



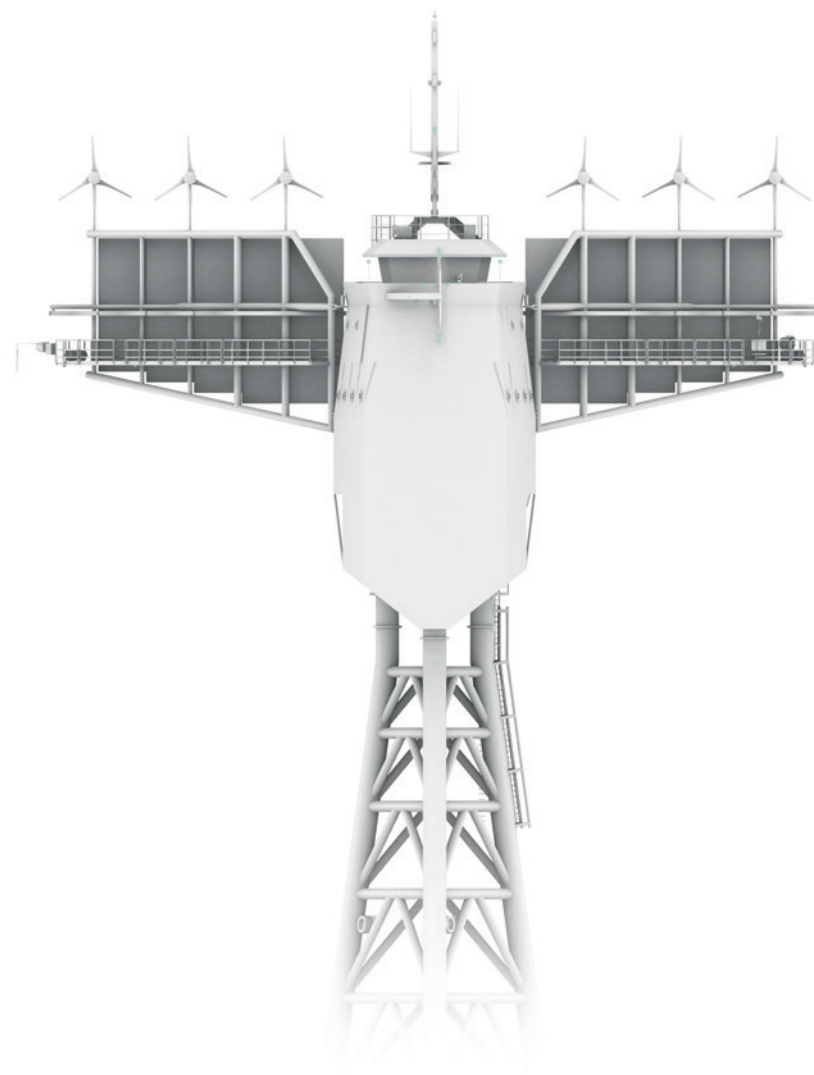
POLAR POD

A JEAN-LOUIS ETIENNE'S EXPEDITION

AN EXPLORATION OF THE SOUTHERN OCEAN

Climate • Marine biodiversity • Space oceanography • Contaminants

CNRS - CNES - Ifremer



A WORD FROM JEAN-LOUIS ETIENNE

« *Everything starts with the strength of an idea...* »

Everything starts with the strength of an idea - not a spontaneous one, but a lucky combination of one's inner needs, an objective challenge, and a desire and willingness to enter unknown territory. I like to invent things, to design unexpected vessels for exploring in new ways.

I like to take notes and convert to paper things that exist only in the imagination. We must dare to engage our minds beyond the things we know to be true, to breach the frontiers of the known, and to win the attention and the ears of those who might venture on the journey with us. But discouragement is a permanent threat one needs to defend against in order to make progress. Confronting disbelief, mistrust, and denial is the price of all new ideas. They only survive if they are held and defended tirelessly.

