St. Pete INNOVATION DISTRICT

STATE OF SCIENCE

January 11, 2023

Alison Barlow

Executive Director

St. Petersburg Innovation District

Collaboration is Fueled by Proximity

Ken Welch

Mayor

City of St. Petersburg

Gina Driscoll

City Council

City of St. Petersburg

Christian Hardigree

Regional Chancellor

University of South Florida St. Petersburg

ST. PETERSBURG INNOVATION DISTRICT

Mission

To develop St. Petersburg into an environment that
fosters job growth,
economic development, and
learning and inspiration
by bringing innovative people and organizations together.

Pillars

Marine Science

Life Science

Data & Technology

Art

Entrepreneurship

Education

2022 Accomplishments

1	32K SF shared space – The HUB
2	National Awards
38	Collaborative Events
87	Articles about the District and our Partners
180+	Youth Engaged
$410K	Grant Funding

2022 Accomplishments

- Launched District Master Planning
- Secured the future for our Digital Inclusion Effort
- Explored creative solutions for Daycare, Workforce Housing and Cohort-based Technology Internships
- Installed the District Monument Signs/Banners

2023 Way Ahead

- Continue the District Master Plan development
- Maximize the Maritime and Defense Technology HUB
- Pursue transformational funding for the New Blue Economy
- Strengthen our capabilities as a District

OUR PROGRAM

5 Speakers x 6 Minute Each

In-person participants will have an opportunity to ask questions of the presenters at the Reception

THEME

Dive Deeper

Mary Losacco

Bayfront Health
St. Petersburg

VizAI
Innovation Technology

BAYFRONT HEALTH
St. Petersburg

Mary Losacco, MSN, RN, SCRN

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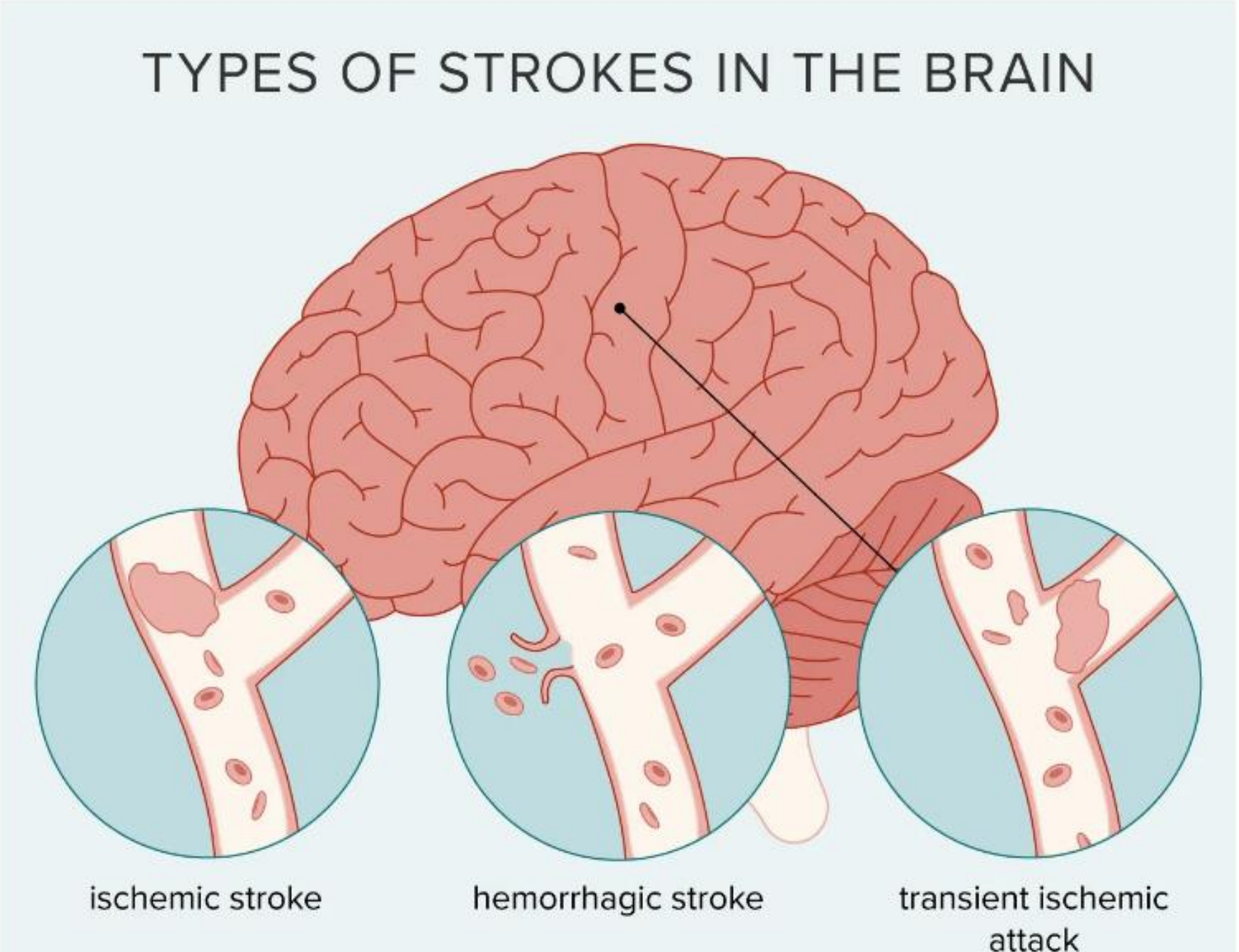


