



FLOTTE  
OCÉANOGRAPHIQUE  
FRANÇAISE par l'Ifremer

# NEW REGIONAL VESSEL

Marc Nokin

June 2023



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

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

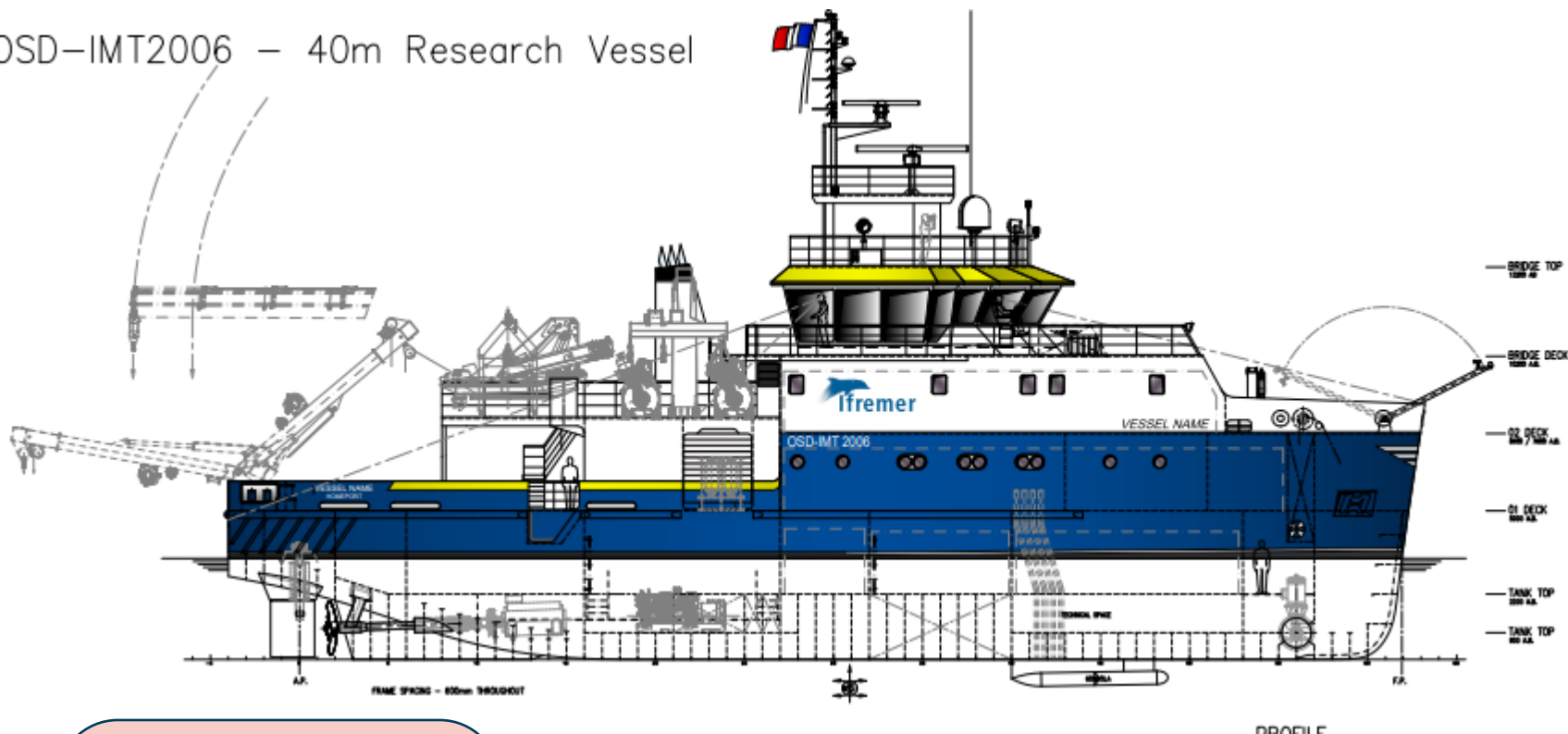


# 4 – Schedule of project

- **Signature of contract : 10 May 2023 with CONSTRUCCIONES NAVALES P. FREIRE S.A. at Vigo.**
- Studies, building and shipyard trials : 24 months
- Delivery : middle of 2025
- Scientific trials : 3 months
- Fleet entry: 2<sup>nd</sup> part of 2025

