



# ULY<sup>X</sup> an AUV for deep-sea exploration

Advanced functions for exploration and inspection down to 6000m

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[www.flotteoceanographique.fr](http://www.flotteoceanographique.fr)

La Flotte océanographique française,  
une très grande infrastructure de recherche opérée par Ifremer

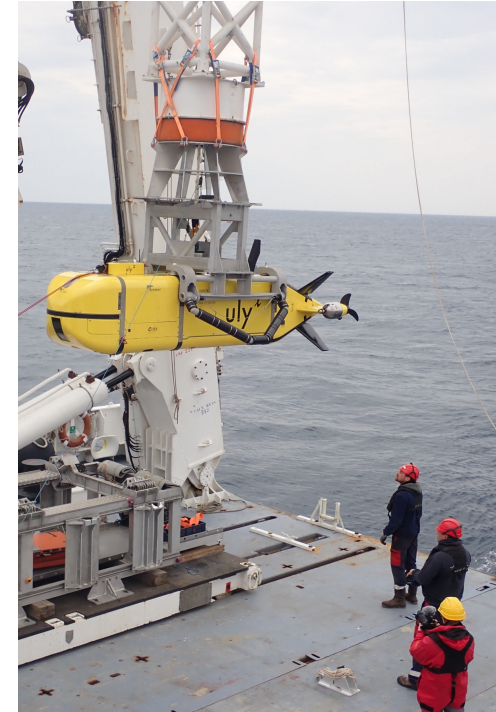
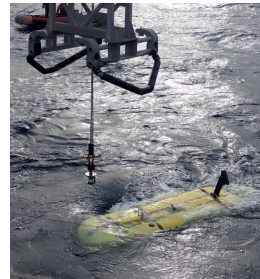
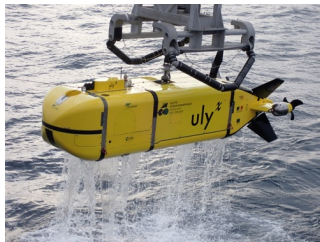


# Uly<sup>x</sup> – the new 6000m AUV in the FOF

## *An innovant autonomous deep-sea vehicle for sea-bed mapping and inspection*

### *Capabilities :*

- *Seabed mapping at scales up to 70km<sup>2</sup>*
- *Visual ground truthing at low altitude*
- *Visual 3D models*
- *Mission-specific scientific sensors*
- *Intelligent exploration strategies*



# Uly<sup>x</sup> - AUV 6000 – the essentials

Dimensions : 4,5 x 1,0 x 0,8 m

Mass : 2,7T

Energy : 28 KWh (LI)

Endurance : 36h / 150km

Payload : 200kg (air)

Max depth: 6000m

## Navigation modes

- long distance cruising (3,5-4 kts)
- low speed close to seabed (0,5 kts)
- hovering capability (0nds)