For me, the time is coming when my own ship of ideas will take shape, and deadlines and responsibilities will become clearer. But this is true already - there is nothing any longer that can stop my departure toward those grand spaces, the pillar of my dreams. It's a precious idea that we're holding onto. We only get such chances a few times in our lives. Let's not give it up !

Jean-Louis Etienne

SUSTAINED OBSERVATION OF THE REMOTE SOUTHERN OCEAN IS CRITICAL !

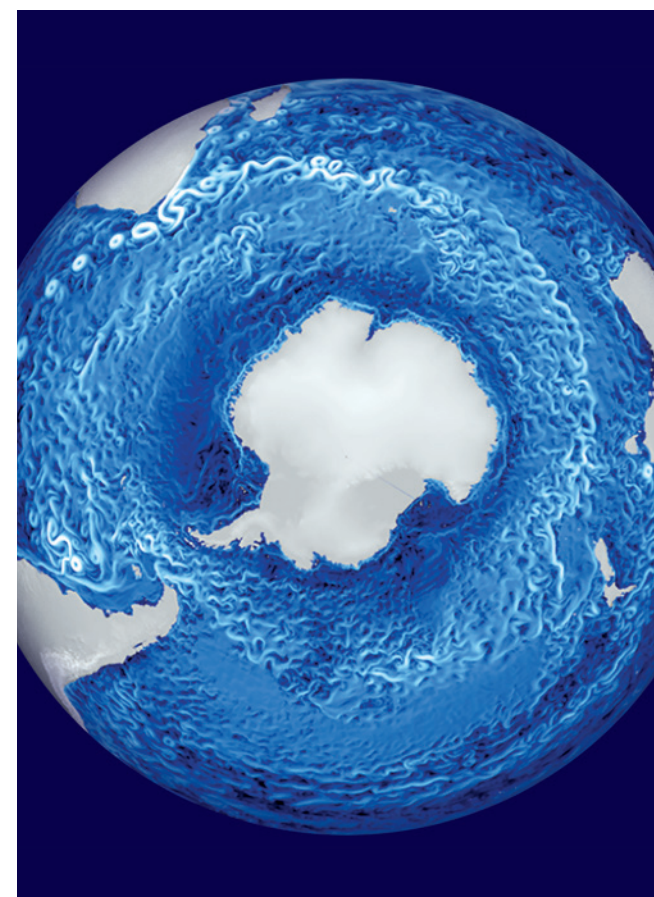
THE SOUTHERN OCEAN A CAUSE FOR CONCERN

Due to the remoteness and rough environment, it is one of the largest ocean data gaps of global ocean. Despite oceanographic cruises, satellites, Argo profilers, sensors deployed on birds and mammals, this remote ocean is tremendously under-surveyed.

Scientists need in situ long period measurements.

Drifting along the Circumpolar Current, POLAR POD will circumvent two times the Antarctic continent between **50 and 55°S**.

It will take three years to complete two "world tours".



THE SOUTHERN OCEAN

The Southern Ocean which surrounds the Antarctic continent, is the only ocean whose waters circulate around the world, **20 000 km without land interruption.**

Driven by the strong western winds, the Antarctic Circumpolar Current (ACC), the mightiest current on the planet, flows continuously around the globe, connecting **the three large oceans, Atlantic, Indian and Pacific** and then plays a vital role in interacting with the deep-water.

Due its immense surface of cold water, **it's the world's largest oceanic carbon sink of the planet**; though still poorly understood, it plays a critical role in the Earth climate circulation.

WHAT KIND OF VESSEL IS CAPABLE OF BRAVING THE "FURIOUS FIFTIES" ALL YEAR-ROUND IN SECURE AND COMFORTABLE CONDITIONS ?