Actual name is NSH for regional vessel in french

# OSD-IMT2006 – 40m Research Vessel



Autonomy : 19 days  
Length : 40-41m  
Breath : 10-11m  
Draft : 4.3m max  
Crew : 12p  
Scientist : 10p

## Missions

- Physico-biogeochemical campaigns
- Biology, ecosystem ecology and fishing
- Underwater vehicles research campaigns



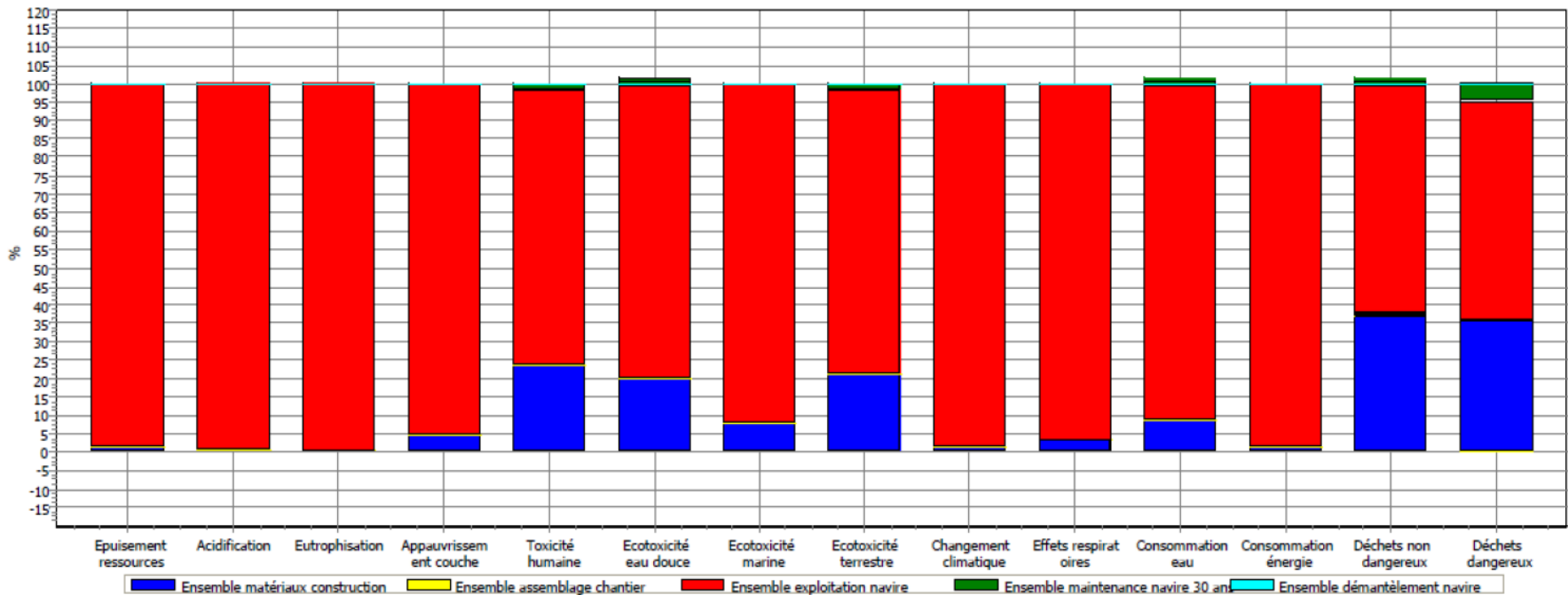
## 2 – CO2 Impact reduction

### ┌ Tomorrow's more environmentally-friendly campaigns

- CO2 impact reduction is a priority in Ifremer. 60 % of total greenhouse effect gas produced by Ifremer is for fleet operation.
- The question is : which technology is going to emerge in the 20 following years?
- Thus, a progressive approach is adopted:
  - Ifremer ambitious program of ship building : L'Europe, L'Atalante and Marion Dufresne replacements at least by 2030
  - NSH objectives : Reduction of 30% in transit and 50 % in station
  - NSH : Tests platform with real measurement of power consumption
  - Jumboisation anticipated in the design for new technologies

# 2 – CO2 Impact reduction

Observation: the operational phase covers 67% to 99% of environmental impacts



## 2 – CO2 Impact reduction

- **New propulsion technologies exist but not fully convenient in our case:**
  - Sails : low transit time in costal applications resulting in low impact, expensive, possible in the future (Kyte)
  - Fuel cells : H2 availability, low power cells actually, large storage volume - 3 to 4 times % fuel
  - Gaz: large storage volume - 7 times % fuel
  - Biocarburant B7 and B30 possible

