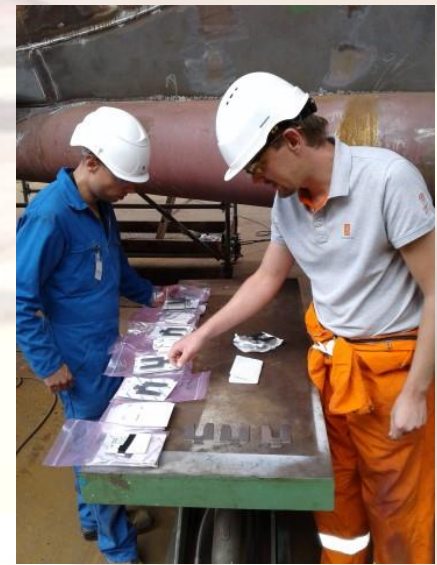
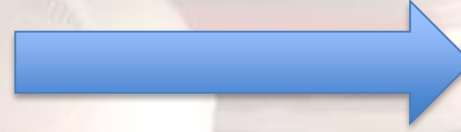
Transducers & Frame installation



[VIDEO](#)





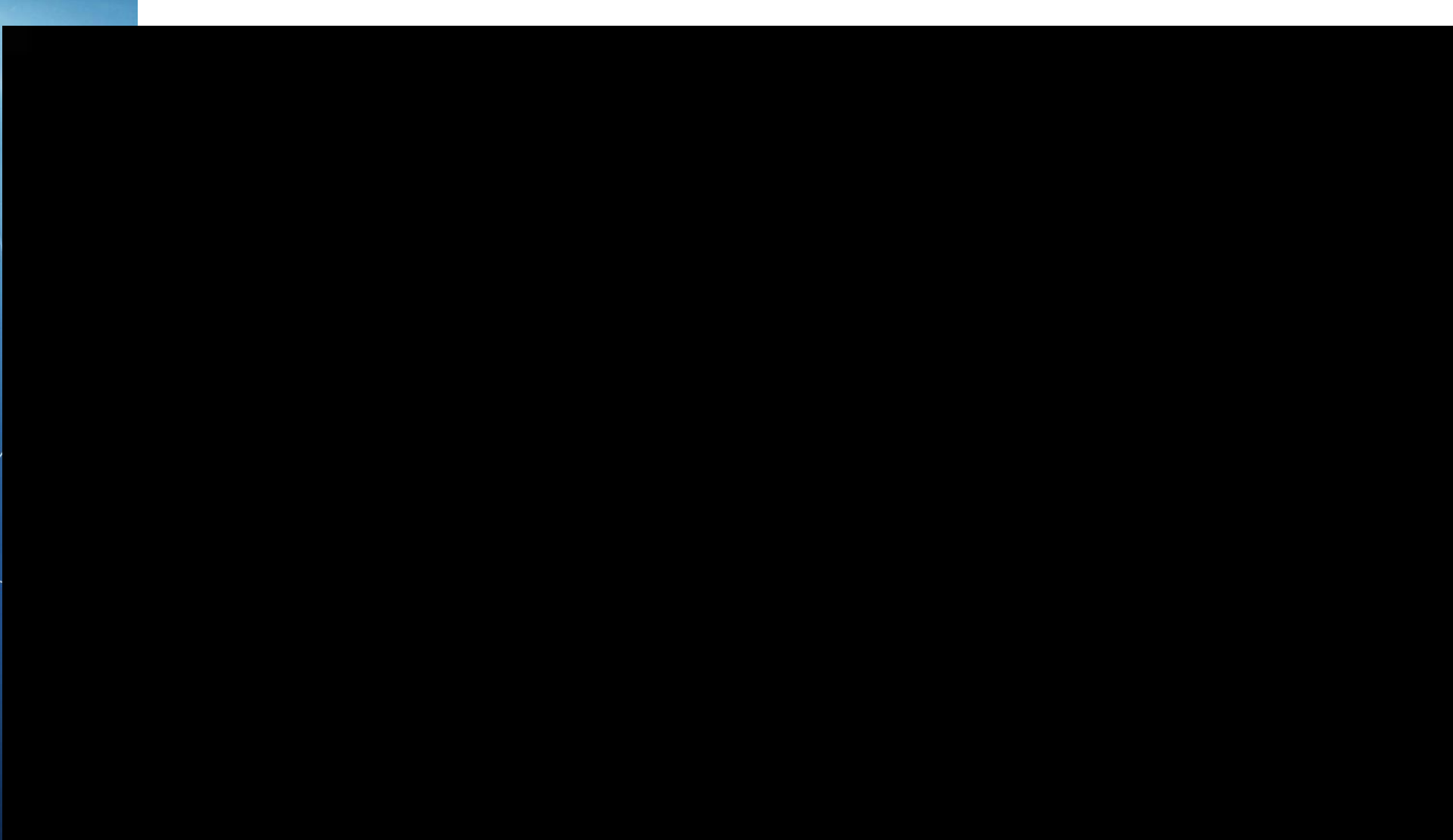


TX: 40 screws
RX: 21 screw
Position accuracy à 0.1mm
Torque: 180 N.m

Installation of transducers, pulling cables



VIDEO 1 : MBES



Acoustic Equipment integration



EM2040



SBP – IXBLue 3500 (5 transd. instead of 7)



ADCP 38kHz – homemade installation system







16 oct 2018

Picture: Brieuc CRÉNAN ©IFREMER



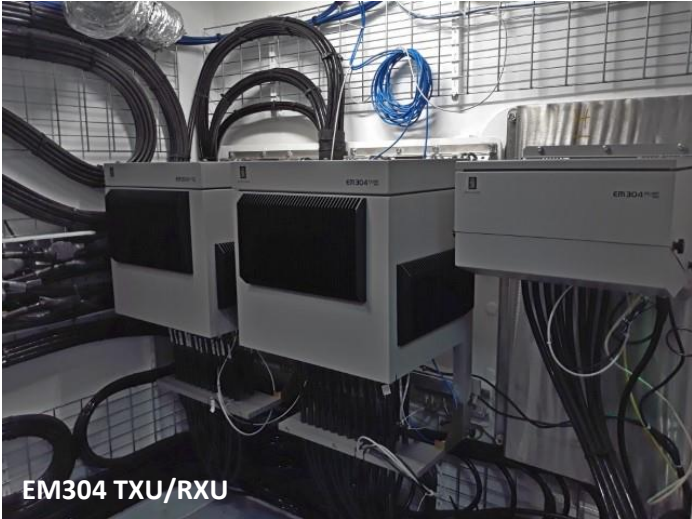
Sonar Room pictures

DECK B



DECK B

DECK B



DECK A

EM304

What's new ?

