

# Department

## « Ships and on-board Equipment »

(Head : Marc Nokin)

# Structuration and activities of NSE department

## ➤ **Scope**

- ✓ Construction and modernisation of Ifremer oceanographic ships
- ✓ Development of softwares for scientific community, ships and vehicles
- ✓ Development of scientific equipment for ships and underwater vehicles
- ✓ Research and development in seismic and acoustic

## ✓ **3 laboratories**

- ✓ Ships and Equipement (10 persons) - Brest
- ✓ Software (16 persons) – Brest and Toulon
- ✓ Acoustic and seismic (11 persons) - Brest

# Construction & modernisation of oceanographic ships

## ➤ Scope

- ✓ Construction & modernisation : Project management – from pre-project to transfer to the operational team (Genavir)

## ➤ Technical fields

- ✓ General architecture (rules, general arrangement,..)
- ✓ Scientific areas (rooms, laboratories,..)
- ✓ Winches and cables (steel, aramide,..)
- ✓ Handling equipment (underwater systems deployment)
- ✓ Kullenberg coring
- ✓ Scientific sensors (echo sounders, CTD, ADCP,...)
- ✓ Computing systems (network, hardware and software)

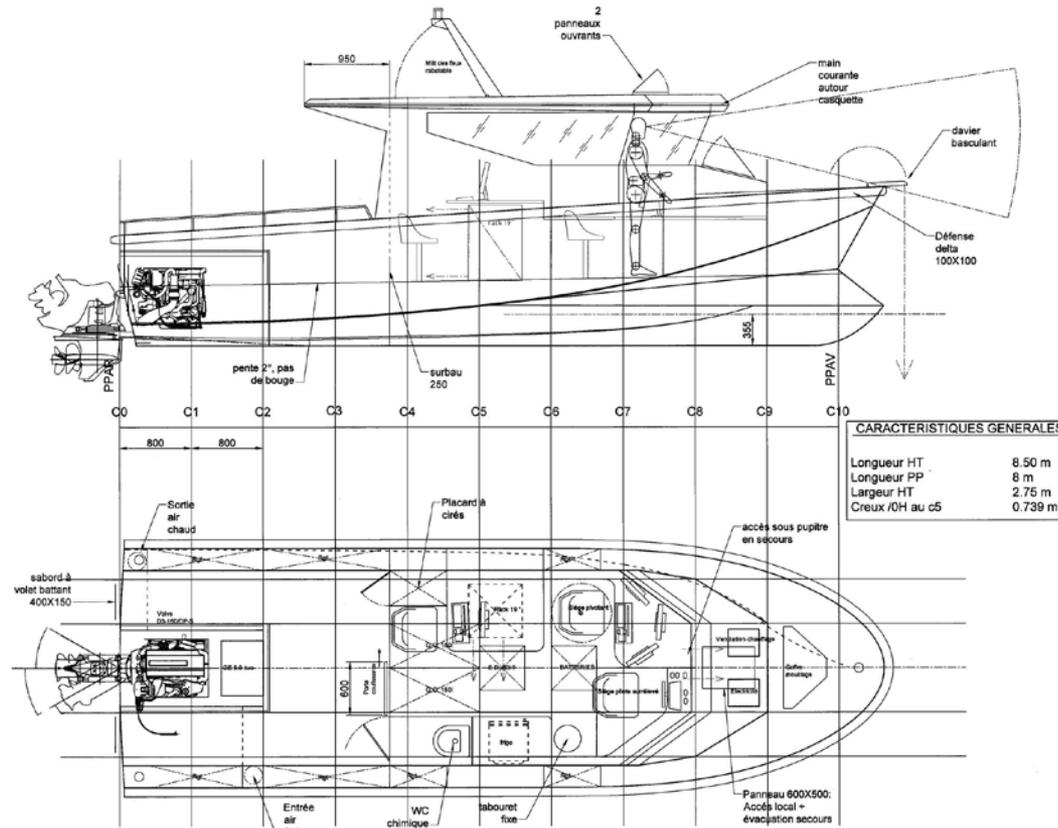
## Project example - Oceanographic ships (1)

