The Philippines International Ocean Station Model Making

Blending indigenous and scientific approaches via art & science towards ocean-based climate solutions

Photo: Honor Harger, ArtScience Museum, Marina Bay Sands, Sep 2023. Source: https://flic.kr/p/2p5gdaK Video: https://youtu.be/04r6c4m3LuU?si=GxCFYIPqqiW1mH0W

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Abstract

This paper examines the process of the co-creation of the architecture model of the International Ocean Station (IOS) [1] in the Philippines, inspired by pre-existing works, first by a primarily coastal fisherfilk community (La Union, Luzon), second by the urban scientific community (primarily from the University of the Philippines), and thirdly by the general public at the Mind Museum (Taguig City, Metro Manila).

The goal is to develop a replicable participatory speculative design process in which

- The interests of coastal communities are prioritized and their indigenous knowledge and culture valued
- The scientific community research goals are achieved and possibly leveraged for commercialization
- The general public imagination is stimulated with art and science with the architecture model, leading to a greater interest and support for the making of the actual Philippines “International Ocean Station” as an open source design, inviting other communities to replicate such effort.

Introduction

The International Space Station (ISS) is one of humanity’s greatest scientific achievements, yet only a few elite nations have been invited to contribute to this 100 billions USD adventure, namely the United States, Russia, Canada, Japan and 10 of the 20 European nations who are part of ESA (European Space Agency) [2] - most of which are former or current colonial empires. Observation from space have contributed to identify the role of the ocean in the earth’s climate.
The ocean cover about 70% of the planet’s surface area, is the main controller of the climate absorbing more than 90% of our excess heat [3], and approximately 40% of the human population lives within 100km from the sea [4]. The ocean is accessible to many but the the oceanographic research ships and marine science instruments tend to be inaccessible to developing nations, many of which are highly dependent on the ocean’s environmental services.

There are several other notable projects that have borrowed or adapted the “International Ocean Station” (IOS) naming

- “Sea Orbiter”, by Jacques Rougerie (France), estimated at 52.7 million USD [5] [6].
- “The International Ocean Station of the Deep Sea”, by Fabien Cousteau (France), raising 135 million USD [7].
- “Polar Pod”, by Jean-Louis Etienne (France) “an exploration on the southern ocean, a drift around Antarctica in the "Furious Fifties” “ estimated at over 14 million USD.[8] [9].

These projects are inaccessible to developing nations ocean research budgets.

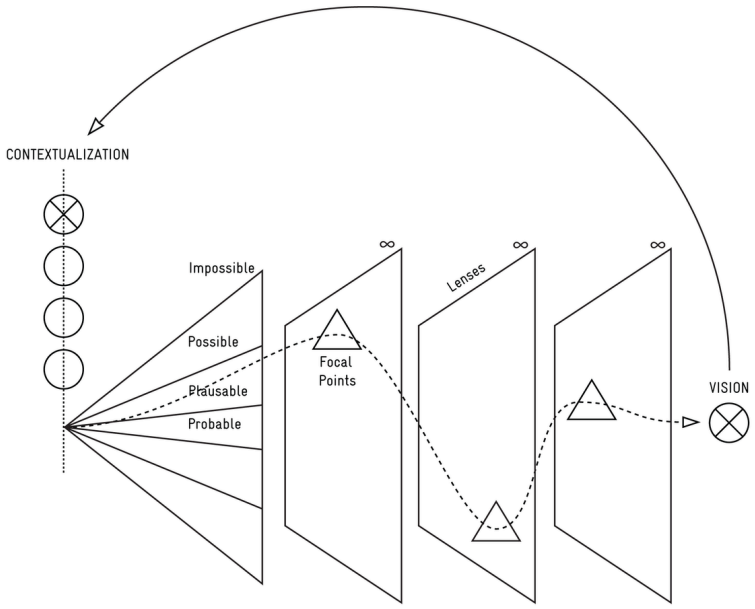
The concept of the International Ocean Stations (with an “s”) as proposed by Cesar Jung-Harada (in 2009) is to produce many of such Ocean Stations at a low cost, in different countries and cultures, as much as possible using local materials, using Open Science as a general operating principle. The ceiling cost for these inhabited international ocean station would be 100,000 USD, making them 140 times cheaper than the next similar equipment.

The Phillipines is a fast developing archipelagic country with 7,641 islands that produces the most seafarers with about half a million actively working on the sea [10]. With its highly skilled and affordable seafarers, dependance and vulnerability with the ocean resources, the Philippines is uniquely positioned to produce and benefit from the creation of a series of IOSs.