Transducers: **identical** from EM302 but **different**

EM302 305326/A p32:

3.7 Transducer modules

To make the installation of the transducers easier, they are built with standard modules

- All Rx modules are identical
- **Two different Tx modules are used; Tx1 and Tx2**

The two transducer module types are identified by their unique registration numbers, which are moulded into the rear of the element.

For 0.5 ° system, only Tx2 modules are used

	EM302	EM304
Tx 1°	4*T _{x1} +4*T _{x2}	-
Tx 0.5°	16*T _{x2}	8*T _{x1} + 8*T _{x2}
Rx	-	-

R/V Thalassa's EM304 0.5° Tx =
R/V Le Suroît 1° Tx + 4 new Tx1 + 4 new Tx2

Electronics : **totally different**

Separate small RX and TX units with low noise and high resolution – synchronized by optical cables

Slim Processing Unit ("Slim PU") connected by Ethernet (**same as EM124, EM712, EM2040 : the new KM's MBES generation**)

IT: **a revolution**

HWS + Acquisition software SIS v5 + .kmall dataformat (+kmall2all routine)

New velocity format "KM Binary" (instead of Seapath/SimradEM) → ordered by Ifremer to Ixblue in Jul 2018 for SAT (Sept2018)

(>= Version 12.1.6.2)

EM304

0.5°x1° system

RX : 3 m
TX : 6 m

EM304

Local Electronique Informatique (E03)

Vers Slim PU

157.237.16.12



HWS



Local Sondeur Haut (B60)

Vers HWS

157.237.14.60

Réseau sondeur

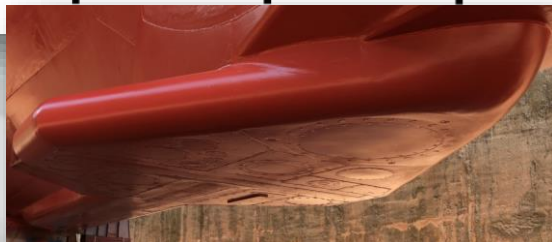
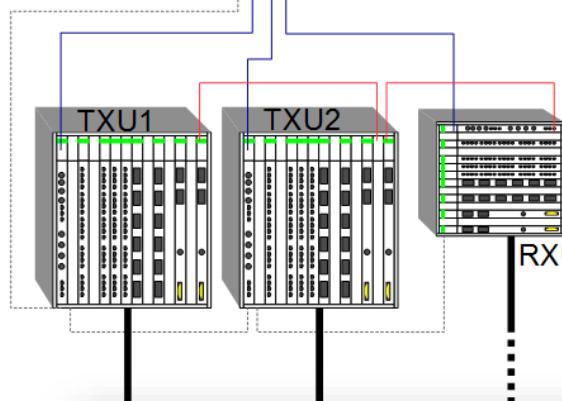
192.168.54.xx