- Construction of *Pourquoi pas?* (2002-2007)
- ✓ Polyvalent ship – 107 metres
- ✓ Partnership Ifremer (55%) / French navy (45%)
- ✓ Shipyard : Alstom CAT (St Nazaire)



## Project example – Oceanographic ships (2)

- Project « PETIBATO » (2006-2008)
- ✓ Boat of 8 metres
- ✓ Cartography of very shallow depth (0-10 m)



# Development of scientific softwares

## ➤ **Scope**

- ✓ Conception, development and maintenance of softwares
- ✓ Training of operational and scientific teams
- ✓ Valorisation of softwares to external laboratories and institution

## ➤ **Aims**

- ✓ Softwares for the scientific community, ships and underwater vehicles
- ✓ Data acquisition, data real time and post processing, cruise preparation

## ➤ **Technical fields**

- ✓ Bathymetry & imagery data processing
- ✓ Fishery applications data processing
- ✓ Seismic data processing
- ✓ Underwater systems survey data processing
- ✓ Video data processing

# Products

## ➤ Data acquisition

- ✓ TECHSAS Scientific and technical sensors
- ✓ ACQUANAUT3 *Nautilé* data
- ✓ STR/SIS Victor *Victor 6000* data
- ✓ POSEIDON Long base line
- ✓ HERMES Configuration and acquisition of multibeam echosounder for fishery applications