**Classical up to date diesel propulsion has been chosen**

## 2 – Low- CO2 Impact reduction

Key point is the usage changing

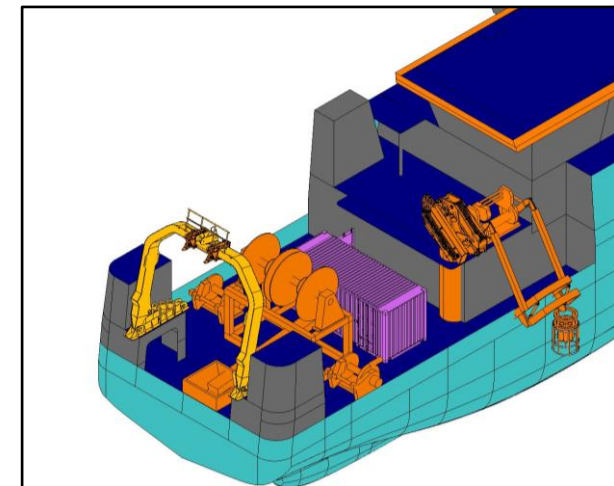
1. Reducing non-propulsion energy consumption on board: designing a "low consumption" vessel
2. Modify programmation of campaigns to reduce vessel speed.
3. Maximising the most of time at sea: involving shore teams and optimising measurements. As a result, tele-presence, tele-operations and USVs must be part of the solutions.

# 3 – Principles of the new vessel

## Scientific Equipment

### Equipments on keel or gondola

Kongsberg EK80 Sounders	18, 38, 70, 120 and 200 kHz
Multi beam echo sounders	EM712 0,5° x 1°
Sub bottom profiler	IxBlue 5 transducers
ADCP	55/75 kHz and 200 kHz
Fishery trawl and net monitoring device	Marport equipment
Ultra short baseline (USBL)	GAPS (mobile equipment)
Several	Acoustic remote control TT-8011 Pinger EA440 Loch Doppler