Seapath b11 UDP Port 301

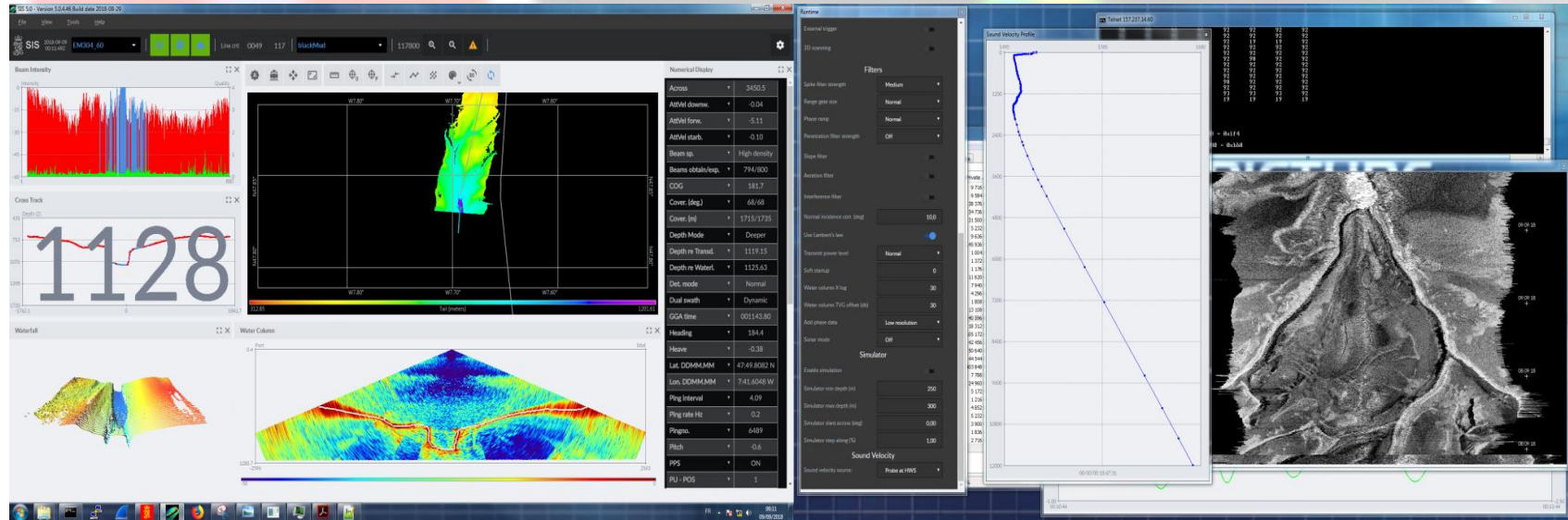


Slim PU

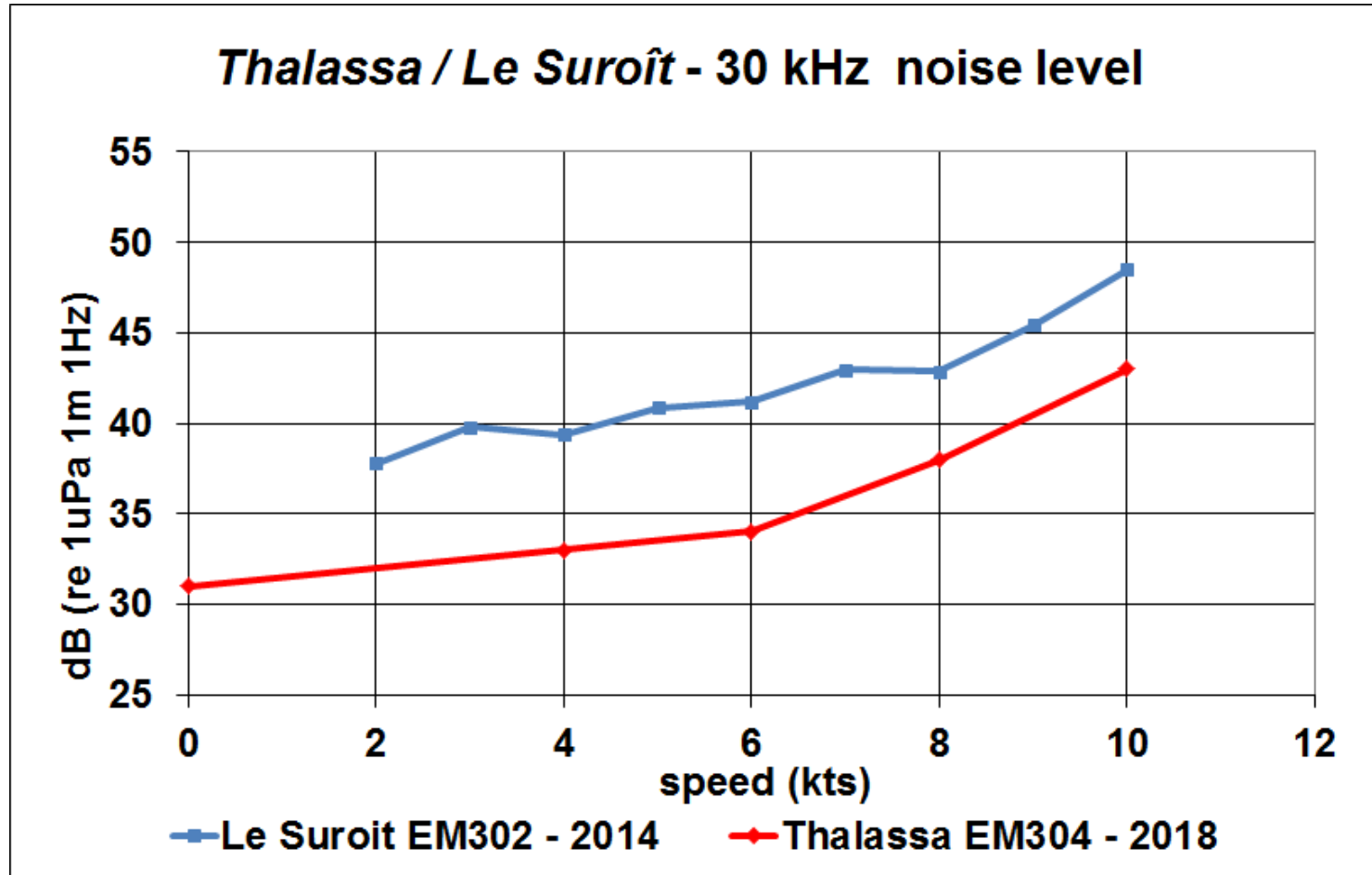
NMEA \$GGA/4800/8/N/1
NMEA \$SimradEM19200 ⚠