## ➤ Real time display

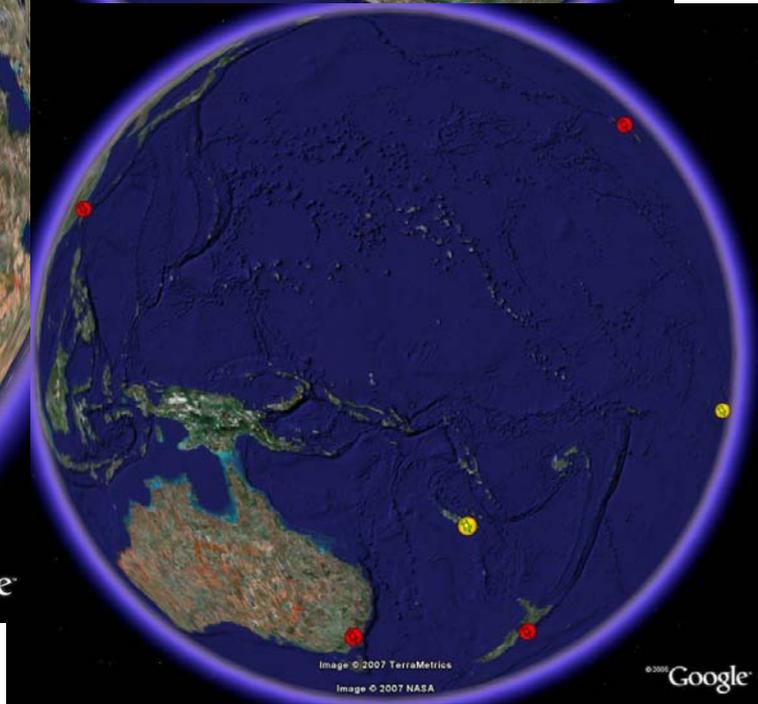
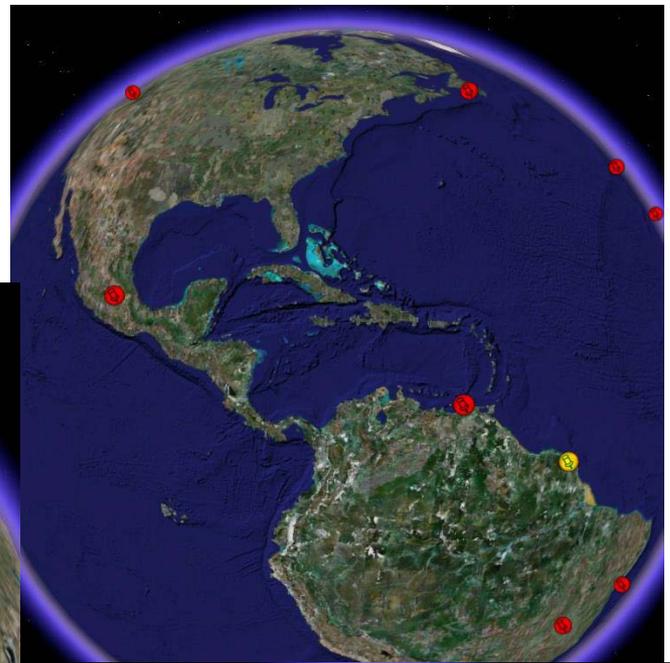
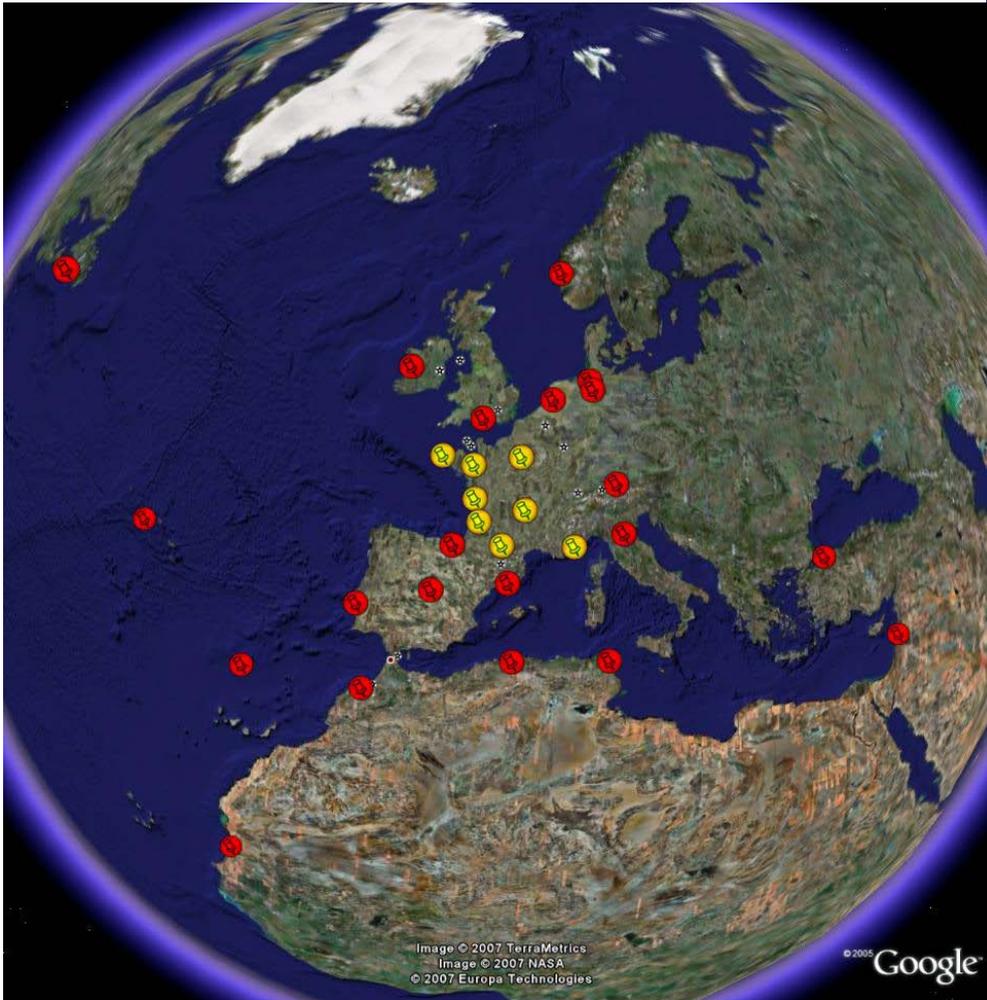
- ✓ SDIV+ Vidéo diffusion on ships
- ✓ CASINO+ Cahier de quart informatisé
- ✓ SUMATRA Real time tracking
- ✓ CARAIBES Multibeam echosounders and side scan sonars
- ✓ ADELIE Sensors data and videos of underwater vehicles
- ✓ MOVIES+ Multibeam echosounder data for fishery applications