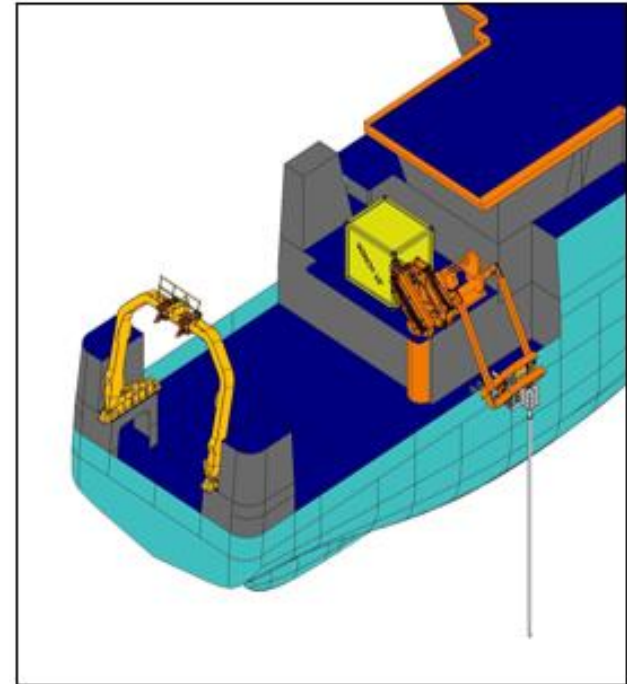


# 3 – Principles of the new vessel

## Scientific Equipment

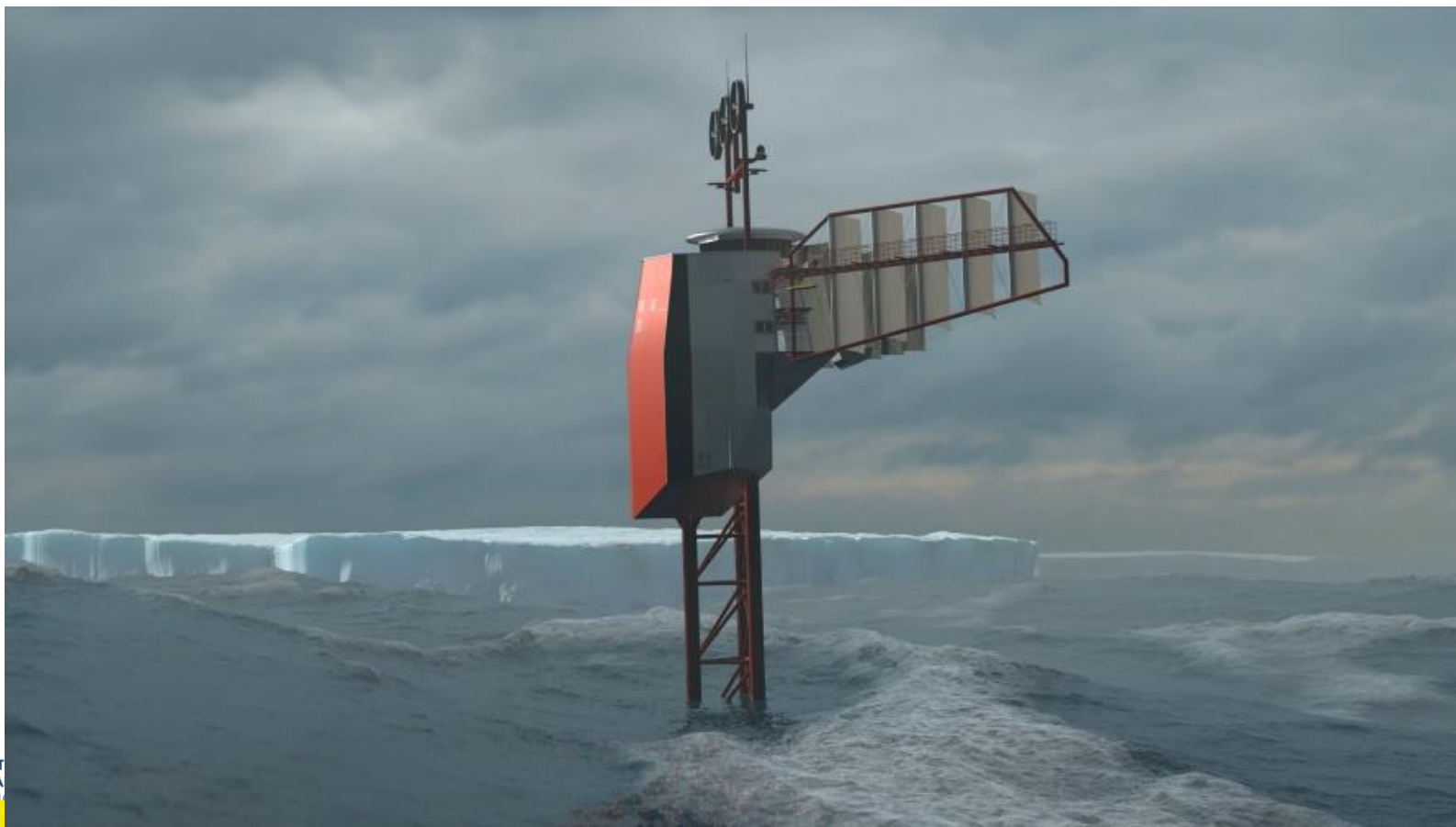
### Mobile equipment

Continuous measures	Thermosalinometer SBE21 + SBE38 Pocket Ferrybox 4H-Jena
CTD	SBE11 – SBE19 + deck unit
UW vehicles	AUV Asterix ou Idefix HROV Ariane Ulyx
Seismic	Ifremer mobile equipment
Coring	10 m Calypso – Up to 2000m
Various	LARS ROV



# Polar POD

## An innovative zero emission « ship » to explore Austral ocean



- Project initiated by Jean-Louis Etienne in 2010
- Concept : « vertical ship » based on US FLIP (Floating Instrument Platform)



