

Underwater Colonization



Underwater Colonization

Torben Riise - 3/1/2018

2

Ocean colonization:

The theory and practice of establishing permanent human settlement of oceans

Underwater Colonization

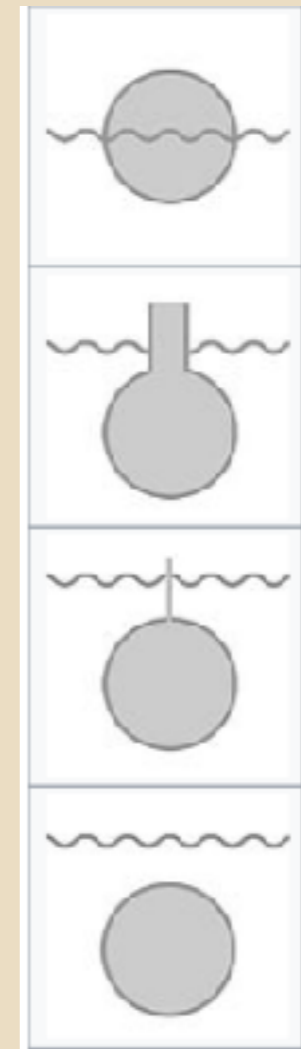
Torben Riise - 3/1/2018

3

Ocean colonization:

The theory and practice of establishing permanent human settlement of oceans

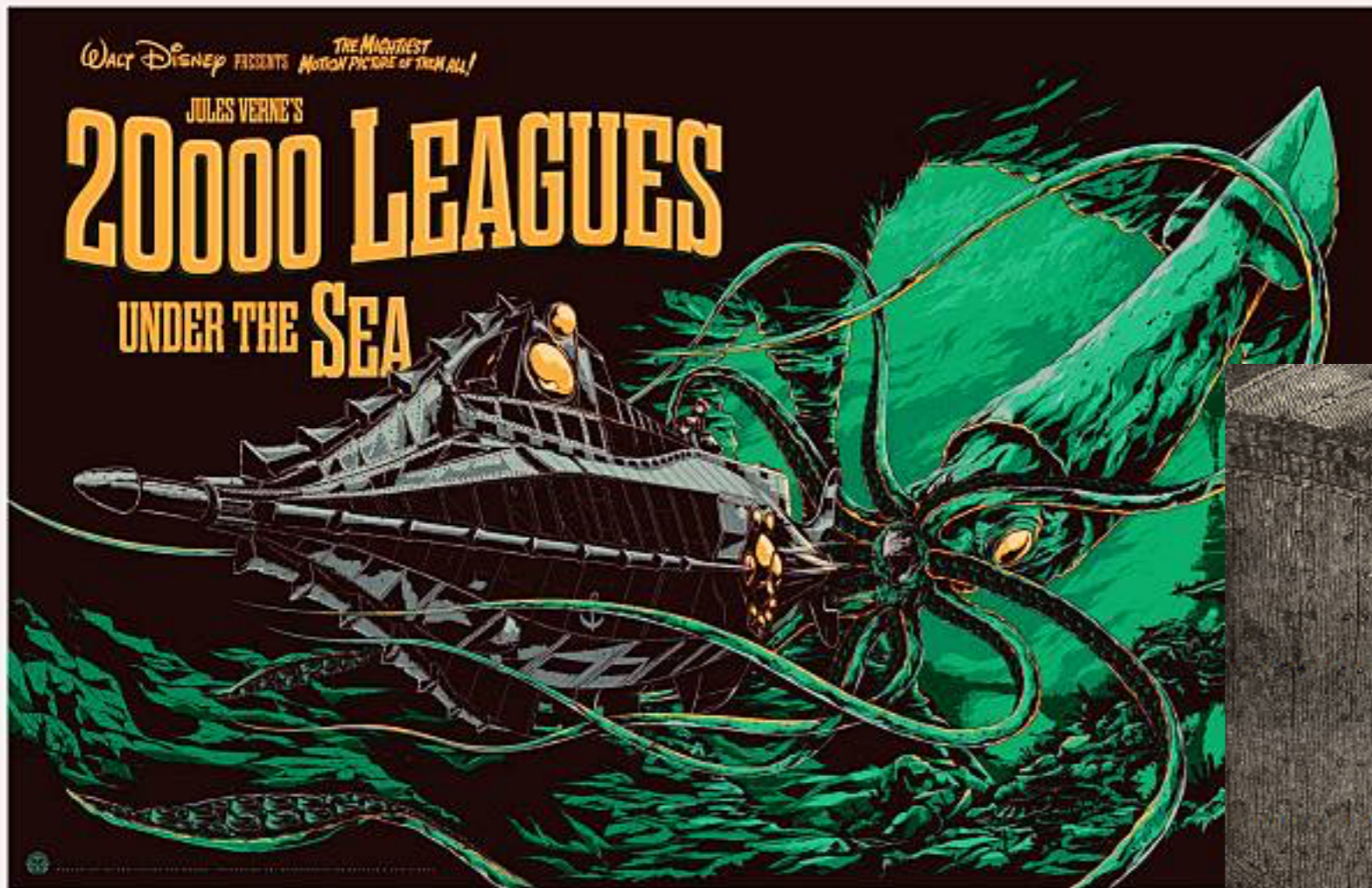
1. Seasteads: floating on the surface
2. Underwater habitats
 - intermediary position
 - secured to ocean floor



Underwater Colonization

4

HISTORY:

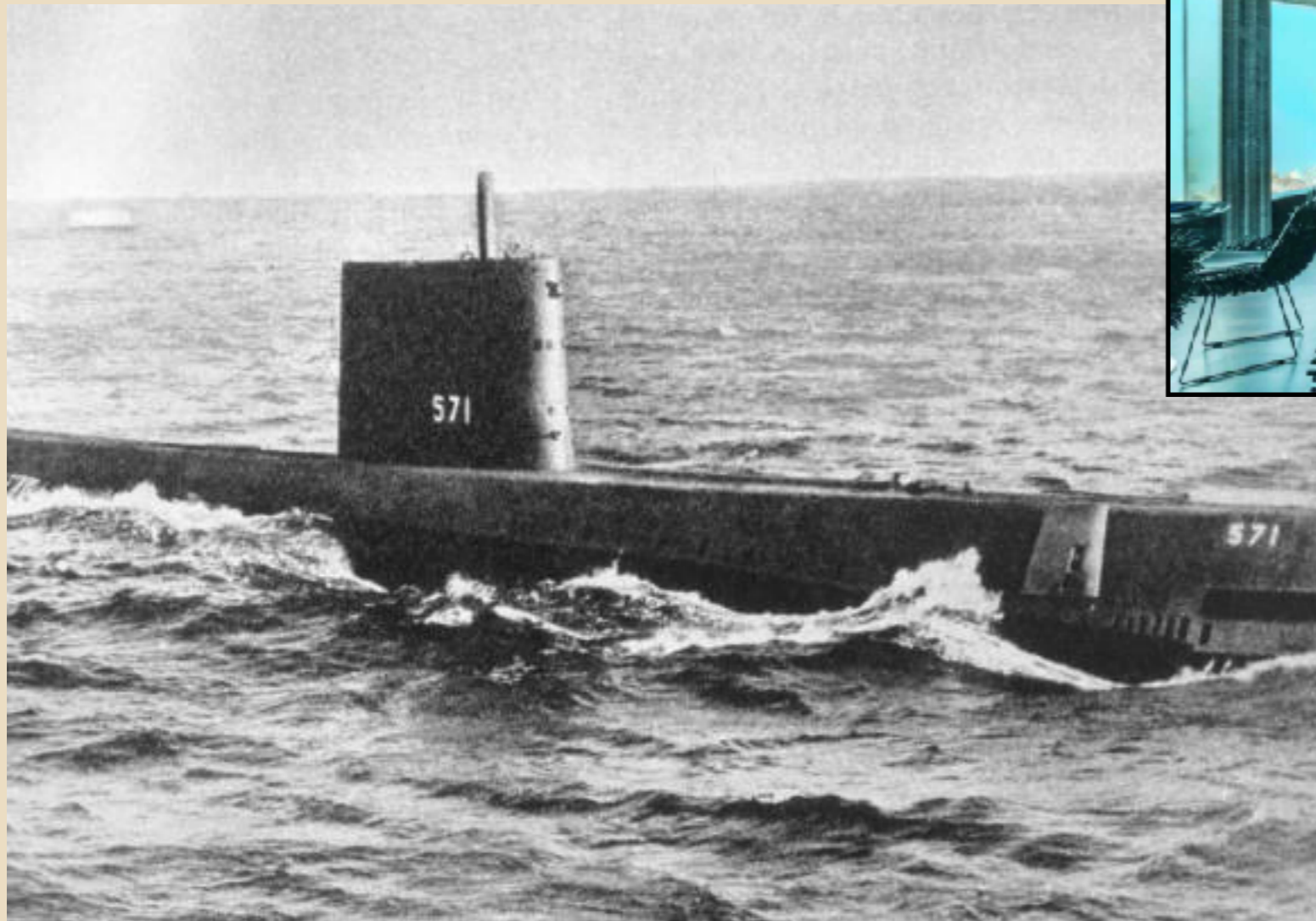


Captain Nemo

Underwater Colonization

5

HISTORY:



Underwater Colonization

6

Why are we even considering ocean colonization?

- Like space exploration - adventure
- “Because it’s there” (Edmund Hillary)
- or . . .