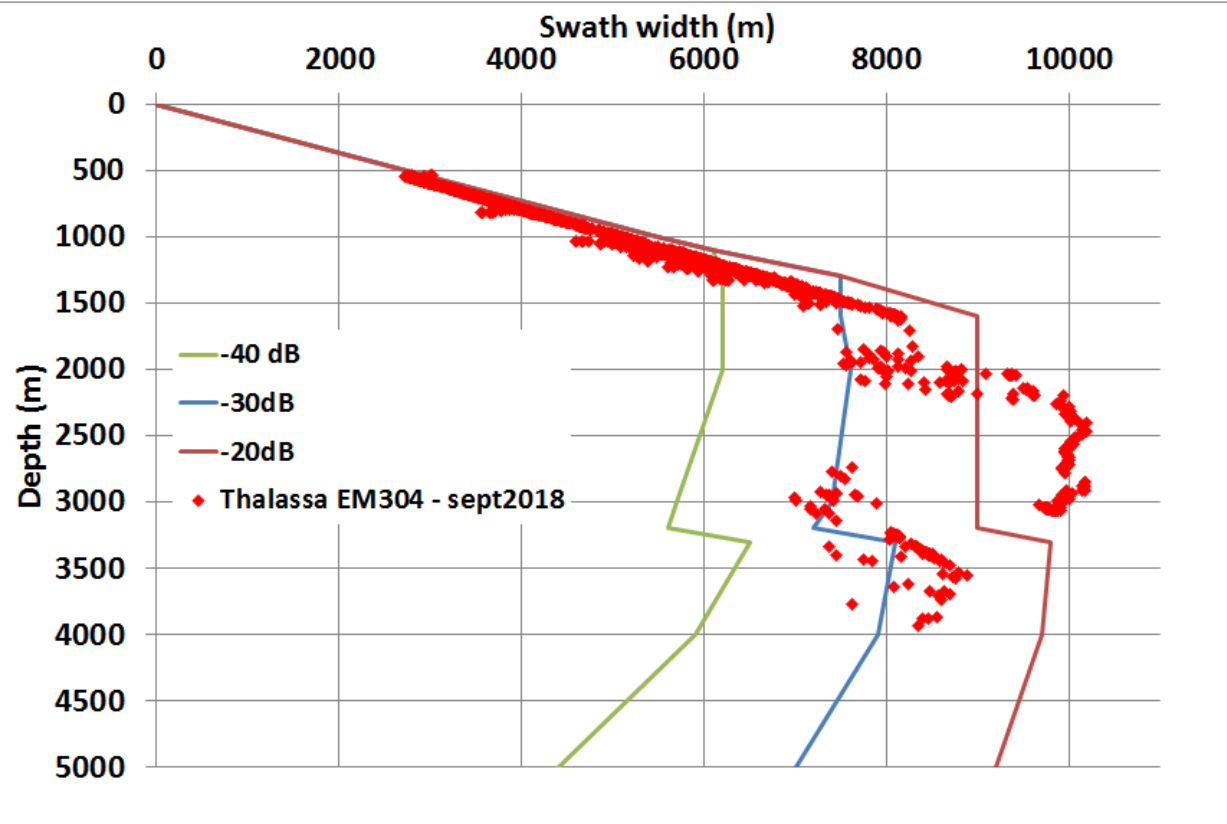
EM304 – SIS v5 interface



EM304 – Noise level measurement

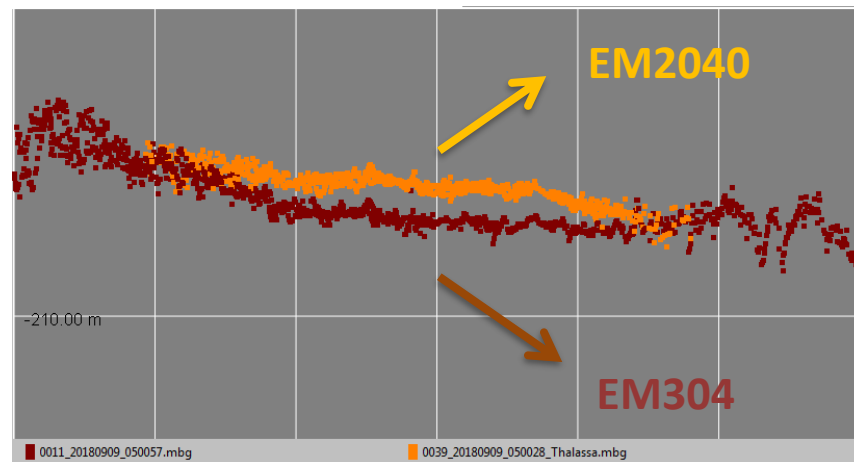
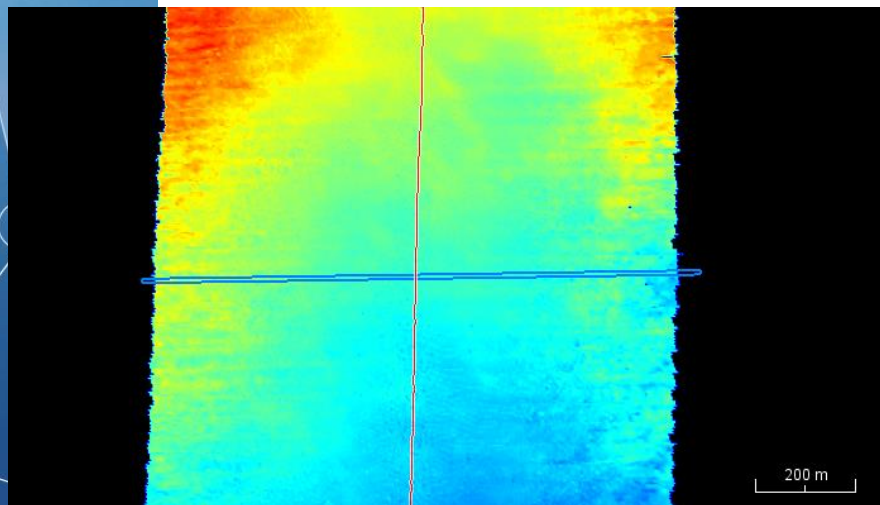


EM304 – Swath width



- Prediction = KM
 - NL = 43 dB
 - Abs = 4.5 dB/ km
 - BS = -20/-30/-40 dB

EM304 vs EM2040 (D=200m)

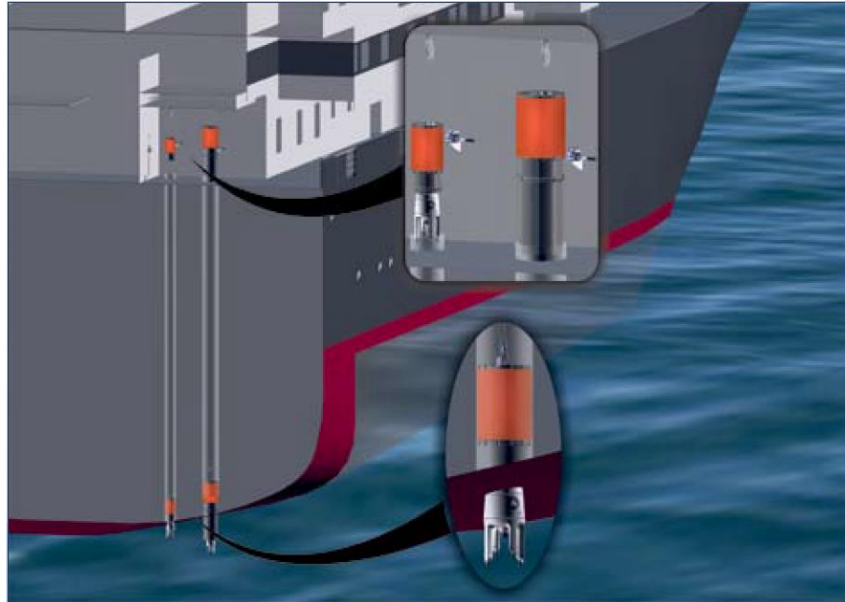


EM304 is deeper (range error) (approx 80 cm)