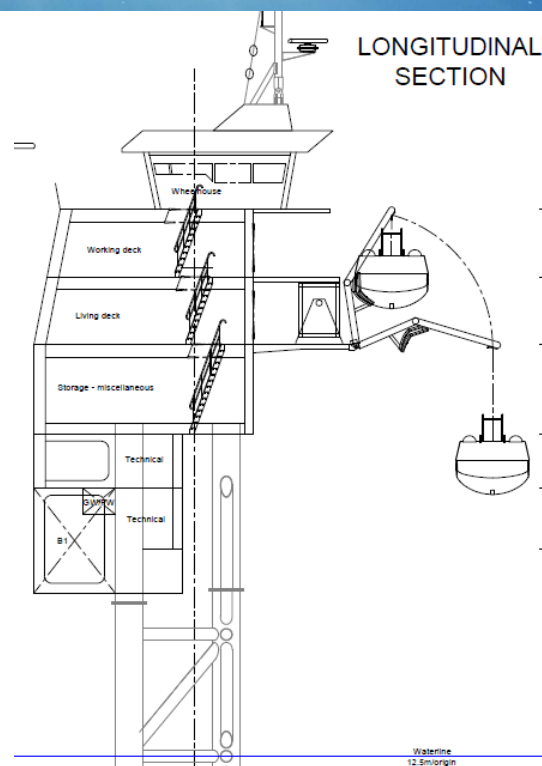
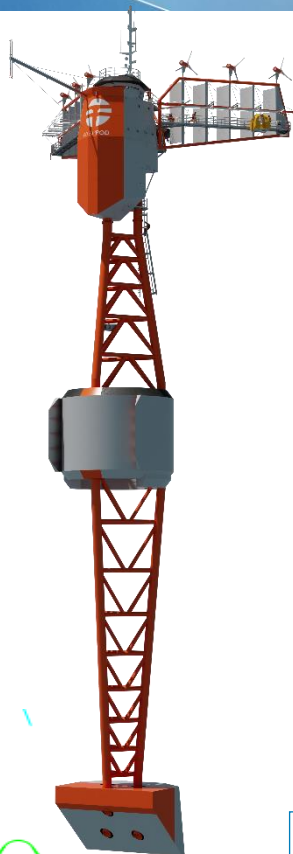
- **Scientific expedition : 2025-2028 around Austral Ocean non stop and 2 continuous rounds the world**

- Ifremer in charge of the construction of Polar POD
- Contract notified with Piriou/3CMetal in september 2022
- Construction funded by ANR French Agency
- Ocean Polaire (JL.Etienne) in charge of the first austral expedition

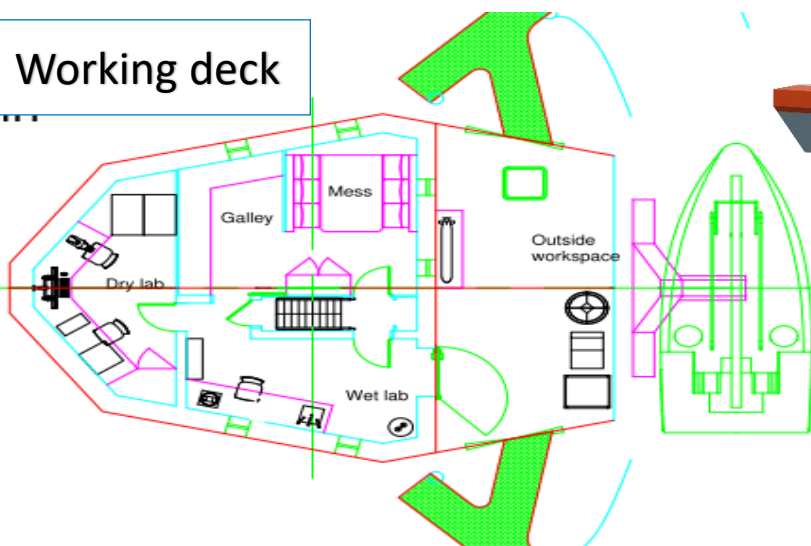


## Characteristics

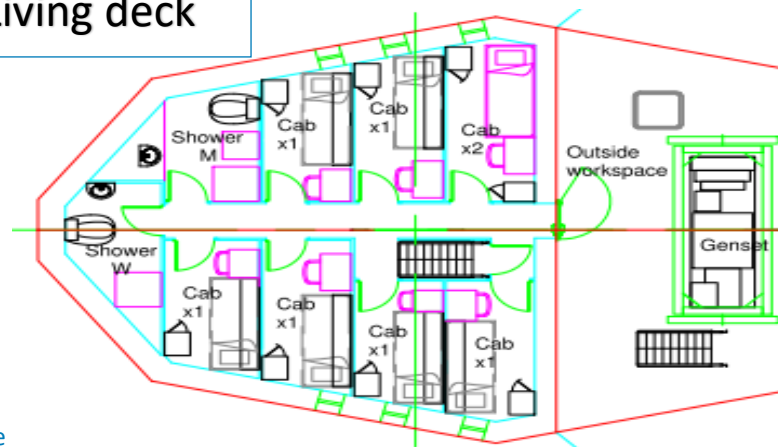
- 12.5m – 42.5 length
- 60-74m draft
- 60m air draft
- 1080 t
- 8 persons on board
- 6 wind farms
- Safety propellor (2\*110 kW)