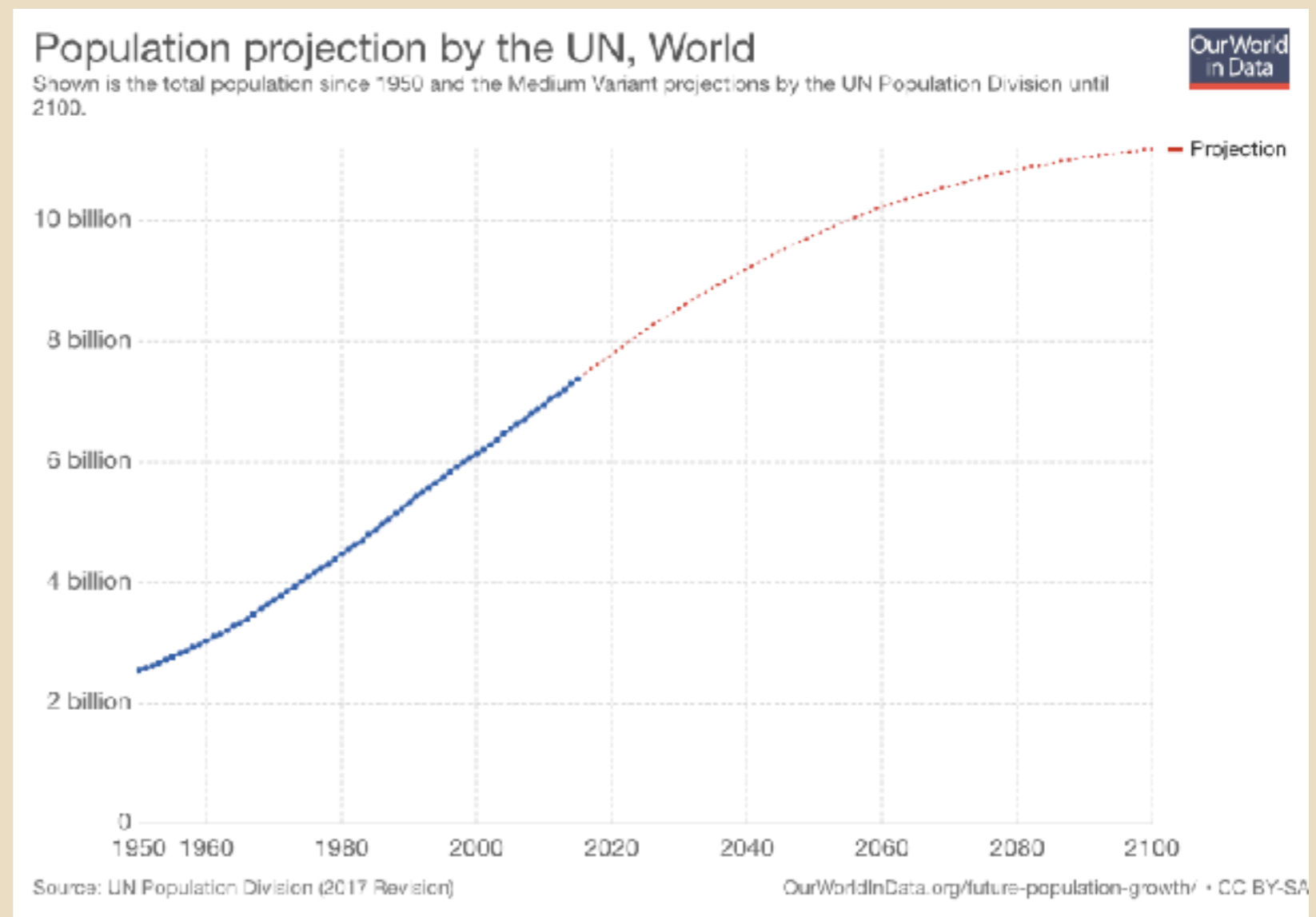
An overcrowded world

7

Facts:

Today, **54%** of the world's population lives in urban areas, increasing to **66%** by 2050 (adding **2.5 billion** people to urban populations)

Currently, 757 million people live in the 100 largest cities in the world, home to 11% of the world's population - by the end of 21st Century, the world population will be (est.) 13 billion with 23% of people (3 bn) living in the 100 largest cities



Urbanization

8

Rank	City	Projected Population (millions) 2025	City	Projected Population (millions) 2050	City	Projected Population (millions) 2075	City	Projected Population (millions) 2100
1	Mumbai 21	40.40	Mumbai	51.40	Mumbai	65.86	Lagos	88.30
2	Tokyo 38	26.39	Dhaka	36.16	Lagos	55.26	Mumbai	83.53
3	Dhaka	22.50	Delhi	35.19	Kinshasa	54.51	Dar es Salaam	73.68
4	Delhi	22.02	Kinshasa	35.00	Delhi	49.34	New Delhi	68.37
5	São Paulo 21	21.43	Kolkata	33.04	Kolkata	45.09	Kinshasa	65.21
6	Mexico City 21	21.01	Lagos	32.63	Karachi	43.37	Dhaka	58.41
7	New York City 18	20.63	Tokyo	32.62	Dhaka	42.45	Khartoum	57.13
8	Kolkata	20.56	Karachi	31.70	Dar es Salaam	37.49	Cairo	56.92
9	Shanghai 23	19.41	New York City	24.77	Cairo	33.00	Manila	56.75
10	Karachi	19.10	Mexico City	24.33	Manila	32.75	Kolkata	56.14
11	Kinshasa	16.76	Manila	24.26	Chennai	32.67	Chennai	54.23
12	Buenos Aires	16.50	Cairo	24.04	Khartoum	30.68	Abuja	50.30
25	Lahore	10.51	Bangalore	15.62	Kampala	20.23	Tokyo	55.25
13	Lagos	15.80	Bogota	23.55	Nairobi	28.42	New York	27.49

Expanding into/onto the ocean

9

WHY:

- **Expansion of livable area**
- Access to underwater resources
- Recreational activities
- Micro-nations (novel forms of governance)

Micronations' activities are almost always trivial enough to be ignored rather than challenged by the established nations whose territory they claim. Several micronations have issued [coins](#), [flags](#), [postage stamps](#), [passports](#).
Example: Principality of Sealand - 6,000 sq.ft.