POLAR POD, A VESSEL DESIGNED FOR SUCH A ROUGH ENVIRONMENT

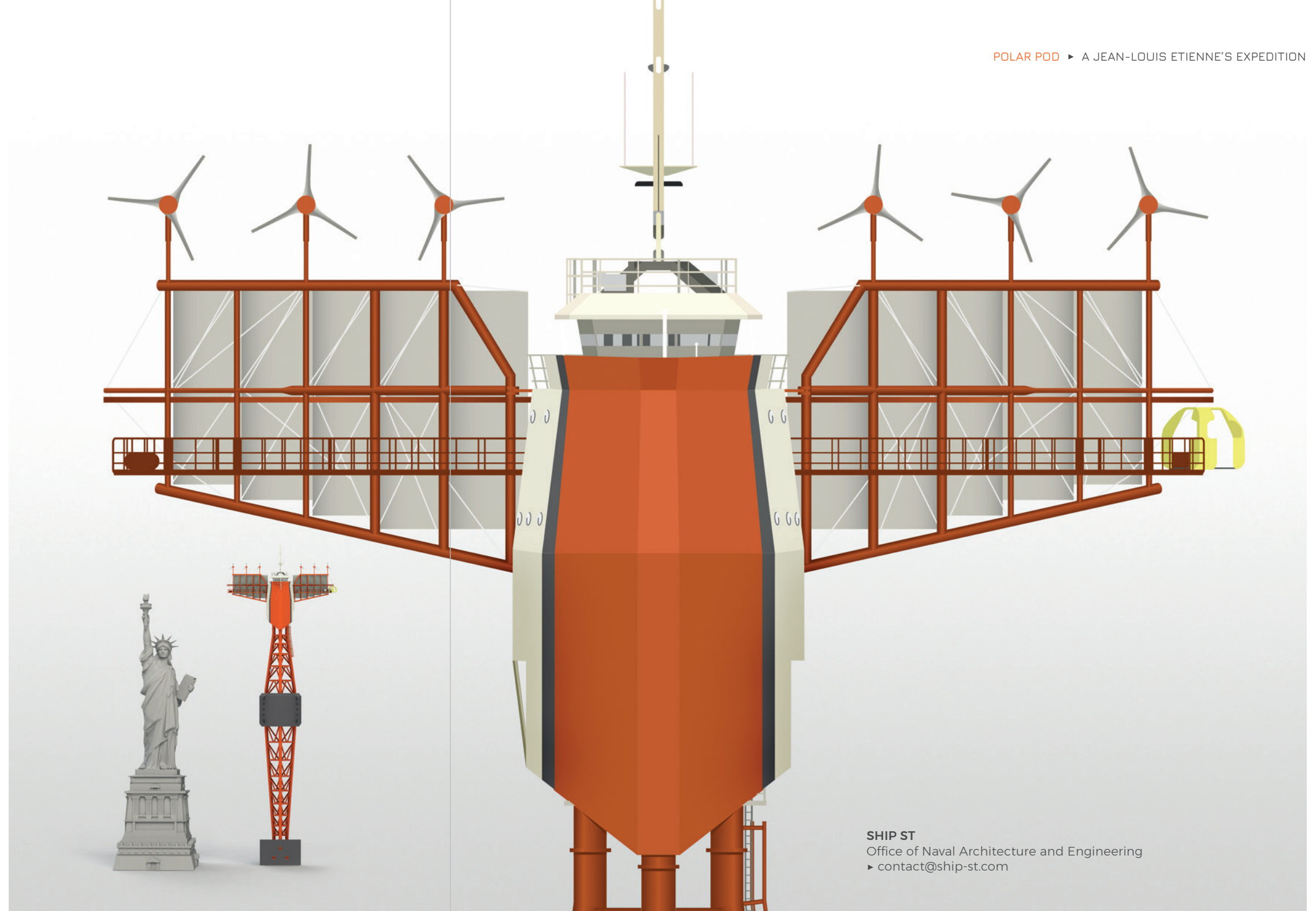
POLAR POD is a new state-of-the-art oceanographic vessel. Extensive engineering and scale model testing have successfully validated the design of the platform for Southern Ocean mission.

The buoyancy is calculated to make the pod **less responsive to wave motion and avoid resonating with the swell**. Therefore, the POLAR POD measurements are extremely accurate unlike those conducted with a conventional research ship.

The sails will maintain the pod upwind and will ensure a shift in direction in case of iceberg sighting.