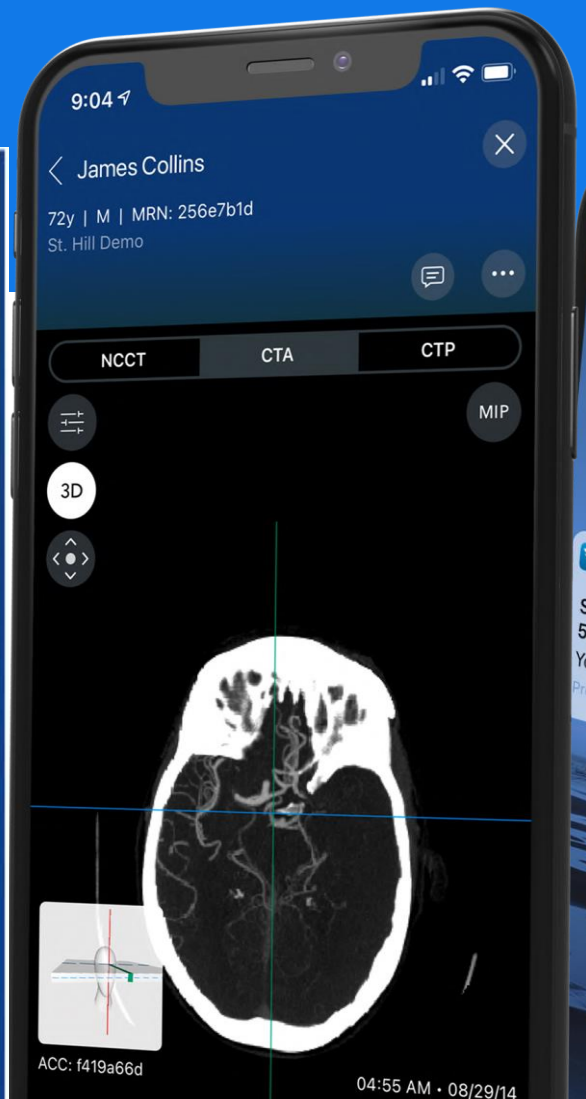
©2020 Bayfront Health St. Petersburg. All

Time is Brain

B	E	F	A	S	T
Balance	Eyes	Face	Arms	Speech	Time
Does the person have a sudden loss of balance?	Has the person lost vision in one or both eyes?	Does the person's face look uneven?	Is one arm weak or numb?	Is the person's speech slurred? Does the person have trouble speaking or seem confused?	Call 9-1-1 now!

The Viz Platform

Viz.ai



Proven Time Savings Across the Continuum of Care

102.3 minutes saved in door-in door-out time[1]

52 minutes faster than standard of care[2]

86.7 minutes saved in door-in to groin puncture[3]

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Viz.ai | BAYFRONT HEALTH St. Petersburg

Performance Improvement

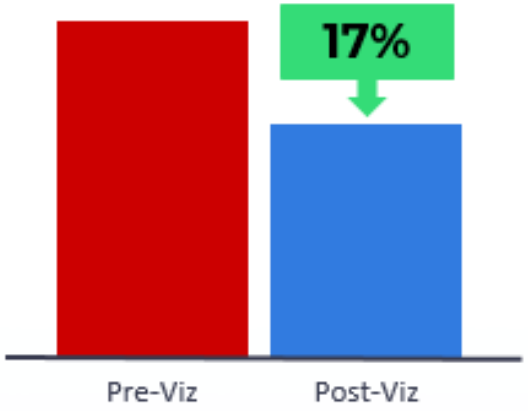
AI Powered Stroke Care Coordination

Background

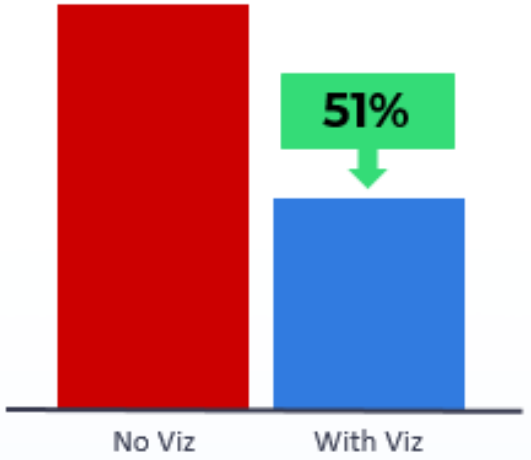
- 363-bed hub hospital in the US Southeast.
- Region serving ~160,000 patients annually.
- Viz was implemented on June 15, 2022.