Methodology

The method implies asynchronous collaboration between diverse groups of people, starting with working with the coastal indigenous communities that would be most affected by climate change, maritime pollution and sea level rise.

#	Date & Location	Comment	Focus
1	Sep 2023 Online	**Desk Research**. Identifying the main functions, instruments and data produced by conventional marine research vessels.	Identifying relevant references
2	Oct 2023 La Union	**Working with Indigenous community**. Collecting materials on the beach, building the initial model with indigenous community, youth, elders, fishermen, surfers, beach cleaners, conservation interest groups.	Indigenous coas Are coastal communities interests prioritized? Is Indigenous knowledge and cultured valued and included?
3	Nov 2023 Manila	**Collaboration with ocean scientists** in Manila, at the Mind Museum.	Could scientific data be collected and leveraged for commercial applications?
4	Nov 2023 Onwards Manila	**General public interactive exhibition**. The public is invited to observe, critique, change and create their own modules for the International Ocean Station and share their documentation online.	Does the Architecture model garner interest and support from the general public?



The process, instead of starting with science, starts with imagination (Art), cultural speculation, and social contectualization. Such process helps to identify the need and the wants that science can attempt to supply.

This innovation framework has been refined over practice by “The Extrapolation Factory” (Chris Woebken and Elliott P. Montgomery). https://extrapolationfactory.com/About

Phase 1: Desk Research (Sep 2023, Online)

Thinking from first order principle and biomimicry

"Open_Sailing, Functions of an International Ocean Station, and hypothetical Threats." By Cesar Jung-Harada for the Open_Sailing Collective. Royal College of Arts, London. Jan 28, 2009, Source, https://flic.kr/p/5VwBar

In this poster, you can see listed several areas of interest:

1. Protect: Shelter seafarers and their sensitive equipments
2. Water: to drink and work
3. Eat (Food): to sustain life at sea
4. Move
5. Exchange (Communicate):
6. Energy: storage
7. Make (Resproduce): repair, upgrade, expand

In many ways, that list is inspired from the biological definition of life: 1. Organization, 2. Metabolism, 3. Homeostasis, 4. Growth, 5. Reproduction, 6. Response, 7. Evolution [11].

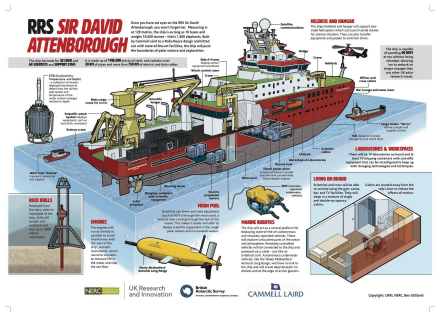
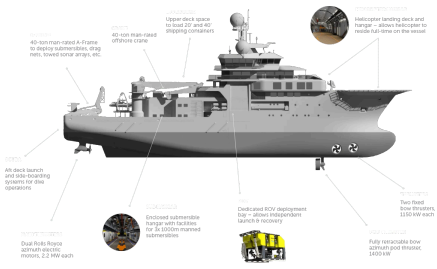
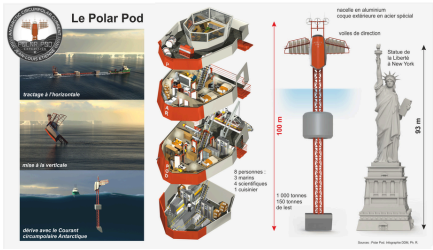
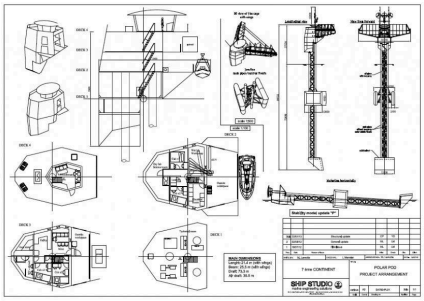
Learning from a study