Drifting along with the current and supplied by renewable energy this spar buoy is a **"zero emission"** vessel.

The Polar POD is a unique silent research platform to conduct an accurate census of marine life **by acoustic**, from «snapping shrimps» to blue whales.



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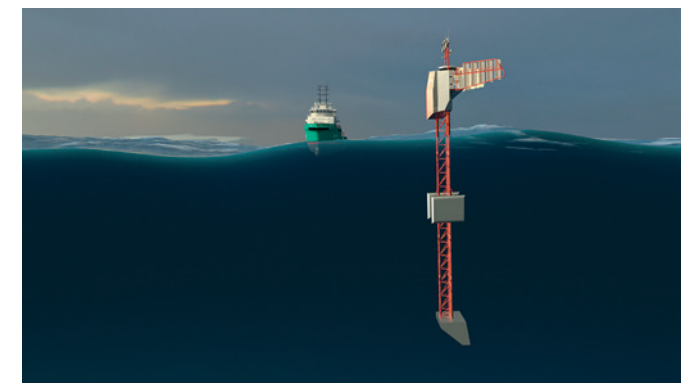
▲ The 340 ft long POLAR POD will be towed to its operating area...



▲ ... in the antarctic circumpolar current



▲ When flooded at the bow, it will flip to a vertical position

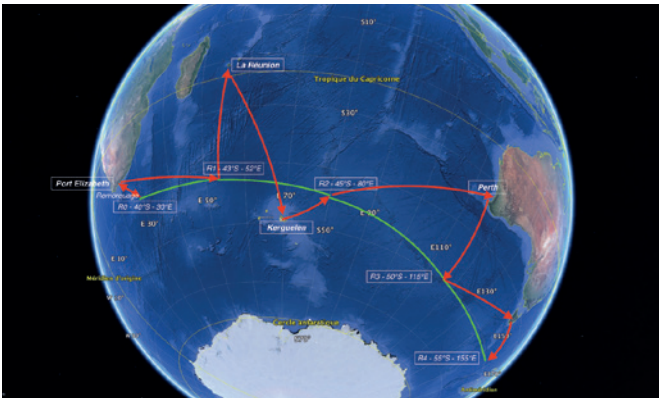


▲ The 1000 tons total weight, 250 ft draft and a ballast of 150 tons ensure its upright stability

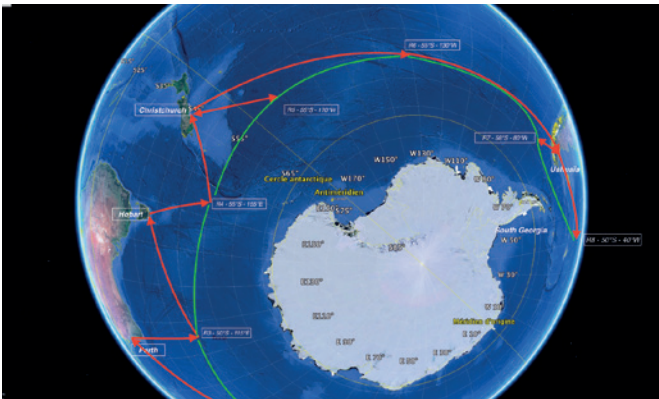
LIFE ON BOARD

The mixed crew is made up of 8 people:
3 sailors, 4 scientists and a cook.
They will be relayed every two months with a ship
mothership specially built for this mission.