→ This default was already observed on EM302

EM304 – Backscatter Calibration

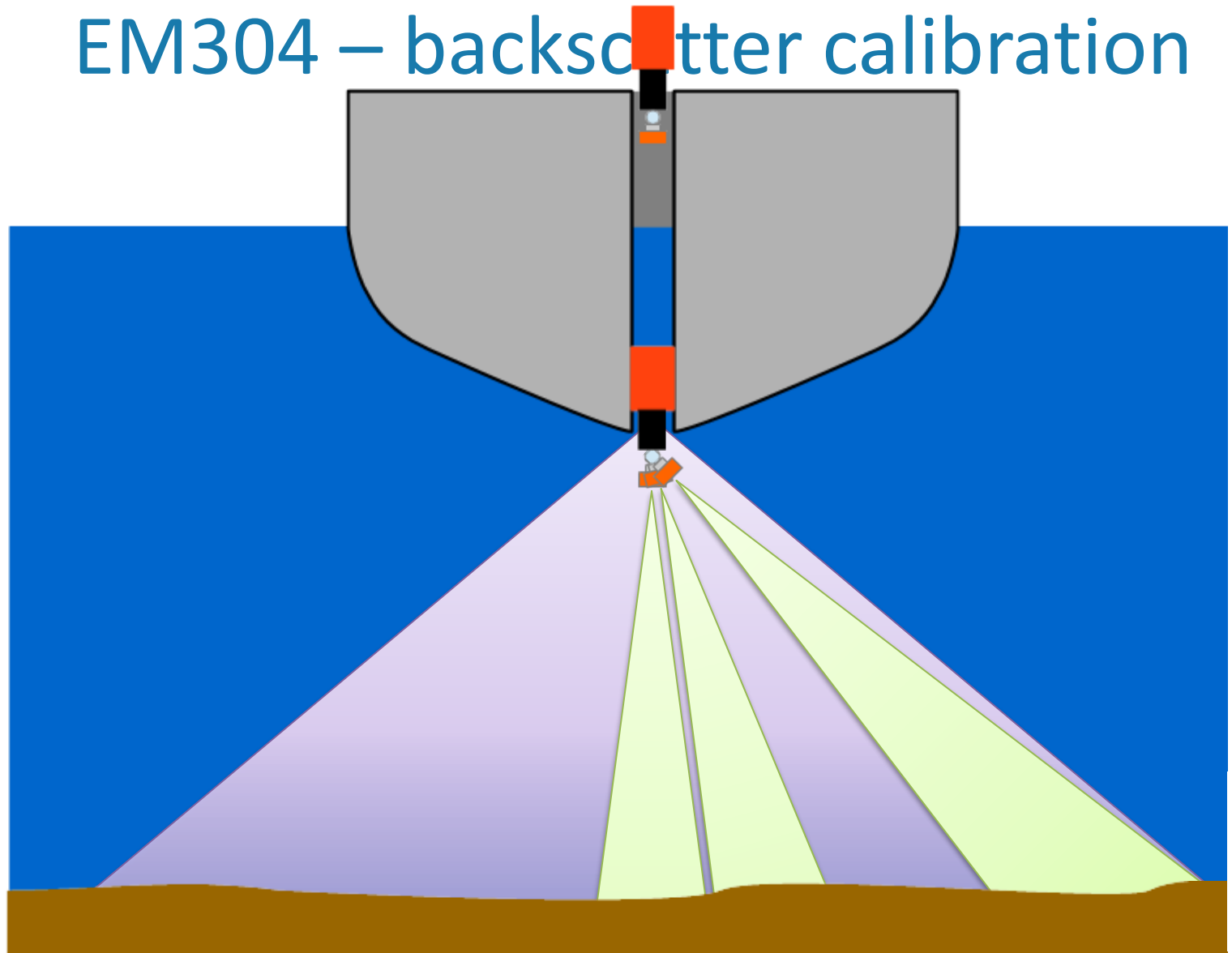
Use of the “TVO” (hydrophone tube/well)



**EK80 38kHz-10°
on a Pan&Tilt in
the hydrophone tube
measurements from 0 to 70 deg**

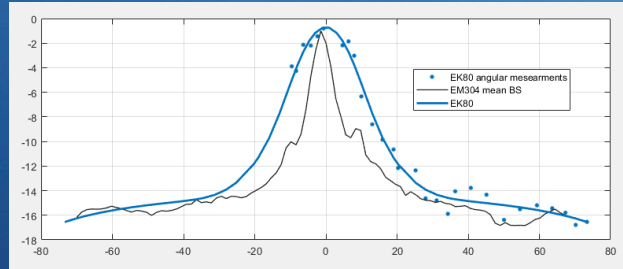


EM304 – backscatter calibration

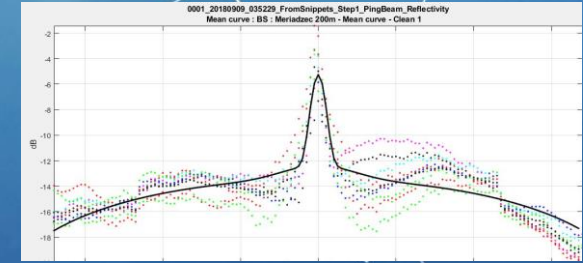
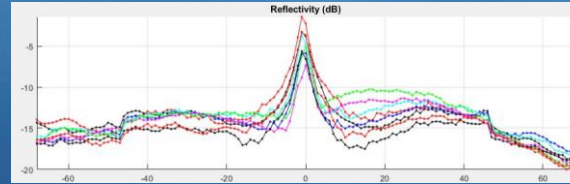


