Sentinels of the Ocean

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THE SEAORBITER PROJECT IN A FEW WORDS

SeaOrbiter is a new human adventure dedicated to the Planet. It is part of the history of the great explorations of our universe led by illustrious predecessors and great adventurers such as Jules Verne, Jacques-Yves Cousteau, Jacques Piccard ... It also constitutes a new planetary challenge. Its purpose is to foster the emergence of a new relationship between man and the sea by the awakening, awareness and action of all to meet tomorrow’s every requirement for a future based on the precepts of sustainable development, particularly related to the sea.

JOINING SEAORBITER IS THUS:
- Participating in the great adventure of human exploration in the 21st century
- Boarding to explore the last frontier on earth
- Recognizing that human survival depends on preserving the oceans
- Meeting the global challenge for a better understanding of this universe still widely unknown
- Living under the sea 24 hours a day over long periods at the very heart of the oceans
- Residing in a nomadic underwater home wandering amidst the mightiest of gardens: the ocean
- Allowing better commitment from the younger generations with regard to the planetary challenges of tomorrow
- Promoting awareness for sustainable integration of the ocean in our attitudes and behaviors to come

SAILING WITH SEAORBITER IS MOVING FROM:
- Discontinuous observation to continuous observation of the underwater world
- Erratic intrusion to a perfect symbiosis with the marine ecosystem
- Passive observation to proactive monitoring of the ocean
- Complex oceanic penetration to easy and permanent access to the underwater world
- A linear approach to the ocean to a real three-dimensional understanding of it
- The remote maritime adventure to a network of sentinels serving the Blue Planet

SEAORBITER HENCE ALLOWS:
- Implementation of a change in relationship between man and the ocean
- Development of a planetary educational plan concerning the oceans
- Establishment of an international scientific research and technological programs
- More sophisticated understanding of the mechanisms linking the ocean and the earth's climate
- Testing of human behavior and ability to live in space related underwater extreme environment
- Emergence of new vocations and new expertise
- Production of interactive multimedia programs accessible to all

To bring man into "global symbiosis with the planet"
THE PROJECT’S CONCEPT

SeaOrbiter is an exploration vessel and a drifting sub-marine as well as marine observation platform permitting the in-situ and a continuous observation of the marine ecosystem, the monitoring of the physical and chemical parameters of the ocean/atmosphere interface and the development of research on human behaviour in extreme situations.

Just as space exploration undeniably transformed mankind’s perspective of planet Earth, it is certain that a better understanding of our planet’s oceans through the study of the undersea depths of our marine world represents one of the major challenges of the 21st century.

Despite the fact that the world’s oceans cover no less than 70% of the surface of our planet, we know very little about these vast expanses of water. However we do know that they play a crucial role in our everyday lives and for our future: the major currents regulate our climate, they provide us with an ever greater source of food with the promise of sustainable marine proteins, the molecules that we hope to discover in the oceans will contribute to healing our illnesses and will most likely provide new pharmacopeia in the future, and what’s more important the new life forms that we discover in the depths call into question our pre-established ideas…

The SeaOrbiter project is based on an innovative technological approach that has resulted in a new generation of ocean exploration vessels, a human adventure in the spirit of the great multidisciplinary explorations of past centuries. It will allow its crew members to benefit from an overall vision of the underwater world and will allow them to actually observe, listen and live 24h a day and during long terms periods, under the sea.

SeaOrbiter is a unique vessel whose technology allows mankind to live at the heart of the world’s ocean, to drift within the major oceanic currents, to carry out observational studies and enjoy a direct and permanent access to the marine and underwater environments. In that sense, SeaOrbiter is truly a unique mean of communication, of sensitization and of education upon the theme of sustainability towards the oceans.

SEAORBITER IS AN INHABITED AND ROBOTIC DRIFTING OCEANIC VESSEL

The 51 m-tall semi-submersible vertical structure includes a submersible section of 31m. The vessel is kitted out with oceanographic observational and sonic equipment coupled with satellite facilities. It can house an international team of 18 people among those 6 scientists who will benefit from the platform to proceed into various research programs with regards to SeaOrbiter’s many observation and analysis abilities.