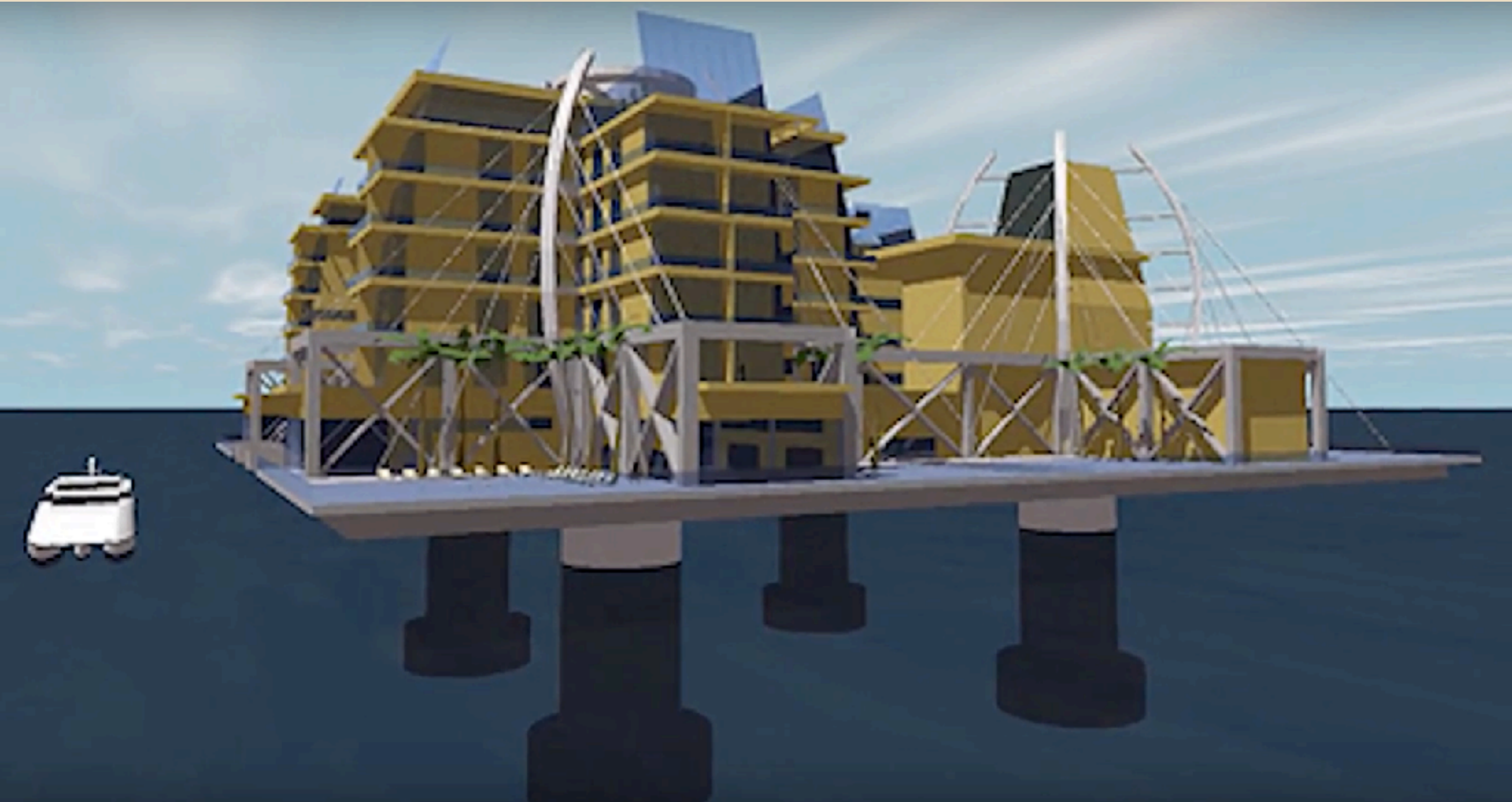
<https://www.youtube.com/watch?v=KEfg5vpDJRk>

<https://www.youtube.com/watch?v=3Y5DuP2vbag>



Ocean Colonization

10



Ocean Colonization

11



Ocean Colonization

12

https://futurism.com/videos/watch-heres-how-we-can-build-cities-that-literally-float/?utm_source=Digest&utm_campaign=1195e2e13f-EMAIL_CAMPAIGN_2018_02_28&utm_medium=email&utm_term=0_03cd0a26cd-1195e2e13f-246378837&mc_cid=1195e2e13f&mc_eid=731b58f496