EM304 – backscatter calibration results

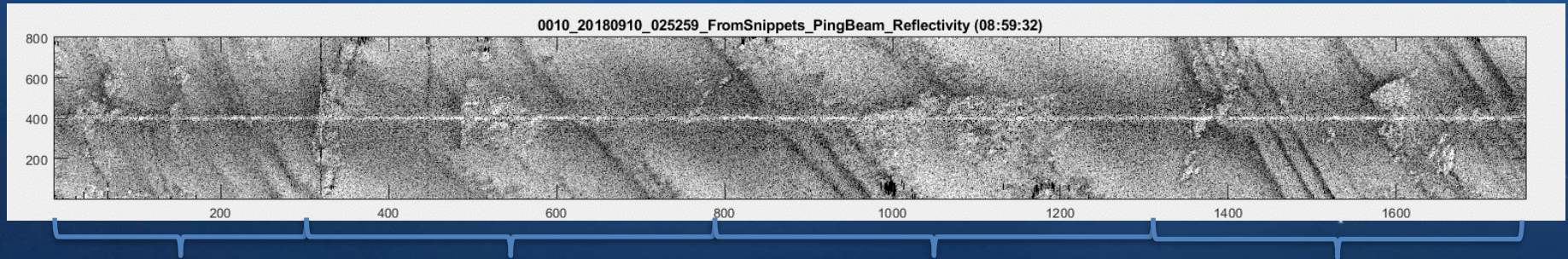
Obtained from a calibrated
single beam echo sounder (EK80)



Thanks to different routines in Sonarscope Software © Ifremer



No more offsets on the backscatter images !



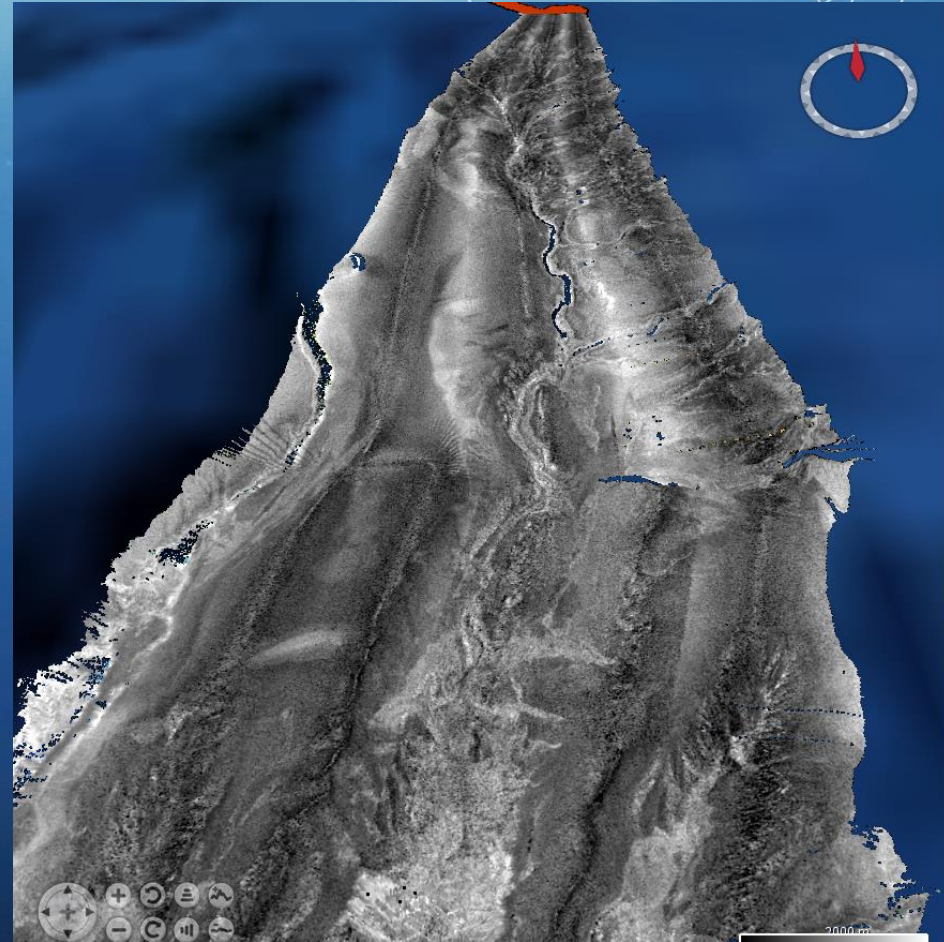
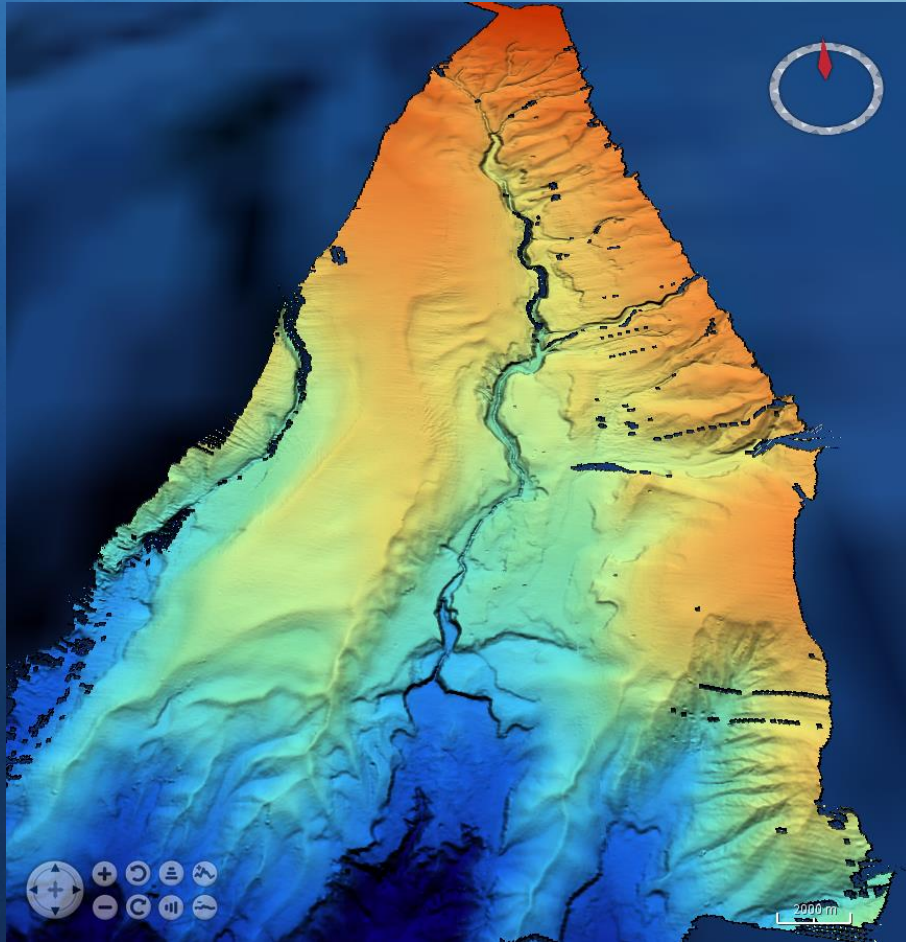
Shallow mode
+ Single swath