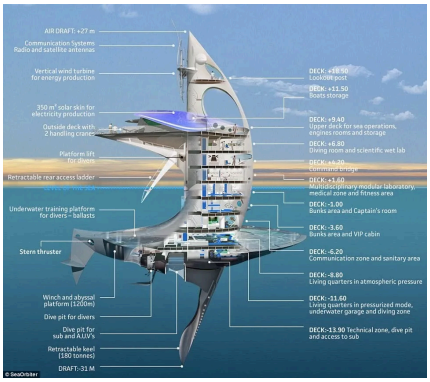
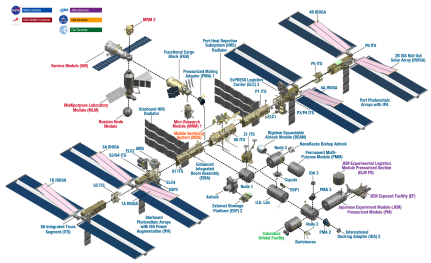
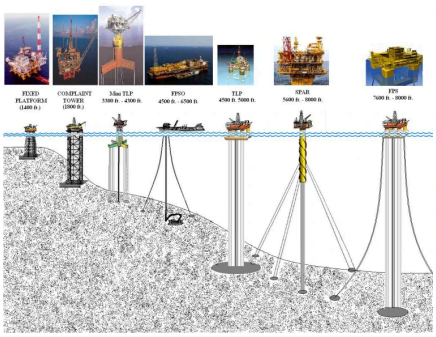
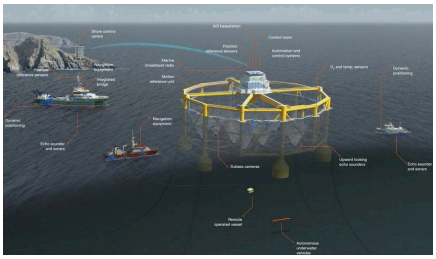
In the publication “Interactions between oceans and societies in 2030: challenges and issues for research” (2016 D. Lacroix et al.) the French researchers identify 9 major challenges for ocean science and for each 2 key issues [12]. These would suggest what kind of equipment one would want to take on board of an IOS.

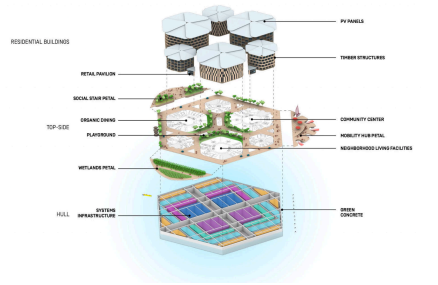
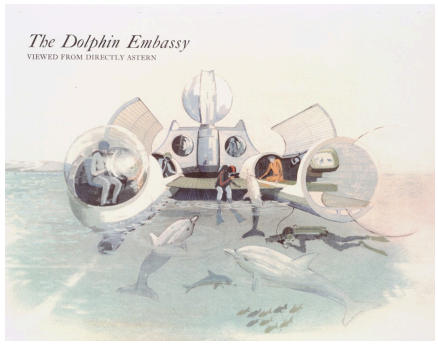
Table: The 9 major challenges and the related key issues for research

9 major challenges	Key issues for research
1. Understanding and anticipating changes in marine ecosystems	Measurement and monitoring networks Modeling of ecosystems
2. Securing the provision of food and therapeutic substances from the sea	Best practices in aquaculture Synergies in the continental shelf
3. Mastering the colonization of the oceans, from shore to open sea	Controlling coastal densification Environmental integration
4. Developing safe and sustainable technologies to exploit ocean resources (energy, minerals, molecules...)	Sustainable exploitation in deep waters Energy resources at sea
5. Preventing natural and anthropogenic risks and hazards in the marine realm and managing crisis situations	Resilience of coastal zones Managing risks and crisis situations
6. Developing biotechnologies for industrial, sanitary or remedial uses in the marine realm	Bioreducing the footprint of human activities Marine bio-economics
7. Developing education, sustainable tourism and responsible social practices in relation to the sea	Education and responsible social practices Sustainable tourism
8. Building international law on a scale commensurate with the new challenges	National sovereignty and maritime common good Standards and regulations at sea
9. Systematizing and globalizing monitoring, surveillance, control and regulation of activity at sea	Monitoring systems at sea Securing vital maritime flows

Learning from ocean expedition research vessels & concepts

	“RRS Sir David Attenborough” UK. *Source:* *https://www.rmg.co.uk/stories/topics/rrs-sir-david-attenborough/polar-science-facilities*
	“OceanX”. “MISSION OCEANX will combine high-end, character-driven documentary with blue-chip sequences to capture the drama and thrill of exploration — a high-stakes adventure in ocean discovery.” *Source:* *https://www.deeperblue.com/national-geographic-announces-mission-oceanx/* *See: https://youtu.be/uHh0u21lDDc?si=hY8HWQJGQ37pdihn*
 	“Polar Pod” by Jean-Louis Etienne *Source:* *https://www.actunautique.com/2021/03/polar-pod-un-navire-vertical-de-100-metres-de-haut-pour-explorer-l-ocean-austral.html*