Working deck

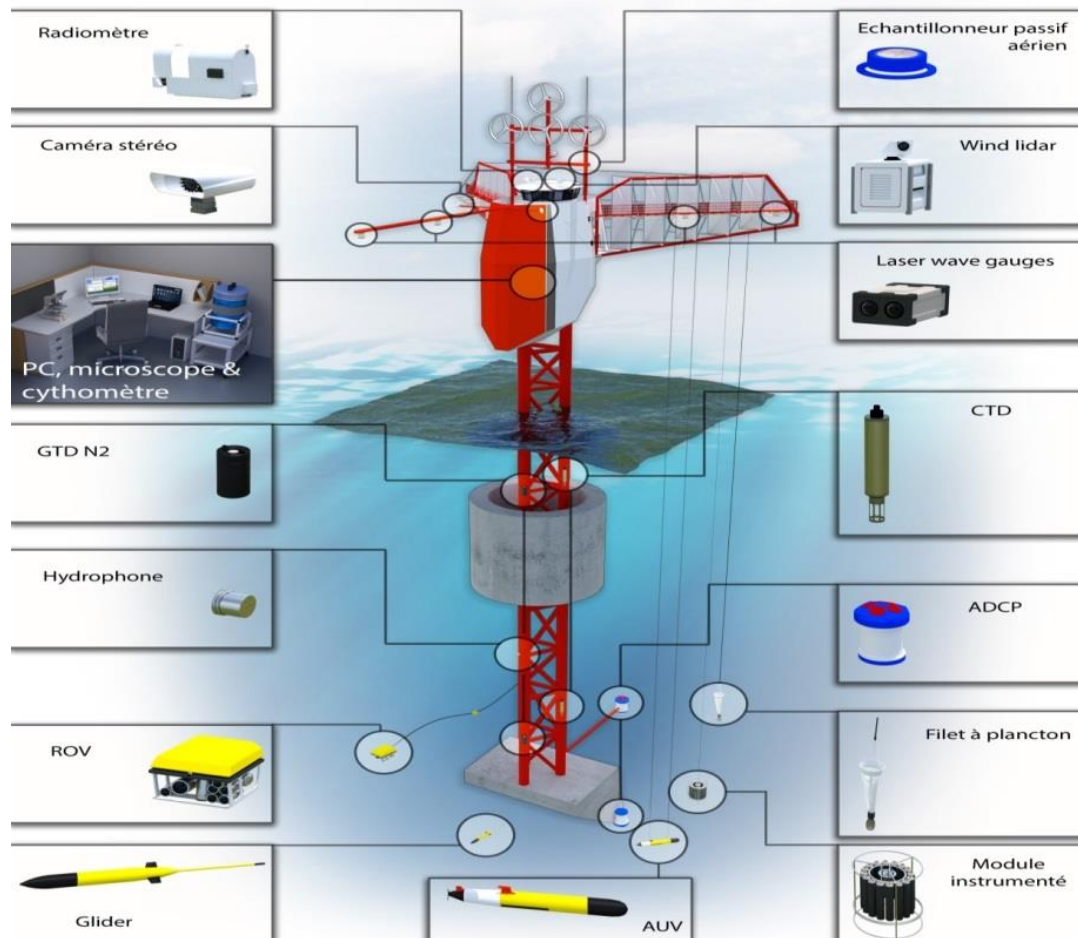


Living deck



## A large panoply of scientific equipment

- SBES (EK80)
- Hydrophones (PAM)
- ADCP (300 and 45 kHz)
- Multiparametric probes
- Lidars
- Samplers for contaminants
- Radiometers
- ROV,
- AUV,
- Aerial drone,...