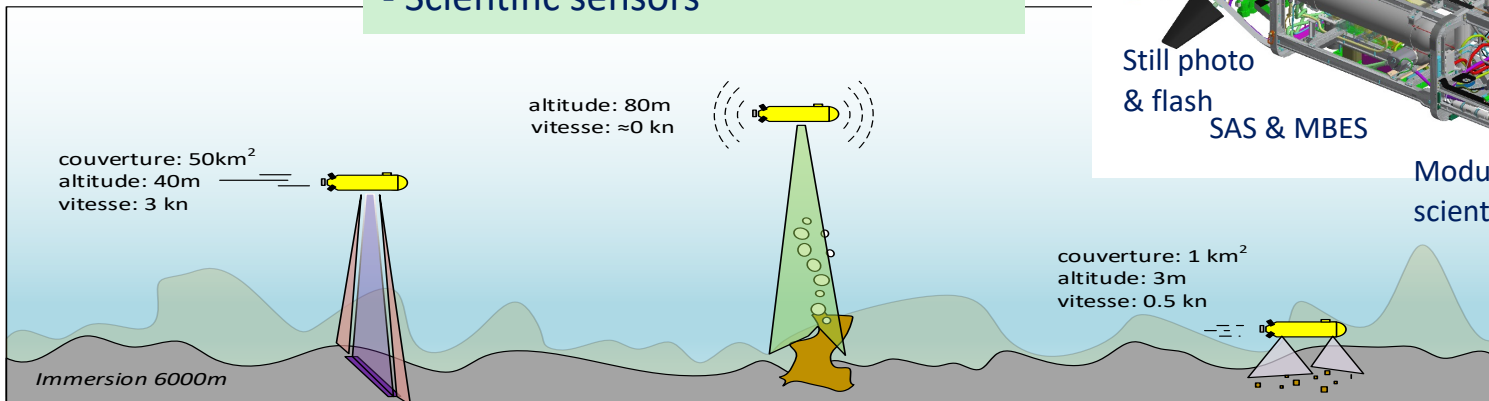
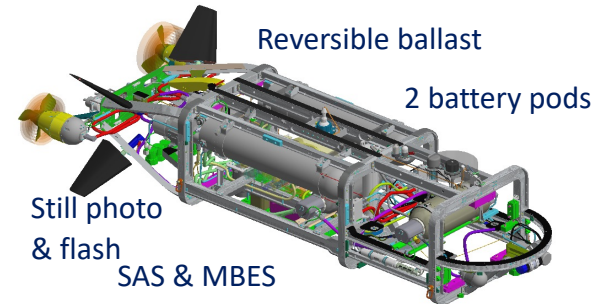
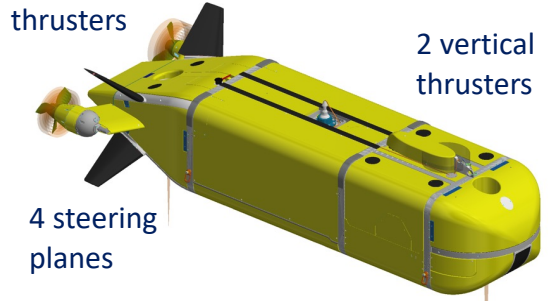
## Payload functions

- acoustic mapping (bathymétrie, SAS imagerie, water column, sediment)
- optic imaging and mapping
- Scientific sensors

Oriented twin thrusters

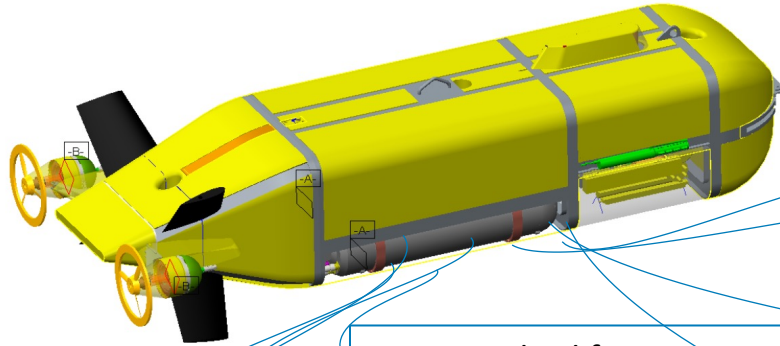
2 vertical thrusters

4 steering planes



Modular bay,  
scientific sensors

# Uly<sup>x</sup> – a strong payload capability



## Multi-sensor hub (6 channels)

- Magnetometer, Nephelometer, Eh/Redox, O<sub>2</sub>, CH<sub>4</sub>, Ph
- Synchronisation and triggering, time-stamping
- Georeferencing

## SAS : iXBLUE Sams 150

- 5x5cm resolution, 500m swath
- Bathymetry by interferometry

## SDS : iXBLUE Echoes150

- 1 – 6KHz
- Resolution 20cm, penetration up to 70m

perspectives : Raman spectrometer, water sampler, etc.