Shallow mode
+ dual swath

Medium mode
+ dual swath

Medium mode
+ single swath

EM304 – Black Mud Survey



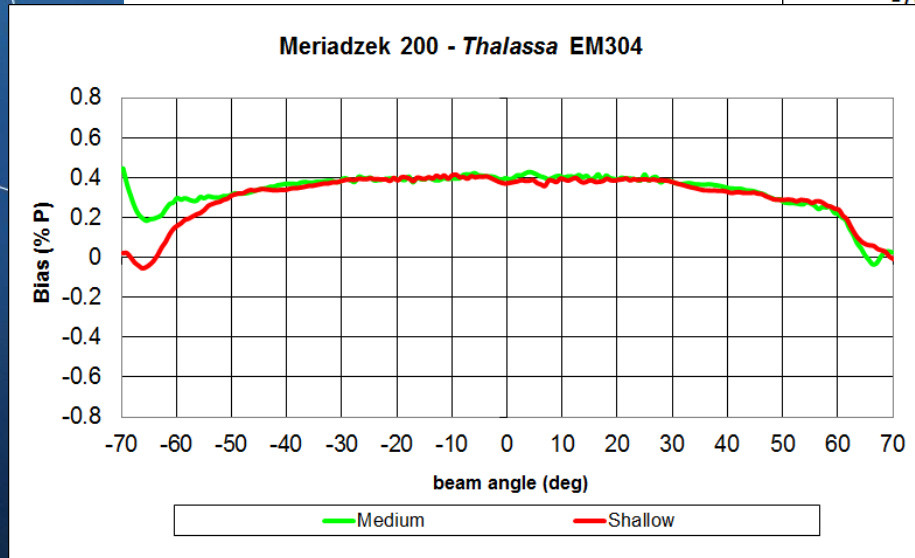
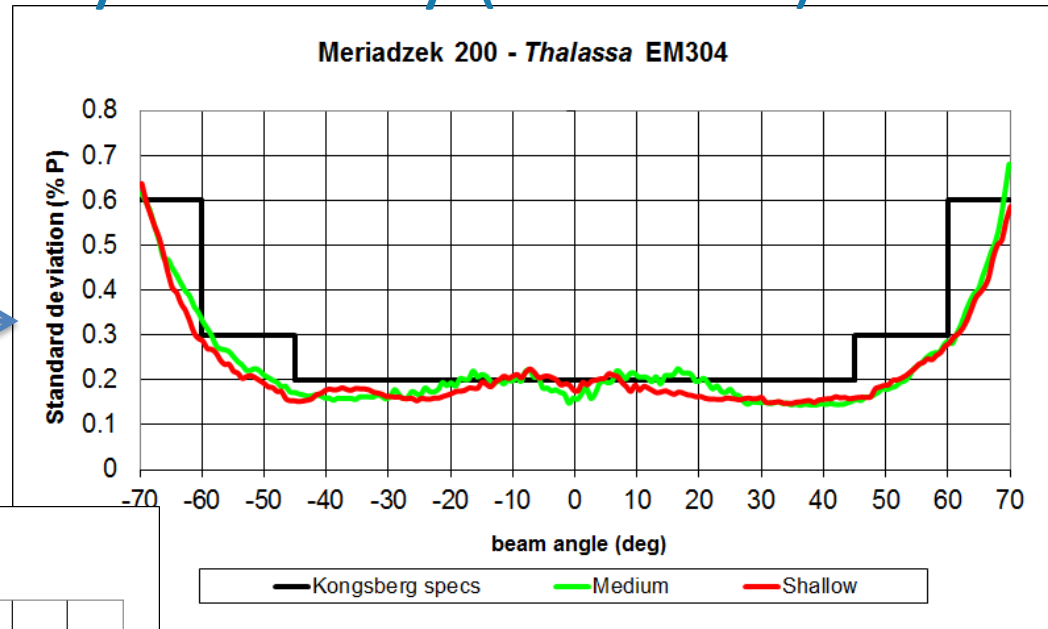
Merci / Thank you

Questions ?