LIFE UNDER THE SEA: A WORLD PREMIERE THANKS TO A UNIQUE PRESSURISED MODULE

SeaOrbiter has a multi-level atmospheric pressure module and a pressurised module. The latter is open undersea, allowing the 6 to 8 aquanauts to live permanently at the heart of the ocean and to have immediate access to the underwater world. This integrated undersea habitat is also a real space analog, favouring the organisation, over long periods, of experiments, model testing and analysis in terms of confinement and life in extreme environment. That is why the international space agencies are likely willing to participate to some unique undersea living world records.

FUNCTION

This observation and exploration vessel will permit the welcoming of multidisciplinary teams coming from multiple domains of scientific research, helping in this way to develop the necessary transverseness of scientific disciplines for understanding the complexity of climatic, biological, atmospheric and natural marine phenomena.

Many great European and international institutions of national research have already shown their interest in using this platform. Programs of research are currently being defined with many Universities and research centres.
Successful testing of a 1/15th scale model at Marintek facility, Europe’s largest simulation laboratory located in Norway
OBSERVATION: LARGE PANORAMIC WINDOWS AND ACOUSTIC SENSORS

SeaOrbiter is an exploration vessel designed to allow observation both above and below the surface of the ocean. The section that remains above the surface houses the navigation and communication equipment. It has an open-air deck for observing cetaceans and documenting migrating species. The submerged section can be considered as a mobile observatory. In addition to its large portholes, this observation post has vast panoramic windows that give the crew a superb and constant view of the surrounding marine life.

The automated measuring equipment allows the scientists to obtain \textit{in situ} analysis of the water samples taken. Deep underwater exploration tools such as remote cable-operated, robotic video cameras, manned pocket submarine or AUV’s will extend SeaOrbiter’s investigation possibilities up to 4000 metres.

EDUCATIONAL AND PUBLICITY RANGE

By the nature of its design and the objective of its mission, SeaOrbiter is also an excellent academic tool about the marine environment, its environmental and climatological components address all generations.

Thanks to collected images that accompany the comments of observer-aquanauts, SeaOrbiter will contribute to the awakening of minds to what is at stake in the conservation and the responsible use of the marine environment. Indeed, thanks to the technologies of numerical imaging it will furnish a resource that will favour a sensitive, even coalescing relationship, for the public with the marine environment. This is by no means a small stake for the latter.

PROGRAMMES AND MISSIONS

SeaOrbiter reveals oceans to a new generation of residents, otherwise known as aquanauts: i.e. scientists, explorers or simply visitors to the undersea world. With a key task: to inform and educate public at large about the ocean and its role into the planetary system.

The main scientific missions revolve around:

- Mankind living under the sea: studies led in parallel with space agencies on the physiology and the psychology of a crew living in a confined environment for long periods of time.
- Exploration of oceanic currents, seamounts and deep seas.
- Studies of marine biodiversity: the oasis of life in the ocean environment as a result of the phenomenon of aggregation linked to drifting structures, resource management, phytoplankton behaviour.
- Genomic sampling of marine molecules, bacteria and viruses for tomorrow’s food or pharmacopeia.
- Climate studies via observation of currents: temperature, CO2 impact, ocean/atmosphere gas exchanges, calibration of satellite measuring equipment...

The communication and educational approach focuses on:

- Raising awareness amongst younger generations regarding the importance of scientific knowledge of the world’s oceans and the human adventure and technological challenge that it represents
- A record-breaking journey: the first permanent ‘drifting’ laboratory, the record of the longest period spent by man ‘under the sea’...
- News releases about the expedition via media, films, press, and Internet coverage.
- Exhibitions in museums, aquariums, Oceanographic Institutes and Sea centres.

ECOLOGICAL AND PLANETARY RANGE

Drifting according to the great marine currents, SeaOrbiter has its place in all the major oceans and in all the most important interior seas.

Being linked with an observation satellite network, the SeaOrbiters of tomorrow will permit the continuous observation of the biggest climatic phenomena and the setting up of a preventive system reducing the risks run by the populations living on the coast (i.e. 70% of the world populations).