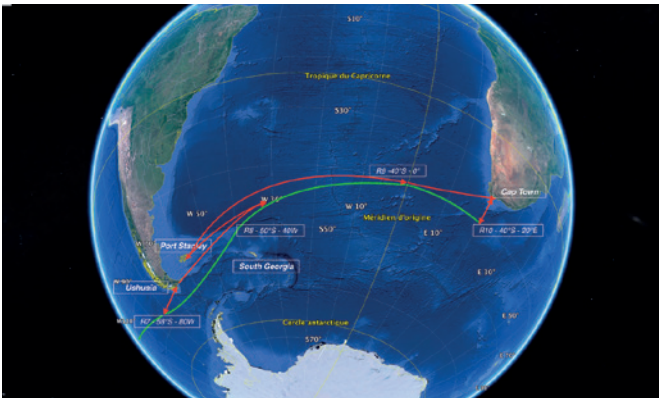
— POLAR POD drift course
— Boat route for crew changes



▲ Indian Ocean



▲ Pacific Ocean



▲ Atlantic Ocean

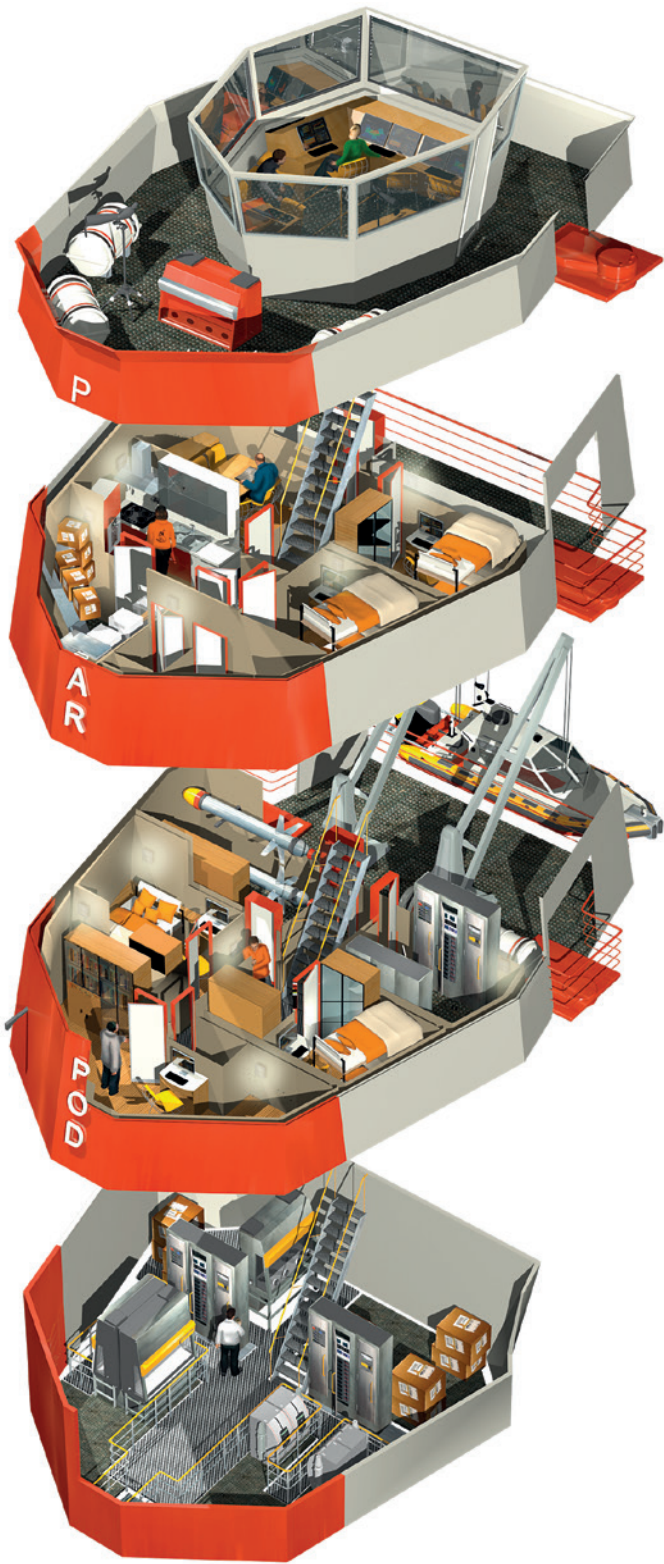


Image © Laurent Hindryckx

EDUCATIONAL PROGRAM



The acquired data will not only be shared by leading scientific institutions worldwide. They will be also available for collaborative educational projects to bring students into the data gathering and analysis activity.