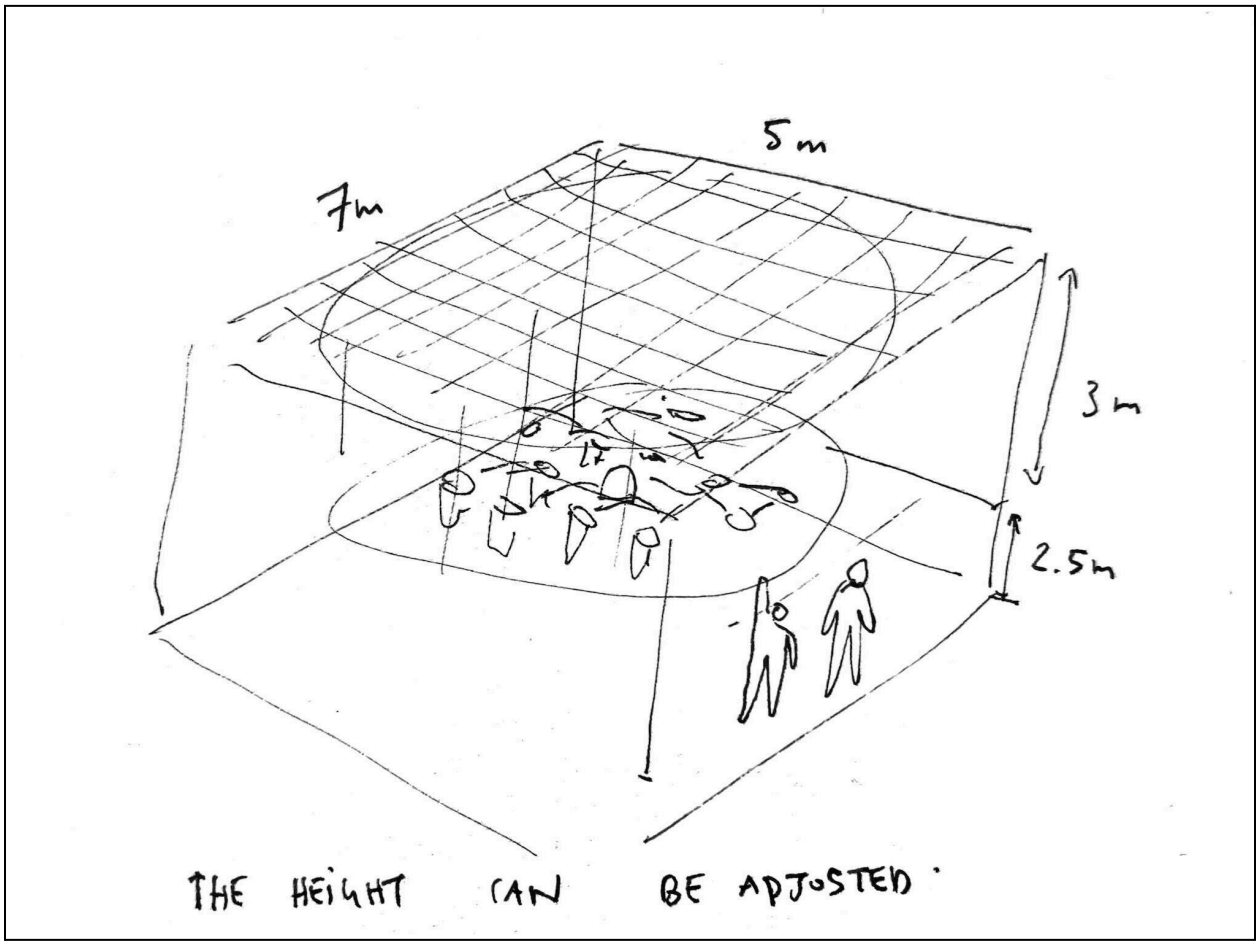
	“Sea Orbiter” by Jacques Rougerie. *Source:* *https://www.stuff.tv/news/meet-seaorbiter-crazy-ocean-roaming-research-station-might-just-discover-atlantis/*
	“International Space Station” *Source: https://www.nasa.gov/feature/facts-and-figures*
	Offshore oil rigs *Source:* *https://psmag.com/news/hurricanes-enter-the-offshore-oil-drilling-debate-4236*
	“Ocean Farm 1” *Source:* *https://www.marinelink.com/news/lankhorst-mooring-largest423960*
	Joyxee Island, by Richard Sowa. *Source:* *https://www.deccanchronicle.com/lifestyle/pets-and-environment/230516/meet-the-man-who-lives-on-a-floating-island-made-of-plastic-bottles.html*