CTD – Seabird fastcat SBE49

ADCP: RDI Pioneer (DVL+ADCP)

MBES: Kongsberg EM2040

- Bathymetry
- Backscattering
- Watercolumn profiling

## Optical Imaging

- 16MPixel still photo & 2x flash
- Laser line projector for microbathymetry



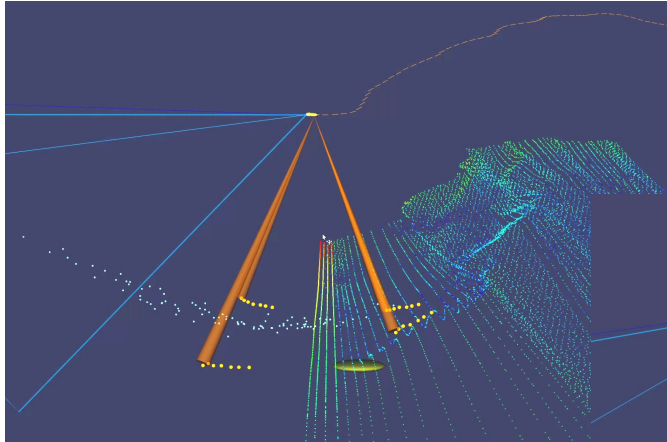
**Permanent  
équipement**

**Modular  
équipement**



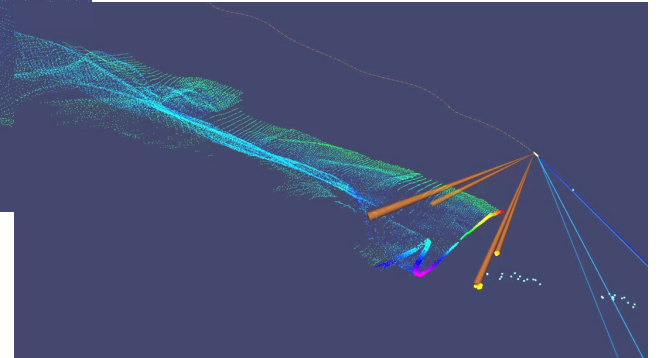
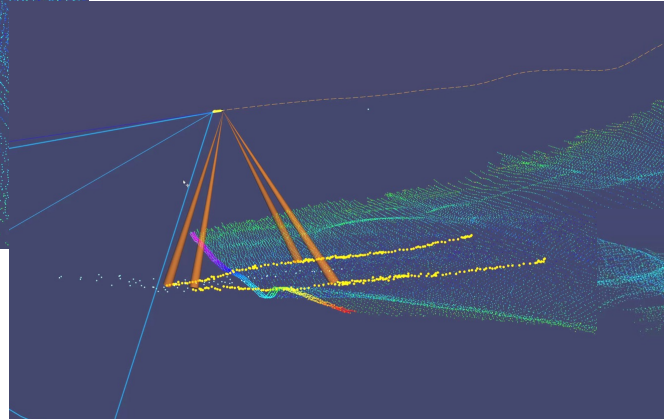


# Sea-floor perception, piloting & navigation



*Obstacle avoidance and vertical travel at 70° pitch and 100m/minute vertical velocity*