Seasteading 101: How to Build the World's First Society-at-Sea | Marc Collins

**Coming to
an Ocean
Near You**



MORE VIDEOS

Seasteading

<https://www.youtube.com/watch?v=UyBPUyRU31o>

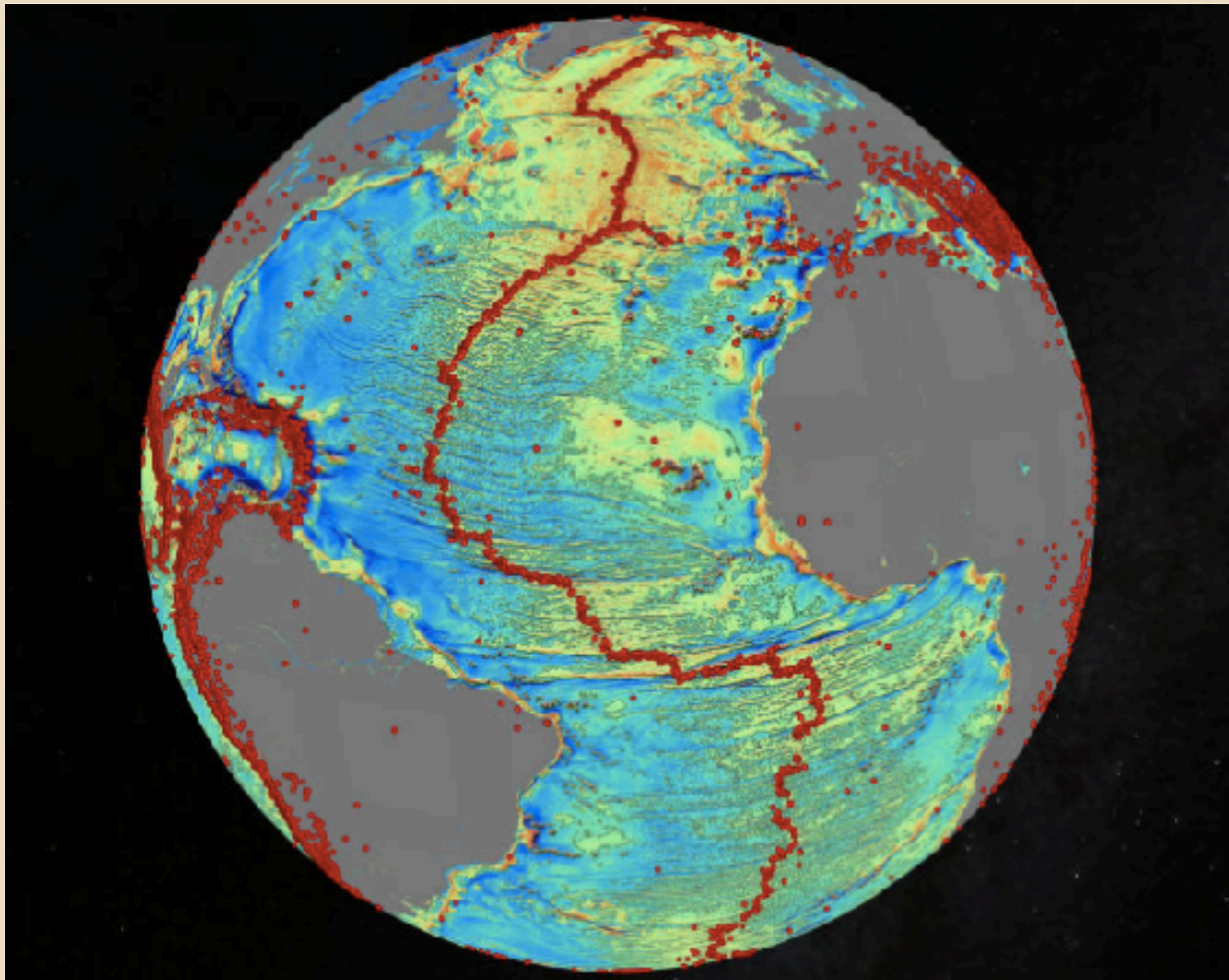
13



Underwater Colonization

14

Where would we want to go?



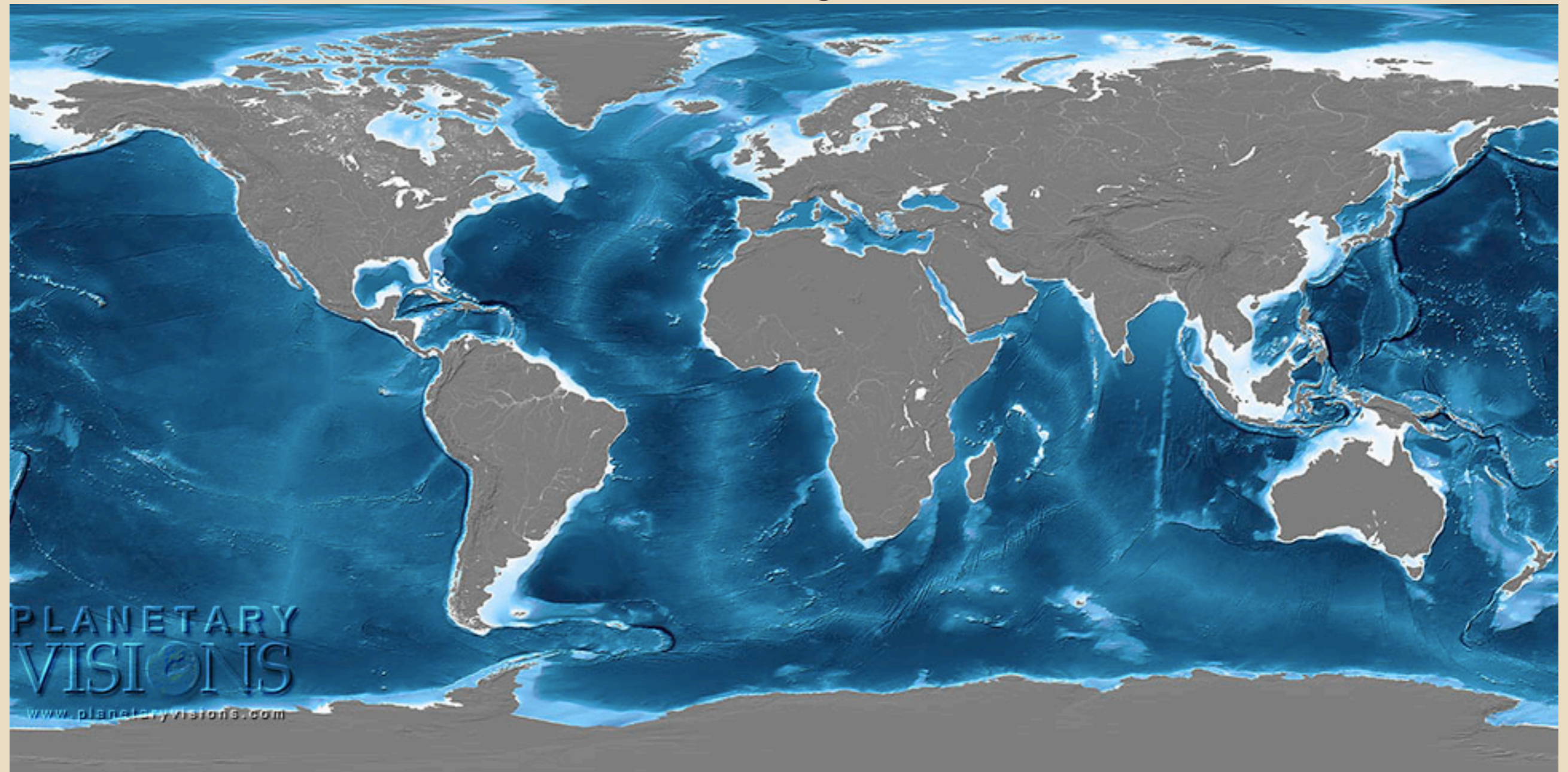
	Area ⁺ (km ²)	% Ocean Area
Arctic Ocean	15,558,000	4.3
Atlantic Ocean	85,133,000	23.5
<i>Baltic Sea</i>	<i>406,000</i>	<i>0.1</i>
<i>Mediterranean</i>	<i>2,967,000</i>	<i>0.8</i>
<i>North Atlantic</i>	<i>41,490,000</i>	<i>11.5</i>
<i>South Atlantic</i>	<i>40,270,000</i>	<i>11.1</i>
Indian Ocean	70,560,000	19.5
Pacific Ocean	161,760,000	44.7
<i>North Pacific</i>	<i>77,010,000</i>	<i>21.3</i>
<i>South Pacific</i>	<i>84,750,000</i>	<i>23.4</i>
South China Sea	6,963,000	1.9
Southern Ocean*	21,960,000	6.1
Total:	361,900,000[±]	100.0