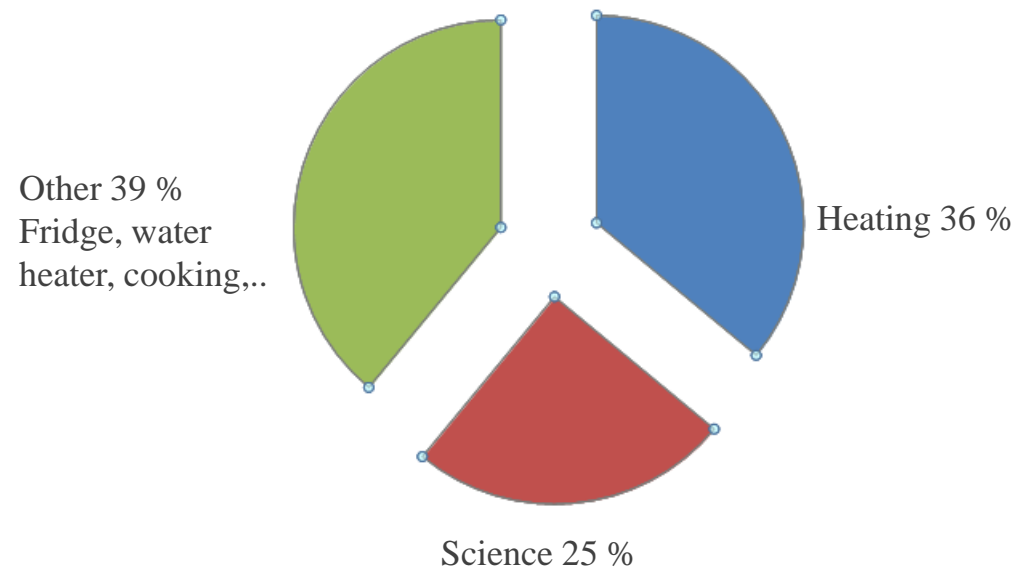
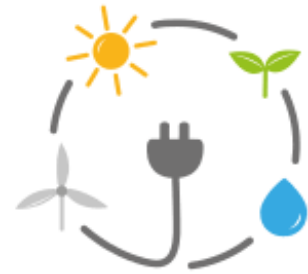
## Energy balance

### ➤ Energy sources

- 6 wind farms – 1 in backup :  $4 * 3 \text{ kW}$ ,  $2 * 5 \text{ kW} = 220 \text{ kWh}$
- Diesel alternator = 20 kW in backup mode (no wind,..)
- Diesel alternator = 220 kW in safety mode (propulsion, ..)
- Buffer batteries = 100 kWh
- Sails – 200 m<sup>2</sup>

### ➤ Daily requirement

- At 5 ° T in nominal mode = 210 kWh



- Ship supply = Persévérance owned by J.L. Etienne - A green ship for a green Polar POD
- Rotation every 2-3 month



- Length = 42.6m
- Width = 11m
- Masse = 310t
- Crew = 8 p
- Passengers = 12 p

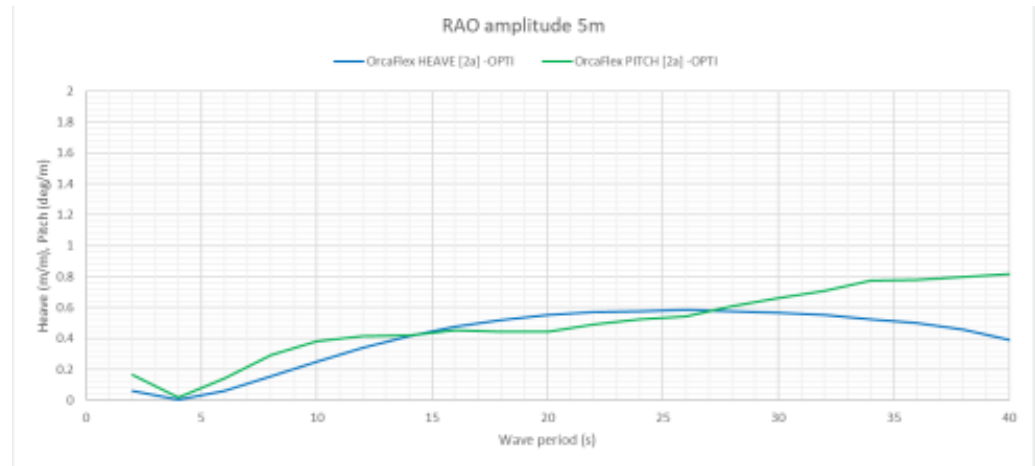
## At sea behavior – preliminary results