## ➤ Mission planning

- ✓ OASIS Simulation of multibeam echosounders for fishery applications
- ✓ MIMOSA AUV dive management

# Softwares around the world

ifremer



# Development of scientific equipment

## ➤ **Scope**

- Development of equipment for ships and underwater vehicles
- Based on Research and Development
- Integration on ships
- Pool test of acoustic systems

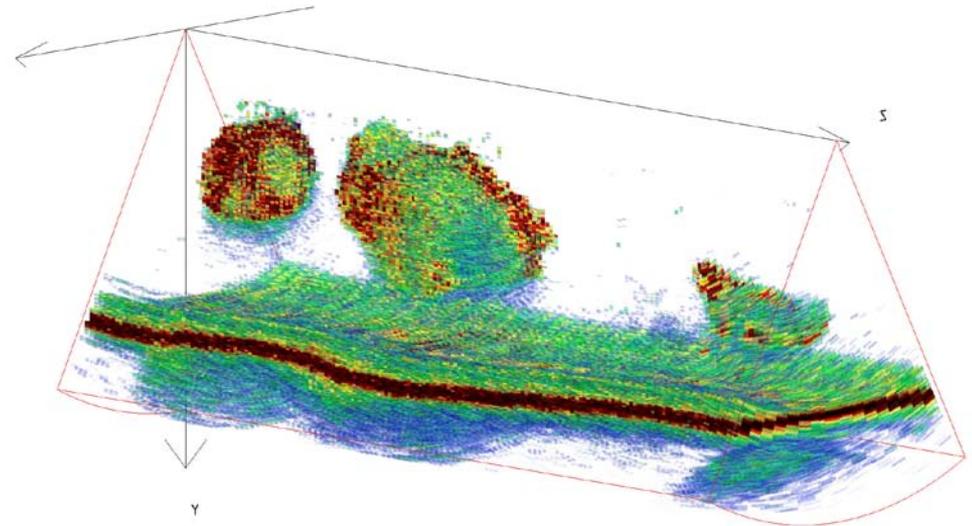
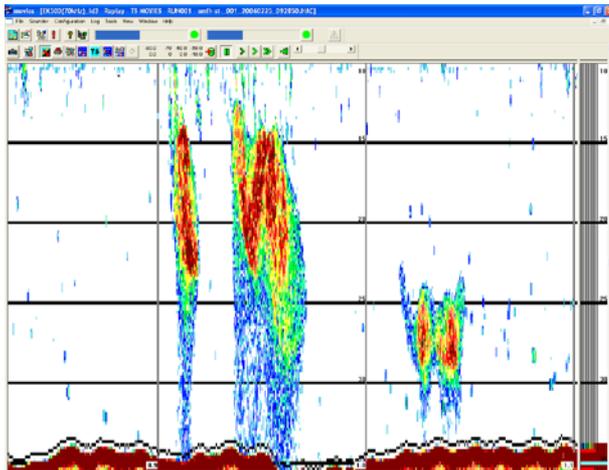
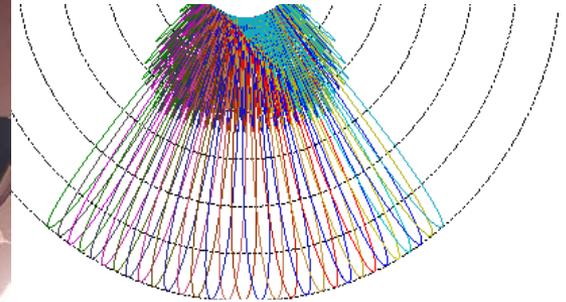
## ➤ **Technical fields – some examples**

- ✓ Mapping multibeam echosounder
- ✓ Fishing multibeam & single beam echosounders
- ✓ Subbottom profiler
- ✓ Seismic system (High Resolution, Very High Resolution, 2D and 3D,...)