The POLAR POD will transmit a sub-set of data in real time for the scientific community and for student, of all ages, to get exposed to research projects.

This program will start **in September 2022** at the beginning of the construction and the preparation of the mission.

SCIENTIFIC PROGRAM

POLAR POD expedition will be a unique opportunity to capture seasonal cycles and long-term phenomena. Hence more than 100 researchers of 43 worldwide national and international research institutions are involved in the scientific program. All data will be available to the entire scientific community as well as the general public, making the POLAR POD an exceptional educational tool.

FOUR RESEARCH PATH-FINDERS

1 - Air-sea exchange

The Southern Ocean (SO) is a key component of the climate system. Despite covering only about 30% of the ocean area, it is responsible for about 50% of the oceanic uptake of anthropogenic CO2. The ability of POLAR POD to remain stable in energetic seas, will reduce air and water platform interferences. A long time series of CO2 air-sea fluxes measurement is anxiously expected by climatologists.

2 - Ground truth for Earth observation satellites

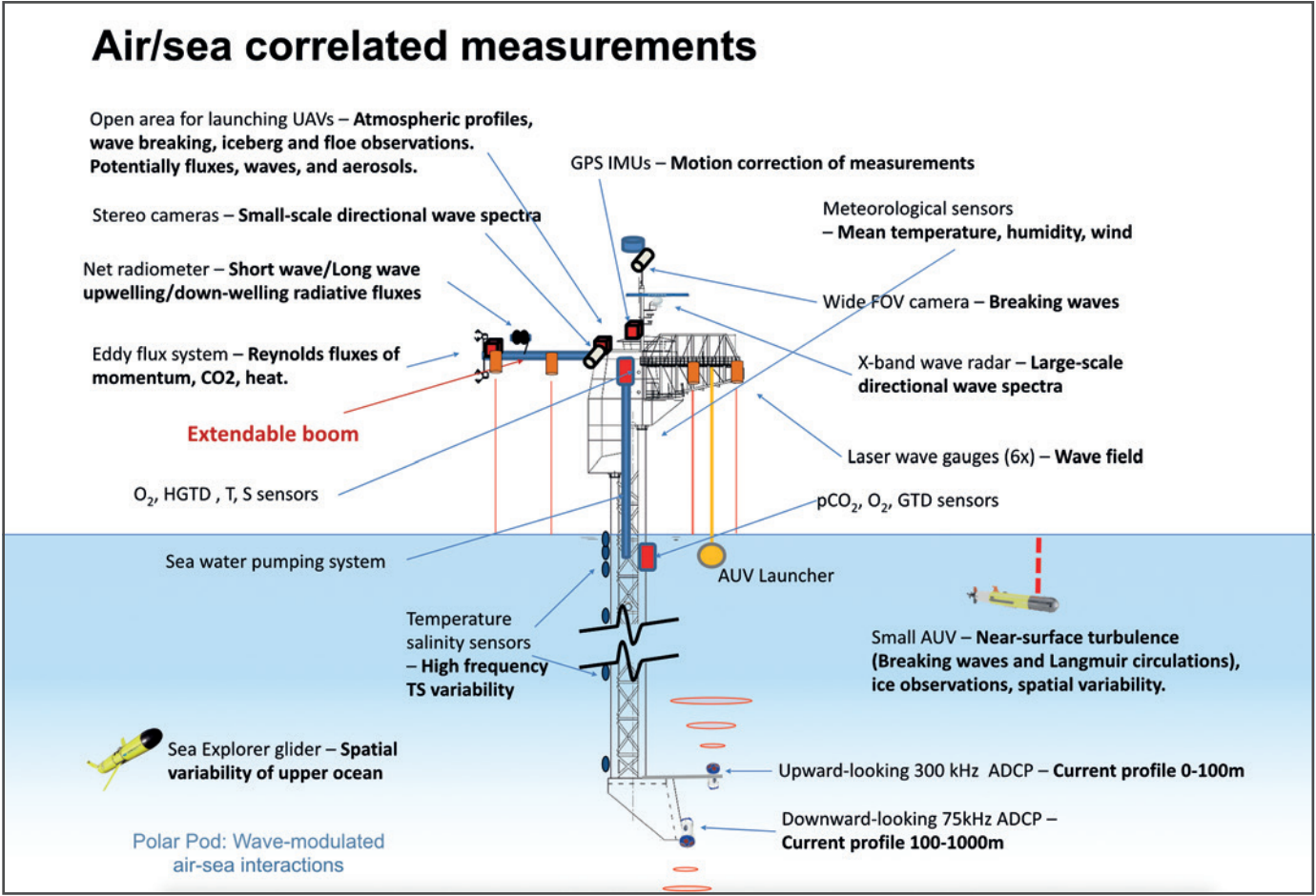
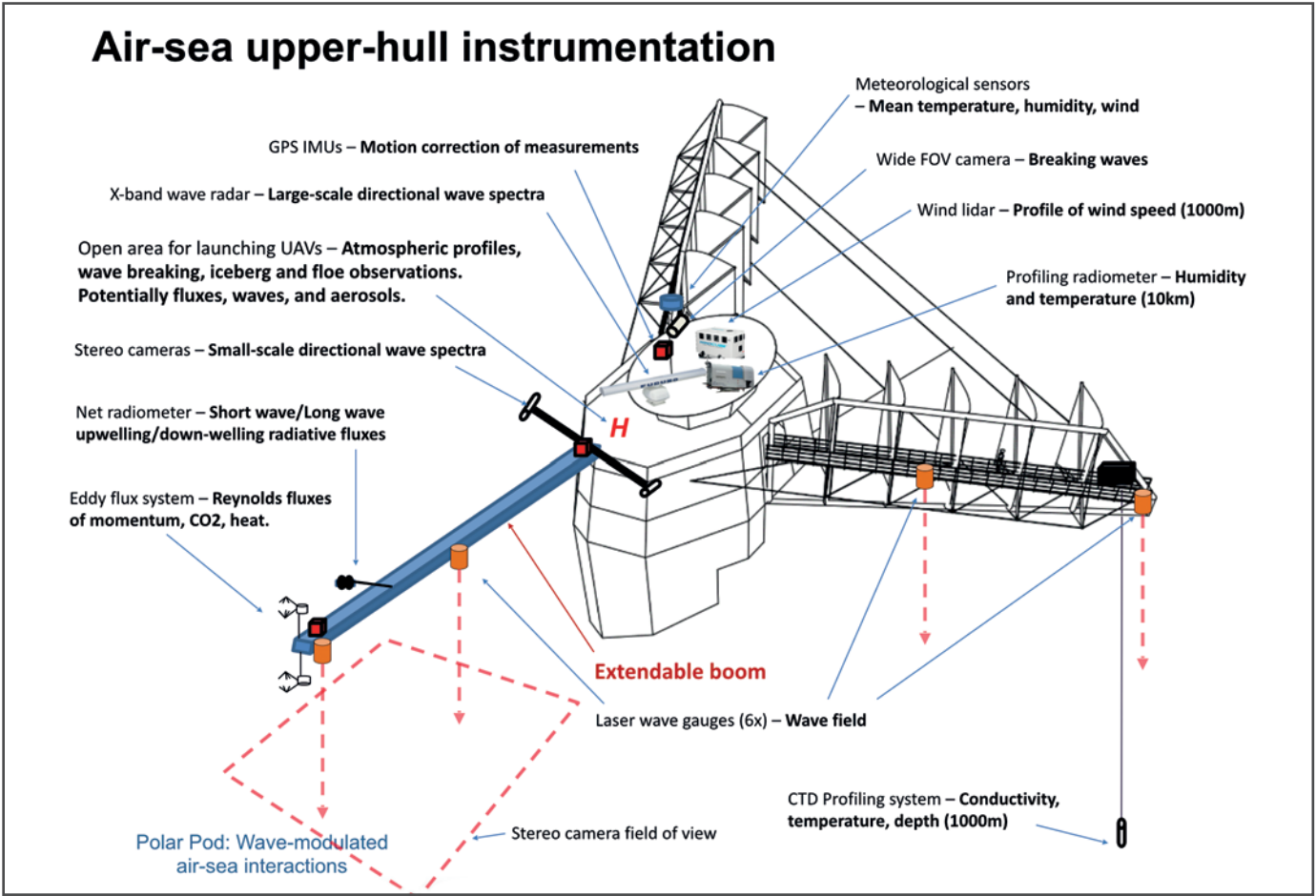
The POLAR POD will be a far-reaching program for the validation of a large number of all year long satellite-derived measurements.
Wind and wave assessments from space in high sea-state conditions.
Ocean salinity estimations from space: the ocean salinity is a key component to determine ocean circulation.
Monitoring phytoplankton from space, the first level of the food chain. Any alteration to its functioning will thus have serious consequences on Earth's biogeochemical cycles and marine life.