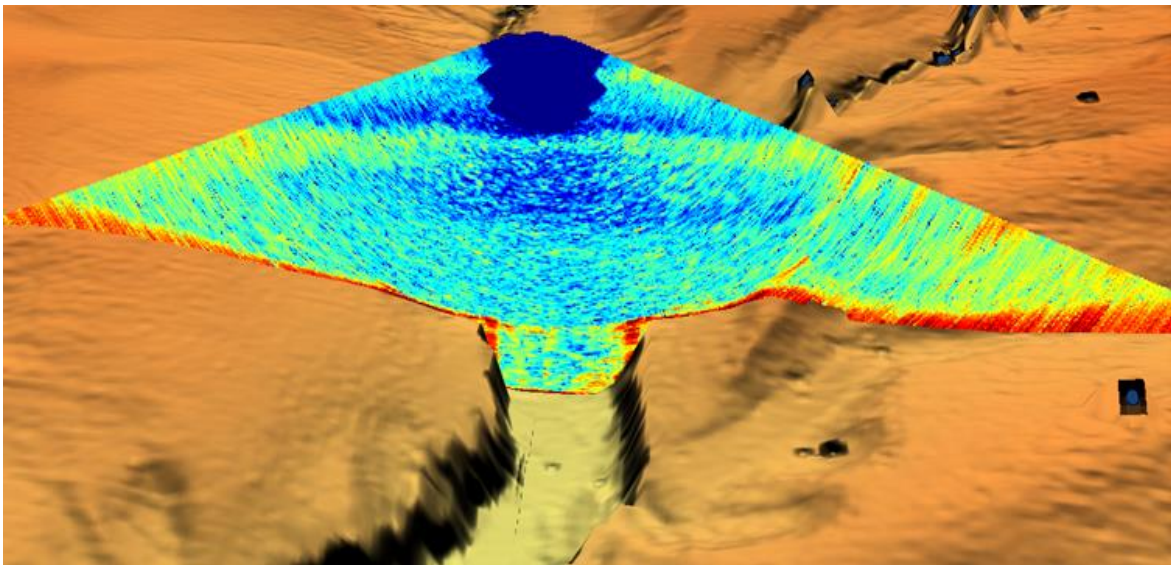
EM304 – Bathymetry Accuracy (D=200m)

Standard deviation is OK →



← Offset with the reference terrain model
(0.4% = 80 cm on the vertical beams)

EM304 – Watercolumn data



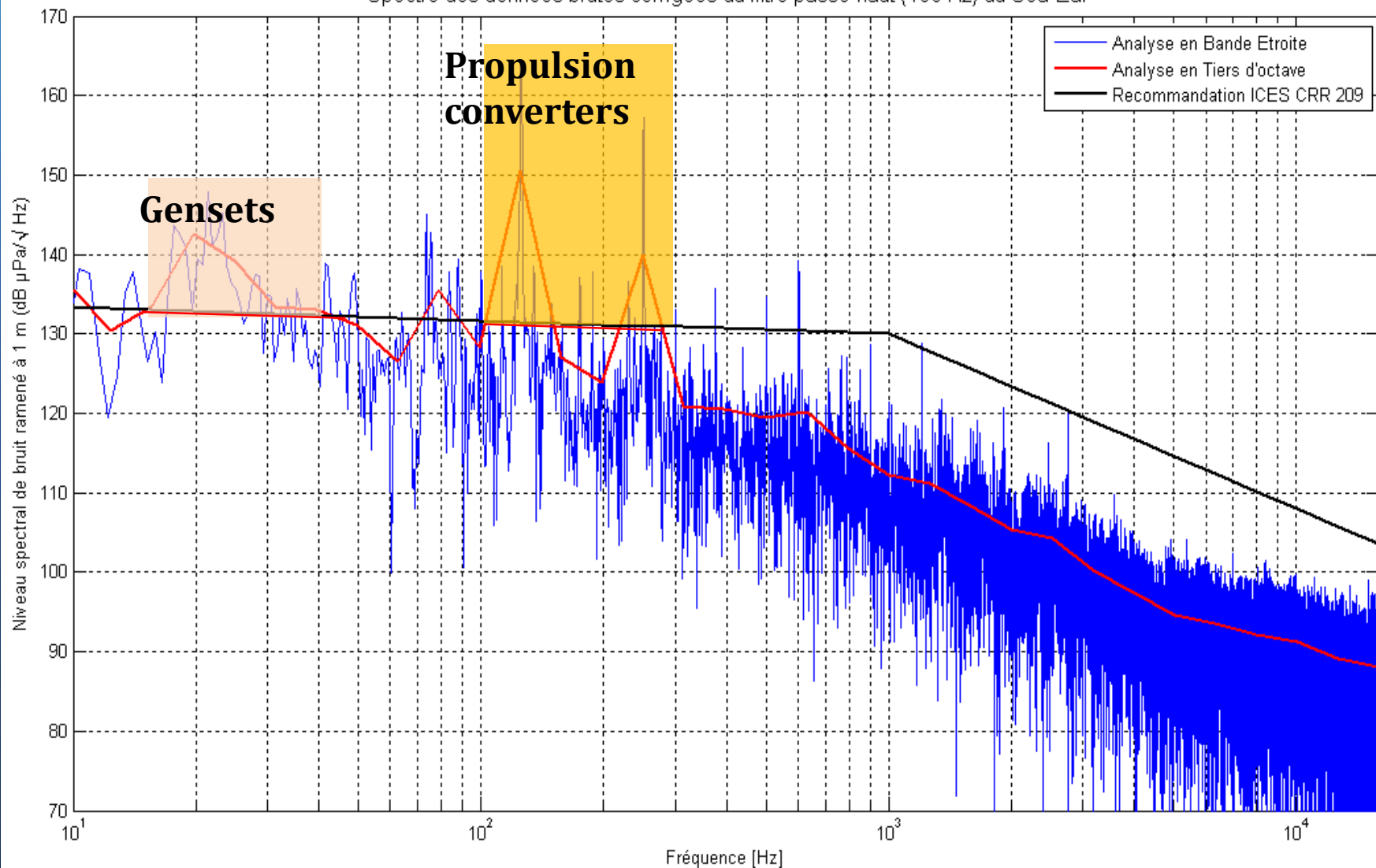
The operator has to be attentive to the WC settings : XlogR / Offset



Water column X log	20
Water column TVG offset (db)	0
Add phase data	Low resolution ▼

SIS v5 is able to log phase data
(no display available right now)





Thalassa Underwater radiated noise