## ➤ **Oceanographic fields** : geoscience, halieutic, physical oceanography, environment, sedimentology

# Acoustic platform of R/V Thalassa for fishery applications

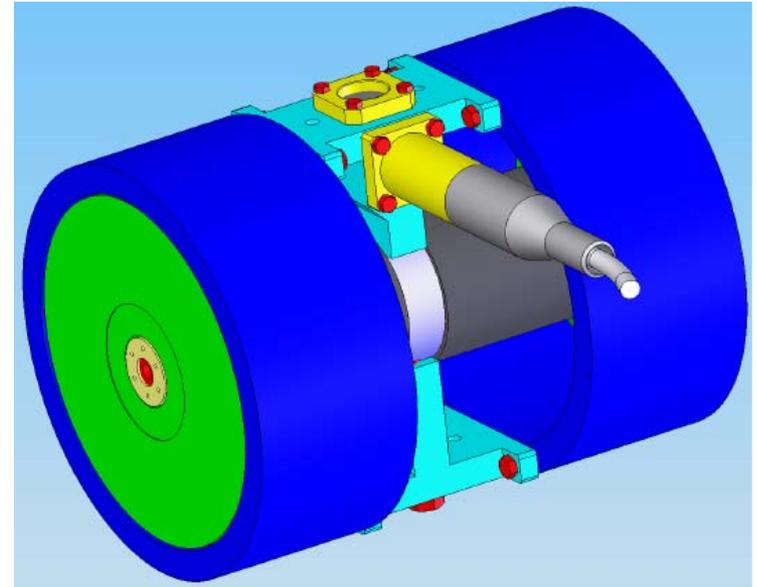
- ✓ Simrad EK60 (single beam)
- ✓ Simrad ME70 (multibeam)
- ✓ Simrad EM 850 (bathy/imagery)