3 - Census of marine life: from microplankton to giant whales

The slow drift will generate low acoustic noise to provide an “acoustically clean” environment. Hydrophones will be mounted on the immersed part of the Polar POD. Acoustic measurements will teach us about the acoustic behavior of marine mammals and enable the constitution of a unique census of marine life. It will be a very valuable result for the CCAMLR, the international commission in charge of the management of the fisheries in the Southern Ocean. A radar will allow monitoring of the seabird distribution along the Polar Pod's path.

4 - Anthropogenic impact

Although the Southern Ocean is the most remote ocean on Earth, a wide range of anthropogenic pollutants have been detected in this region at various levels of the pelagic and benthic food webs: krill, plankton, fish, seabirds, marine mammals.
The Southern Ocean is almost the last terra incognita for contaminants. The targets of our investigations will be microplastics, organic contaminants and mercury.



AGENDA

2021

MARCH 16TH, 2021
Press conference

2022

JANUARY, 2022
Start of construction of the POLAR POD

SEPTEMBER, 2022
Launch of the educational project

2023

MAY, 2023
End of construction of the POLAR POD

JUNE, 2023
Baptism of the POLAR POD

JULY TO SEPTEMBER, 2023
Testing

DECEMBER, 2023
Start of the expedition

2024

2026



Image © Nicolas Gagnon

JEAN-LOUIS ETIENNE

DOCTOR, EXPLORER, WRITER



Commandeur of the Légion d'Honneur
Gold Medal of the French Société de Géographie
Fellow of the American Explorer Club
Former General Director of the Oceanographic Institution of Paris and Monaco

MD, internship in surgery, he is specialized in nutrition, biology of the sport, and physiology of human adaptation to extreme conditions. In 1977-78, he participated in the Whitbread Round the World Race on board Eric Tabarly's mythical Pen Duick 6. A mountain buff, he climbed peaks in the Himalayas, Patagonia and Greenland, among others. In 1986, he became the first person to reach the North Pole single-handedly, pulling his sled for 63 days in complete solitude.

In 1989-90 he performs the longest ever traverse of the Antarctic continent with dogs, over 7 months, covering nearly 4 000 miles. He later went on to explore the Erebus volcano on Antarctica, wintered in Spitzberg on his polar vessel Antarctica, and drifted on ice over the North Pole on board the Polar Observer. In April 2010, he managed the first traverse of the Arctic Ocean in a roziere balloon. His next project is an exploration of the Southern Ocean on board of PolarPOD, an international oceanographic station, driven by the Antarctic Circumpolar Current (2023-26).

www.polarpod.fr

SCIENTIFIC PROGRAM STEERING COMMITTEE



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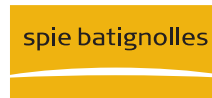
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PARTENAIRES & MÉCÈNES

PARTENAIRES OFFICIELS



MÉCÈNES OFFICIELS



MÉCÈNES PROGRAMME ÉDUCATIF



MÉCÈNES COMITÉ DE SOUTIEN



COLLECTIF DE SOUTIEN