Ocean surface: 362 million sq.mi.
Land surface: 120 million sq.mi.

Underwater Colonization

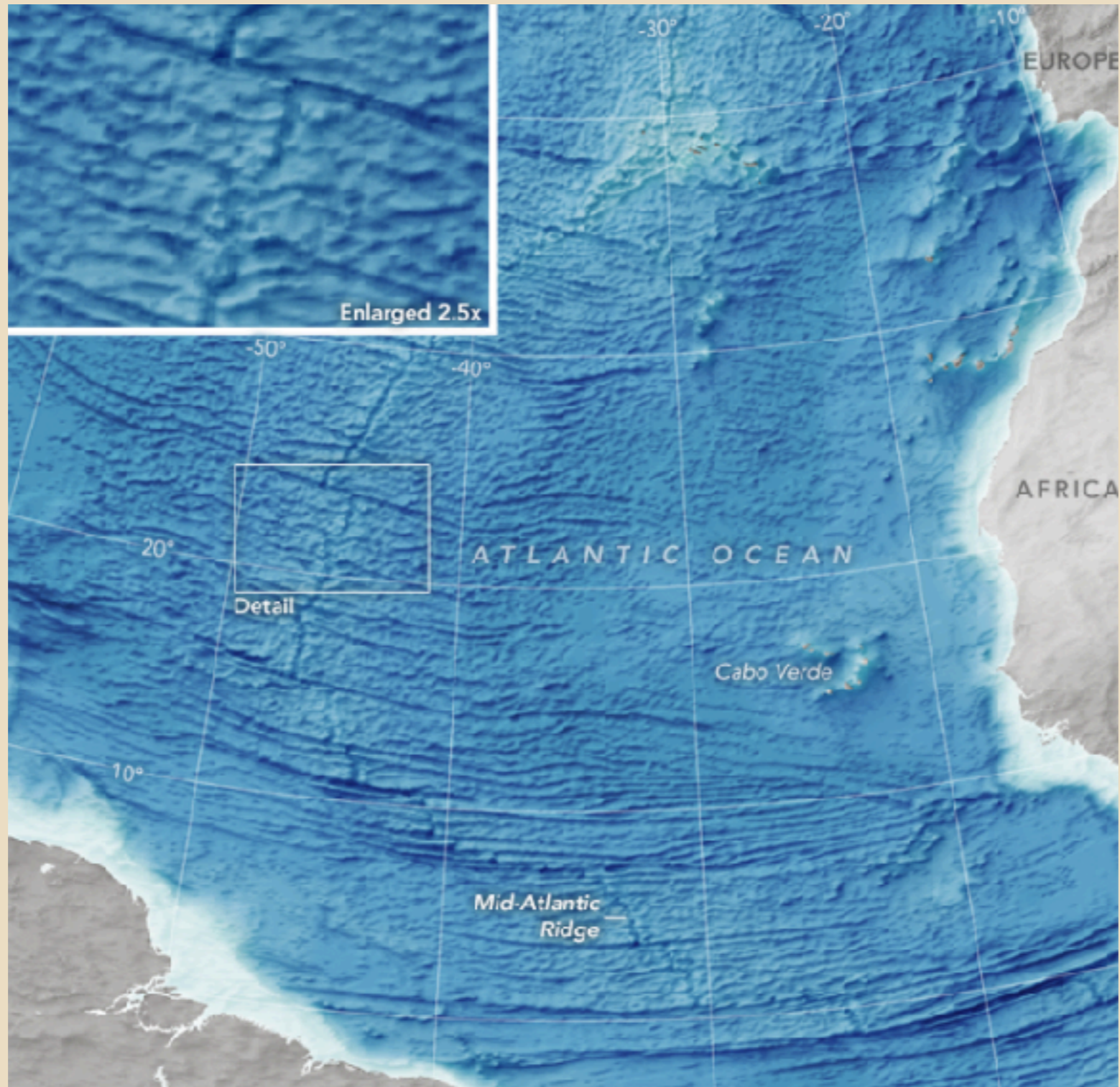
15

Where would we want to go?