## Project example – Scientific equipment (2)

### ➤ Subbottom profiler for ROV and AUV

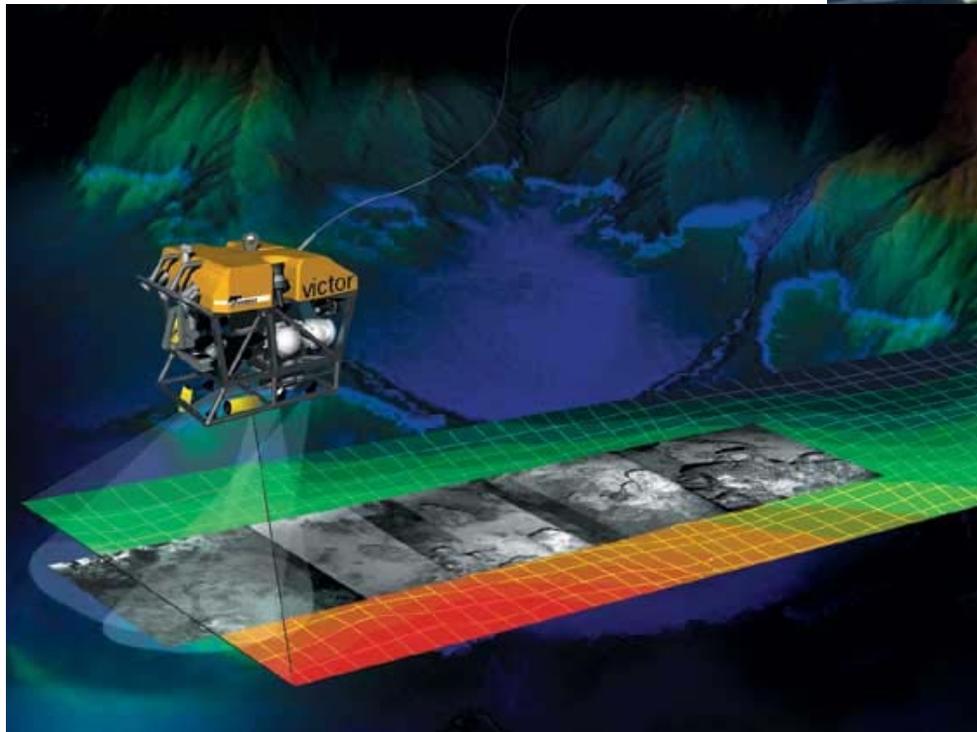
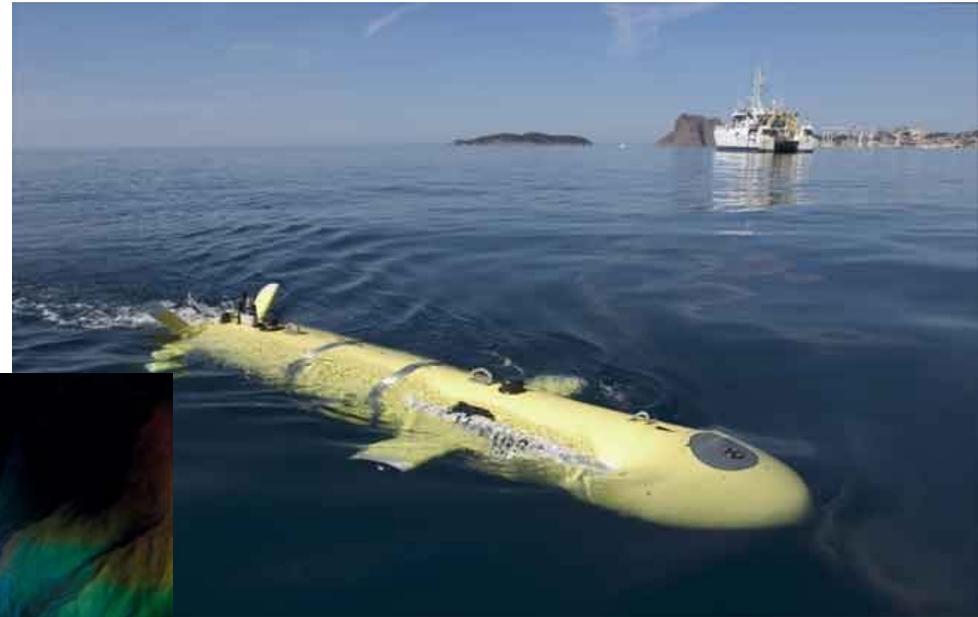
- ✓ Particularities : BF / 6000 m / weight and volume
- ✓ Vertical resolution : ~ 25 cm
- ✓ Max Penetration : ~ 50 m



## Project example – Scientific equipment (3)

### ➤ **Multibeam echo sounder**

- ✓ Bathymetric *Victor* toolsled (2004-07)
- ✓ AUV AsterX (2005-07)
- ✓ Pourquoi pas? R/V



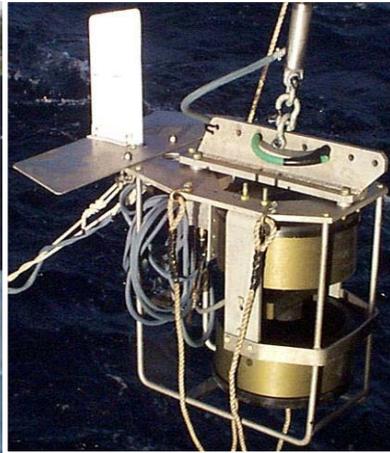
## Project example – Scientific equipment (4)

### Seismic deep tow vehicle *SYSIF*

Seismic



[250, 1000 Hz]