*Topography modelling from DVL beams, forward looking sonar and MBES*

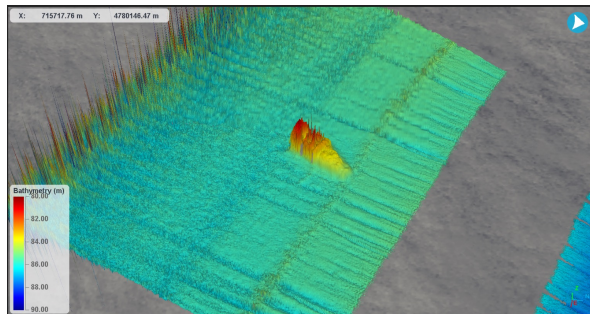


# SAMS-150 sample data (iXblue tow fish)

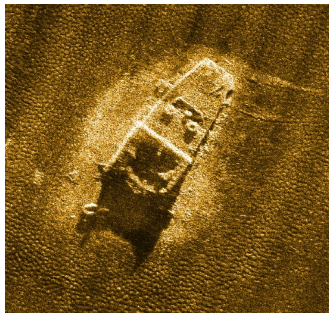
## AUV equivalent integration



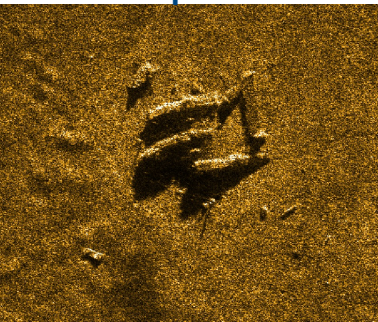
## Interferometric bathymetry



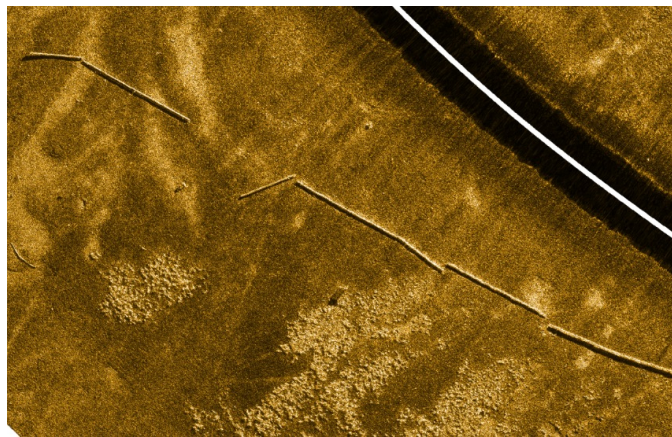
## Small boat wreck site



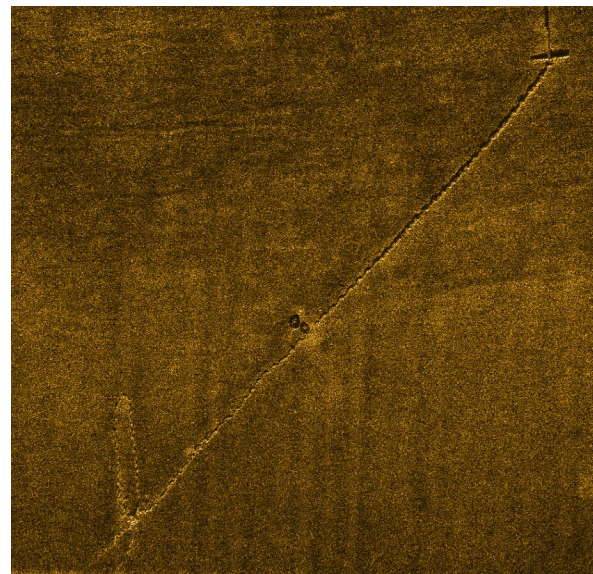
## P38 plane wreck



## Pipe



## Anchor line



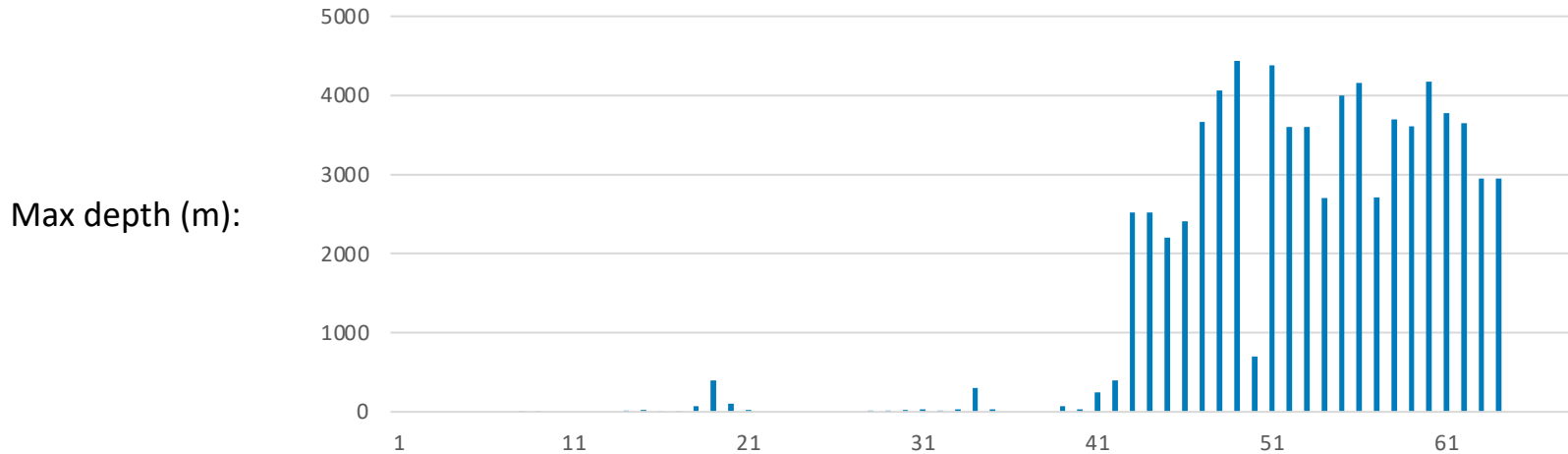
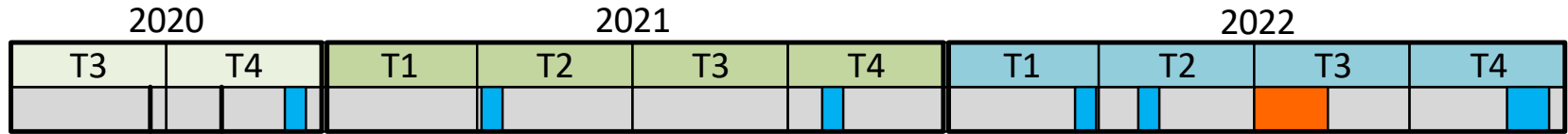