Underwater Colonization

16



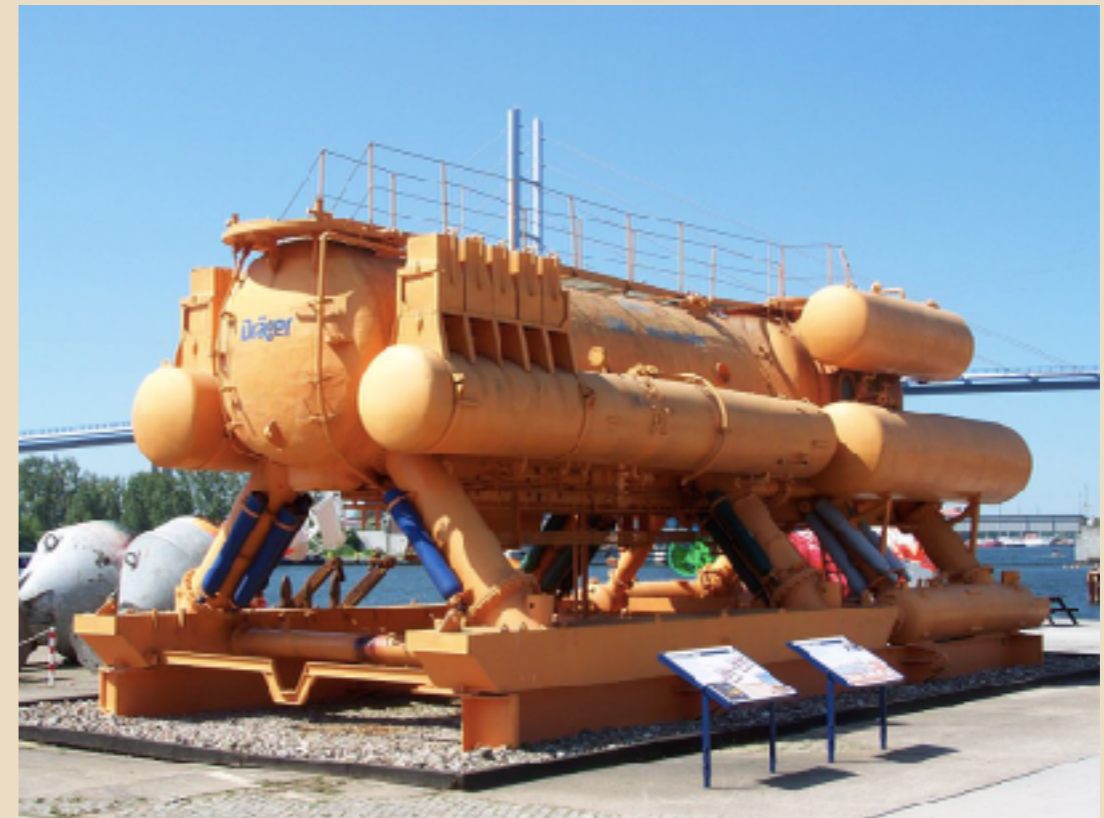
Underwater Colonization

17



Underwater Colonization

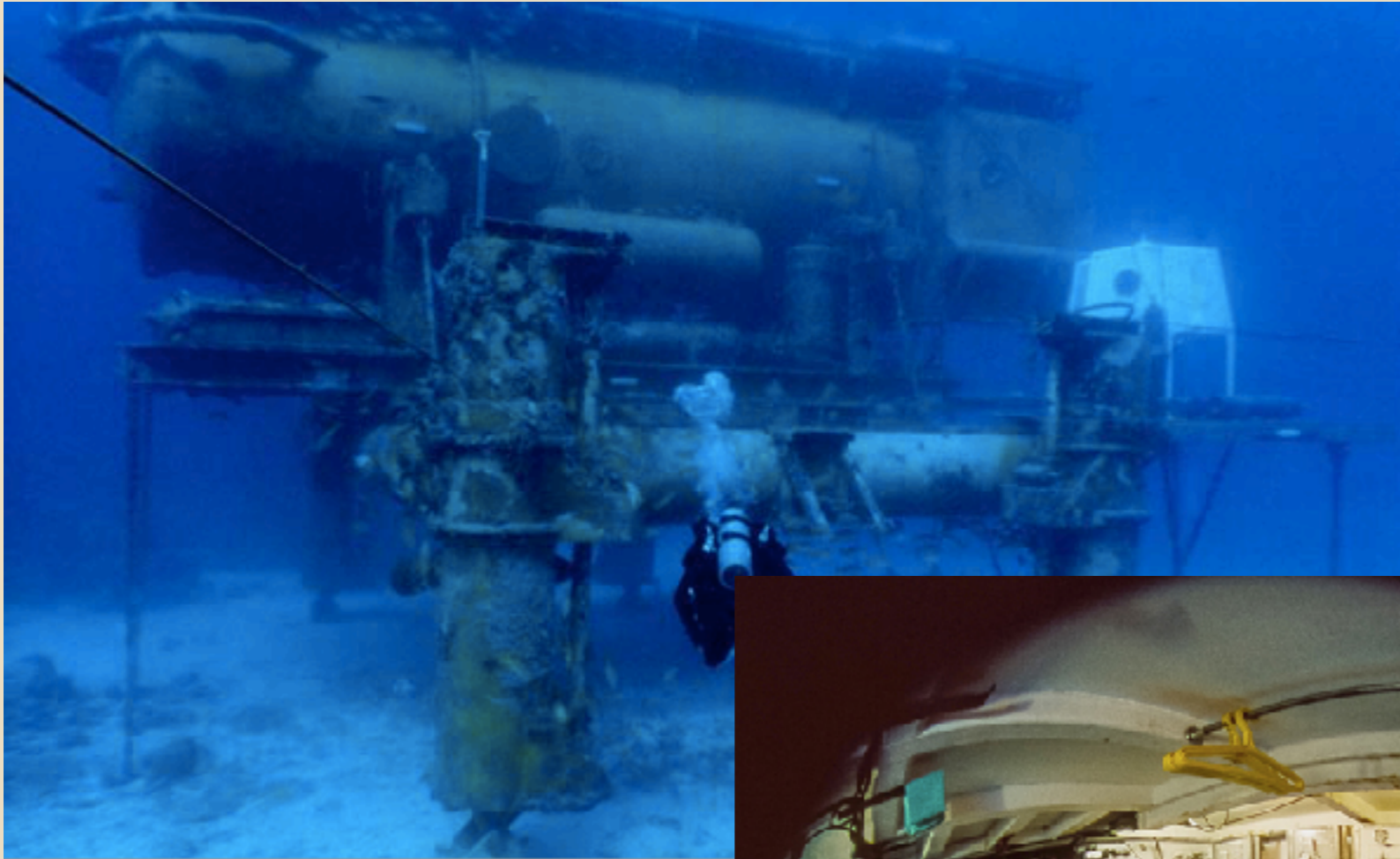
18



Underwater research station

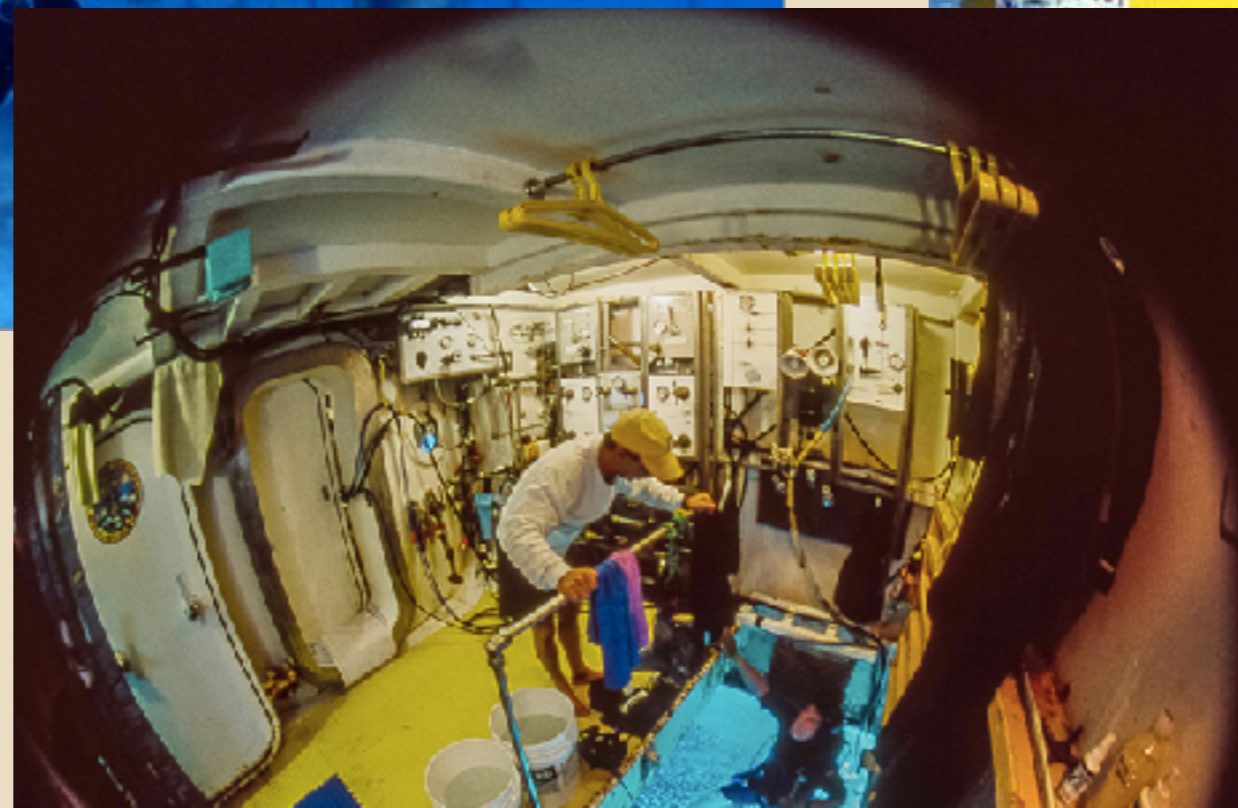
19

Aquarius - Key Largo, FL



Life
support
system

60 ft depth



Is underwater colonization a good idea?

20

What matters?

Compare space traveling
vs underwater colonization

Would You Go?

21

CONCERNS - issues raised during discussions in the forum:

- claustrophobia
- restricted movement - can't drive across the "country"
- social adaptation - can we live together in a confined space
- health - physiological well-being - air/physical issues
- will it have access to high quality health care (hospitals)
- quality of life
- safety/pandemic /diseases in a closed-in area
- pollution (inside/outside)
- will it be only for the rich/well-to-do?

General concern:

- 1) Ocean colonization could make us appreciate and protect the oceans better
- 2) Leave the ocean 'alone' and put the resources into solving the problems that will make ocean colonization necessary!

Compare all that with what "experts say" (on the next two slides) - and see how smart this group is :)

What would it take?

22

Suitable location

- deep enough to isolate us from storms
- accident protected
- ambient light

Construction challenges

- water pressure (1000 ft down means 30+ atm.pressure)
- materials that withstand pressure
- water tight
- assembly underwater?
- self-sufficient
- travel/transportation vehicles

Build a society that can sustain itself

What would it take?

23

An underwater habitat has to

Meet the physiological needs of humans

- breathing air of suitable quality
- pressure, temperature, light, humidity

Have regenerative systems for environmental conditions

- air
- electricity
- drinking water
- food
- waste
- toxins

Provide biological safety

- hazardous sea creatures
- microorganisms/marine fungi

We were right on target!

Seahorse Houses

<https://www.youtube.com/watch?v=VgrPMkU6EJ8>

24



Ocean Colonization

<https://www.youtube.com/watch?v=3Y5DuP2vbag> (Start: 1:33)

Underwater Colonization

26

Thank You!