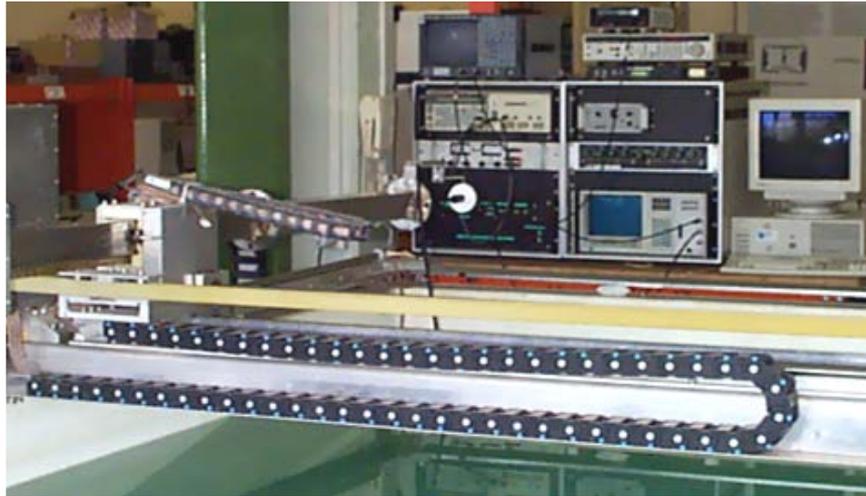


[650, 2200 Hz]



## Electro-acoustic measurement

### Acoustic basin



*Length : 4 m*

*Width : 2.5 m*

*Depth : 2 m*

*Frequency range : [8 kHz, 1.2 MHz]*

### Pool test



*Length : 50 m*

*Width : 13 m*

*Depth : 10/20 m*

*Frequency range : [1 kHz, 1.2 MHz]*

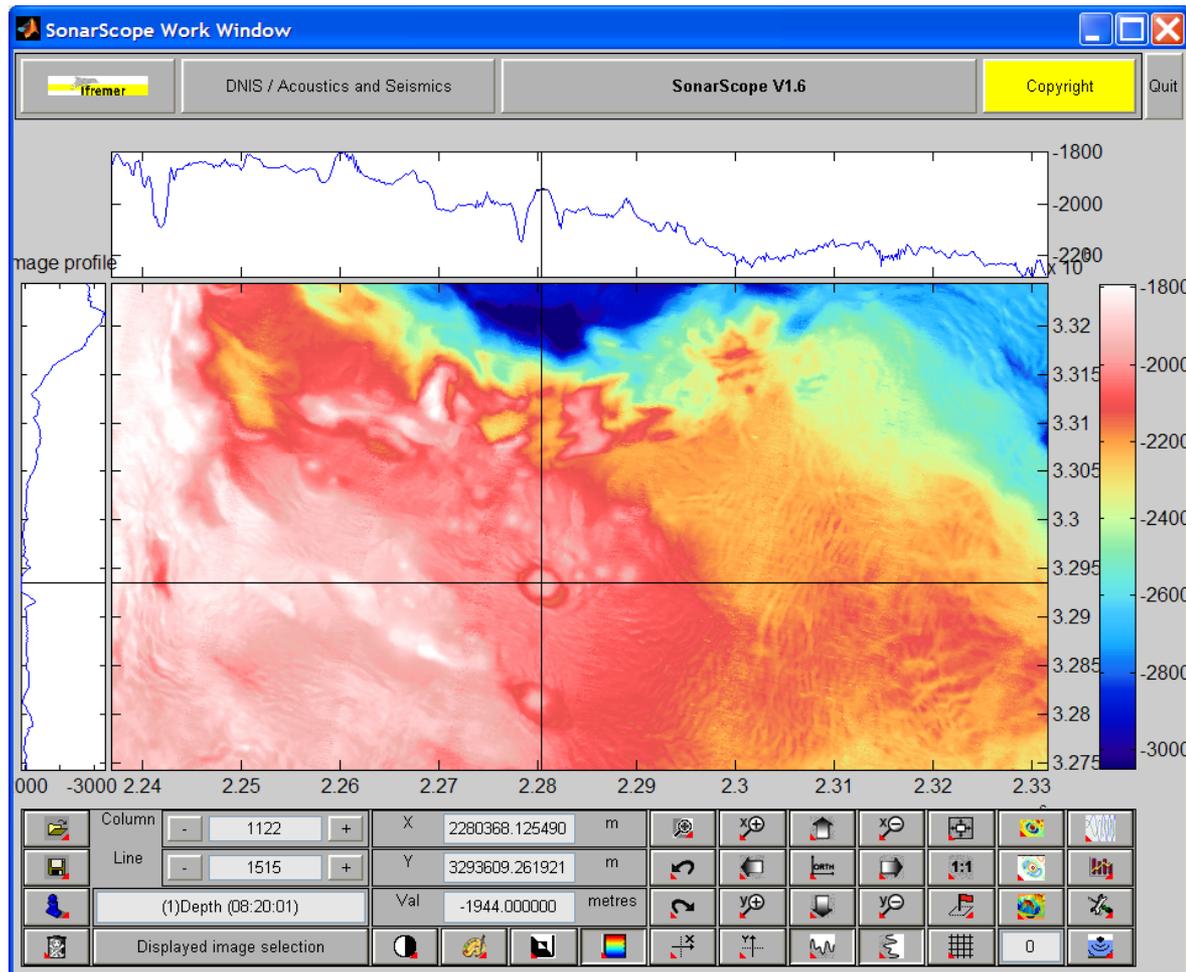
- Measurements : directivity ; frequency answer; sensitivity
- Customers : IFREMER project, scientific community, industrials