	“Oceanix Busan” *Source: https://arquitecturaviva.com/works/oceanix-busan* *Watch: https://www.youtube.com/watch?v=ieSV8-isy3M*
	“Floating FabLab” *Source: https://floatingfab.org/* *Watch:* *https://www.youtube.com/live/xGgK09UpG40?si=h27bPp_nUePDGnVK*
	Lake Titikaka Uros Village Source: https://www.exploorperu.com/blog/peru/exploring-uros-islands/ See also Iraq Ma'dan [13] https://architectureindevelopment.org/news/120 See Cambodia TonLe’Sap Source: https://www.outsidenomad.com/tonle-sap-lake/
	“The Dolphin Embassy” Ant Farm *Source: https://hiddenarchitecture.net/dolphin-embassy/*
	“International Ocean Station”, Open_Sailing, Cesar Jung-Harada *Source: https://flic.kr/p/7Dbimz* Also see: https://flic.kr/p/98YJof

Phase 2: Working with local community (Oct 2023, La Union)

In La Union, co-creating a multi-functional model of what an International Ocean Station could be like at sea.

Phase 3: Collaboration with ocean scientists (Nov 2023, Manila)



Ideally the exhibition space would have a high ceiling and 4 anchor points. Electric sockets for custom lighting would be great.
The installation would be about 5m x 7m and 1m in thickness and weight less than 100 kg.
To suspend the installation, we would use nylon fishing wire, which is very light and strong.
The artwork can be treated for fire resistance.

At the Mind Museum, continuing to co-create the “floating” International Ocean Model with an urban audience

Phase 4: General public interactive exhibition (Nov 2023 onwards, Manila)

Observations

Discussion

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Annex

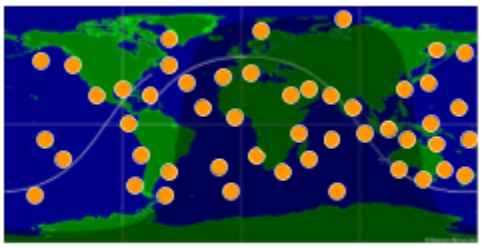
Comparison

1 International SPACE Station

Cost: 100,000,000,000 USD / unit
Countries: United States, Russia, Canada, Japan and 10 of the 20 European nations
Intellectual Property: Secret

100+ International OCEAN Station

Cost: 100,000, USD / Unit (1 million times cheaper)
Countries: All
Intellectual Property: Open Science



Tentative Schedule

1. Oct 20 (Fri): SG → Manila. 16:00 - 20:00
2. Oct 21 (Sat): 9:00AM Inspect the exhibition at the Mind Museum. Manila → La Union.
3. Oct 22 (Sun): Get situated with the workspace, tools, vehicles (scooters), supermarket, and pharmacy.
4. Oct 23 (Mon): Work Day + Beach Clean up people + Junk collector. Materials gathering.
5. Oct 24 (Tue): Work. + Fishermen Elder +
6. Oct 25 (Wed): Work. + Teacher + Kids +
7. Oct 26 (Thu): Work. + Surf instructors +
8. Oct 27 (Fri) : Work. + Craftsman, Artist, Healer + CURMA day
9. Oct 28 (Sat): Work. + Environmental students + Kid day +

10. Oct 29 (Sun): Work until 11:00. Photo session of the model. Lunch. 16:00 Celebration with the villagers. 19:00. Food & Drinks.
11. Oct 30 (Mon): Rest day
12. Oct 31 (Tue): La Union → Manila (can be moved to later day)
13. Nov 1 (Wed): [All Souls Day] Install at Mind Museum, Makati. (Ocular, physical set up, text and visuals) Prepare visuals.
14. Nov 2 (Thu): [All Souls Day] Install at Mind Museum, Makati. Prepare visuals.
15. Nov 3 (Fri): Install at Mind Museum, Makati. Prepare visuals. Cesar Flies Manila → Doha that afternoon

Mind Museum Staff Install (Nov 2-17/18)

1. Nov 17 (Fri): Cesar arrives back in Manila. Last touches, video & photoshoot, in Makati
2. Nov 18 (Sat): 17:00-19:00: VIP Opening , in Makati
3. Nov 19 (Sun): 15:00-19:00: Official Opening to the public, in Makati