## The long road to operational maturity

- 6 engineering cruises between dec. 2020 and may 2022,
- 1 scientific campaign (45 days, july-august 2022)
- 36 technical dives, 11 scientific dives
- 9 dives between 2000 and 3000m, 11 dives between 3000m and 4500m ocean depth
- Operations from RV *Europe* (29m) and RV *Pourquoi Pas?* (105m)
- Deployment & recovery in nominal conditions (without RIB) up to 25knts / Sea state 4



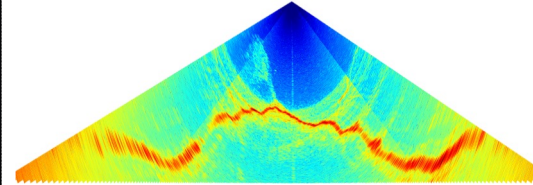
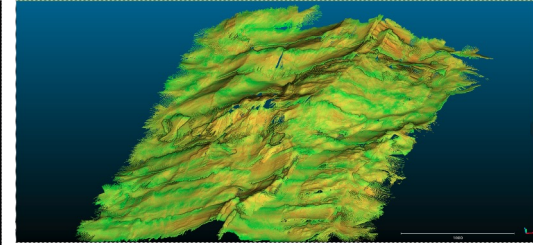
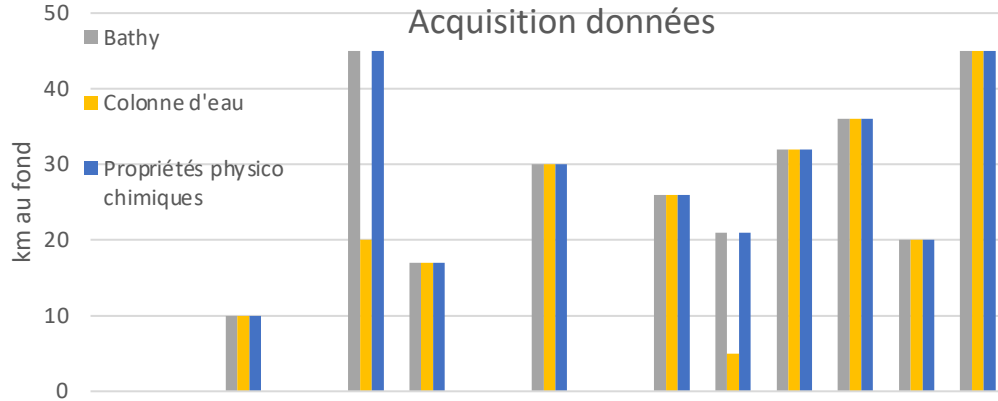
# Dive track record



Ship: L'Europe Pp? L'Europe



# 1rst scientific cruise 2022



15

## Positive experience:

- 15 dives completed alternating day/night with Nautile
- Operational stability ok
- Solving of « young system » problems
- Improvement of data quality during cruise

## Negative points:

- 3rd party components not reliable at depth
- DVL has bad performance in rough terrain
- Navigation and bottom following impacted