## Specialities and contacts

- ✓ Scientific softwares : JM Siquin
- ✓ Network and hardware on ships : Armel Rue
- ✓ Video and telecommunications on ships : Guillaume Clodic
  
- ✓ Ship architecture, scientific rooms :Olivier Lefort, Sébastien Dupont, Sarah Boucard
- ✓ Scientific equipment on ships : Henri Floc'h
- ✓ Ship sailing equipement, DP : Henri Floch
- ✓ Multibeam echosounders : Hervé Bisquay
- ✓ Fishing echosounders : Valérie Mazauric
- ✓ Underwater system deployment : Marc Nokin
- ✓ Kullenberg coring, winch and cable : Loic Dussud
  
- ✓ Seismic system and quality control : Bruno Marsset, Yannick Thomas
- ✓ Transducers & measurement : Yves Le Gall
- ✓ Sonar data treatment and expertise : X.Lurton

## R&D - SonarScope®

- ✓ Software for post-treatment of signal, datas, images from bathymetric sonars and associated sensors
- ✓ Multi layer approach : bathymetry, reflectivity, angles...
- ✓ Tool box for specific treatment, routile exploitation and quality control



# R&D - Development of transducers & antennas TBF

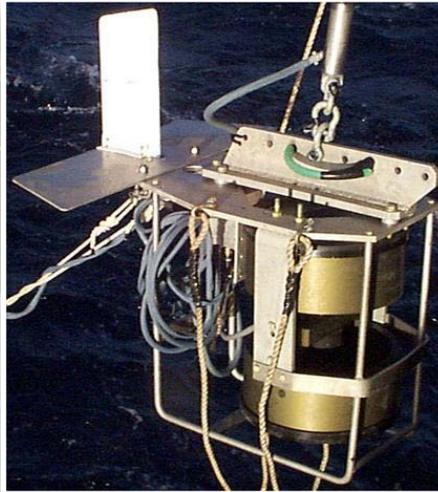
Seismic

*HR*



[220, 1000 Hz]  
Immersion : 6000 m

*VH*



[650, 2200 Hz]  
Immersion : 6000 m

Sediment echo sounders

*AUV, ROV*



[1.8, 5 kHz]  
Immersion : 6000 m

*Suroît & Pp ?*



[1.8, 5.3 kHz]  
Sondeur de coque