- Heave response
  - Complete filter at mow wave period
  - RAO max of 0.6 at 25s wavelperiod

- Acceleration at bridge level

- < 0.06 g RMS in HS 17.5m
- < 0.03 g RMS in HS 17.5m waves
- Recommanded intellectual work at sea < 0.1 g RMS

- Wind : 0 - 100 knts, extreme wind : 136 knots (gales)
- Extreme wave Hs=19m
- Monthly storm wave HS = 8m

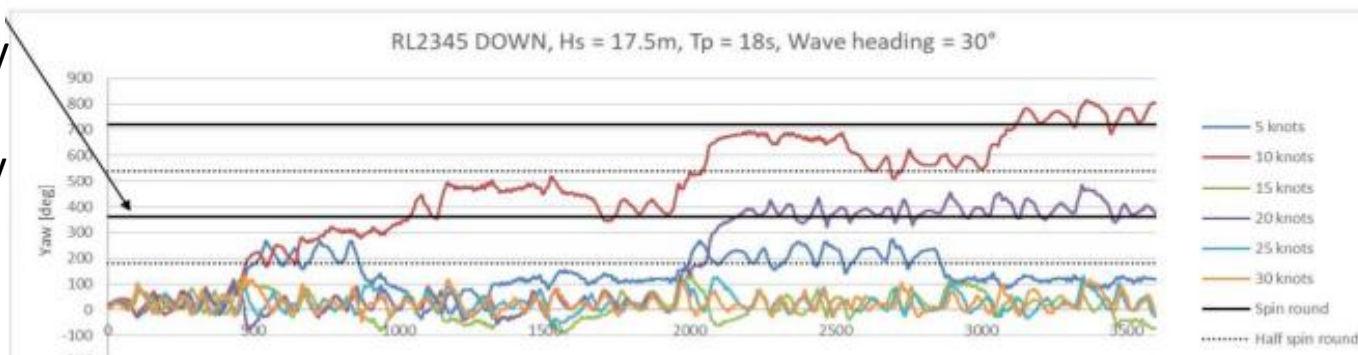
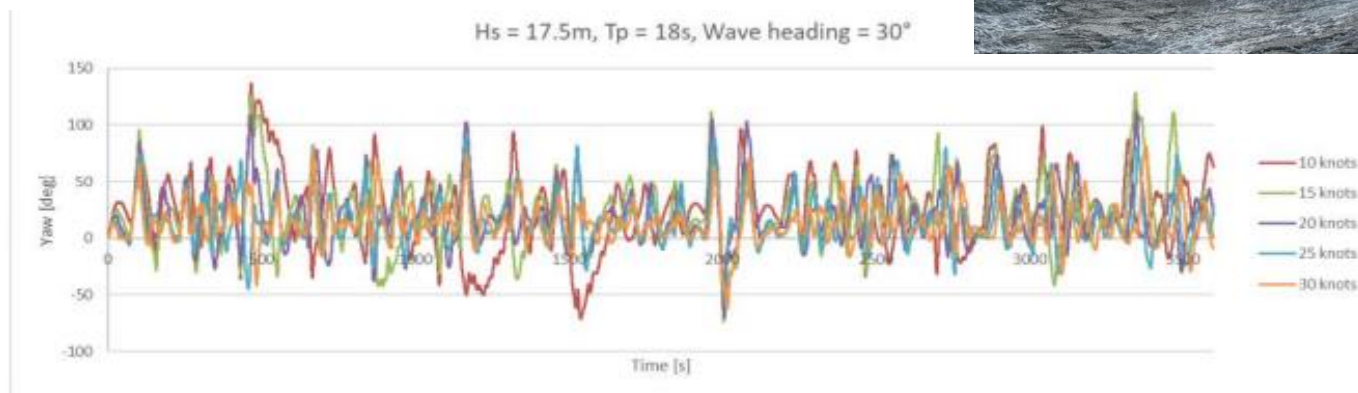




## At sea behavior – preliminary results

### Stability in yaw

- With sails
- Stable but 100° yaw motions possible
- Without sails : Complete turns can occurs in very low wind and high waves – very mow probability occurrence



- Delivery 2<sup>nd</sup> part of 2025 with 1 year delay
- Basic design longer than anticipated

*The End*

- Wind : 0 - 65 knts, extreme wind : 136 knots (gales)
- Wave Hs=15 m, extreme wave Hs=19m