Results after using Viz for 6 Months:

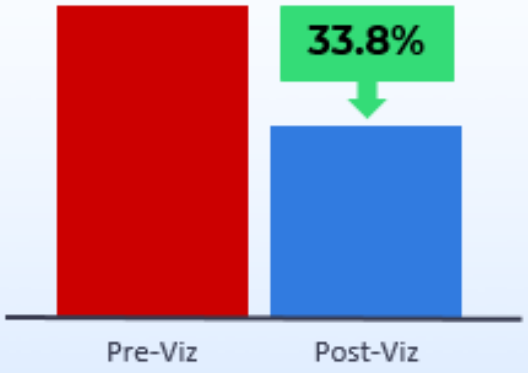
Median DTP (in min)



Door-to-CTA PACS Interpretation (in min)



Median DTN (in min)



Dr. David Rosengrant

USF College of Education

Using Augmented Reality to Help Students Learn Science

Dr. David Rosengrant

Professor of STEM Education

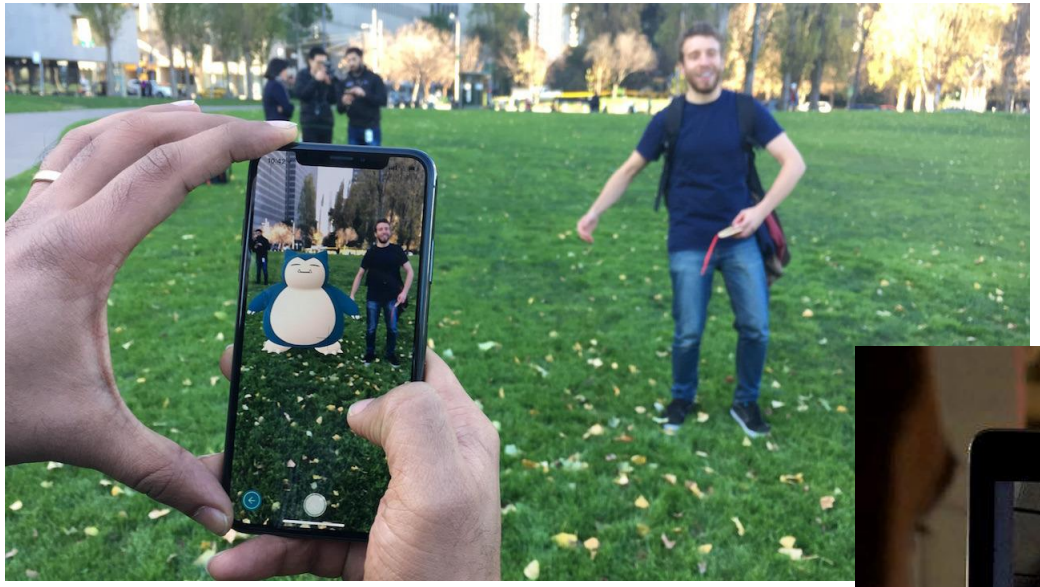
Campus Dean, College of Education St. Petersburg Campus

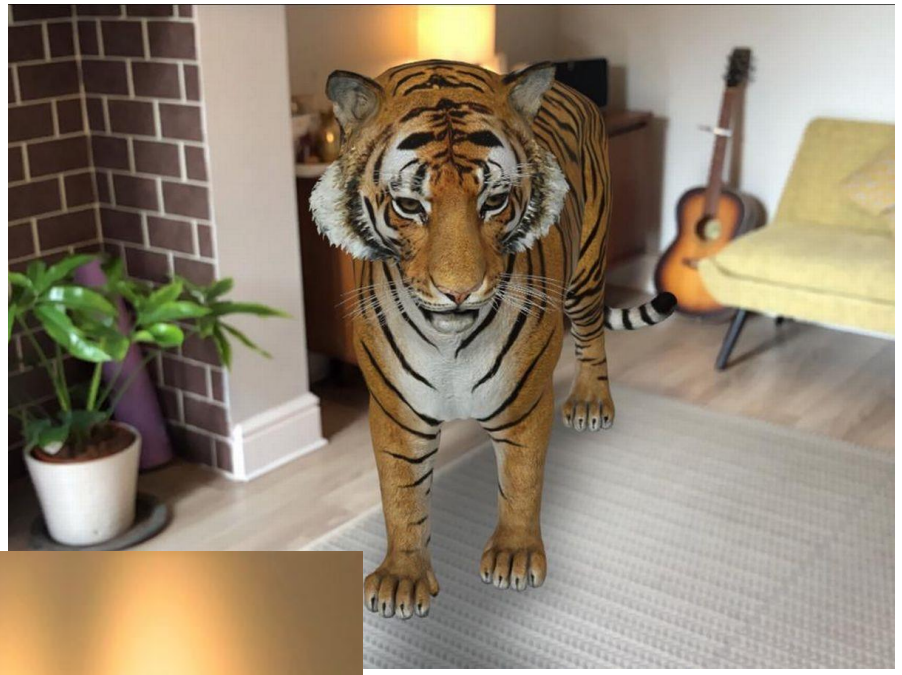
January 11th, 2023

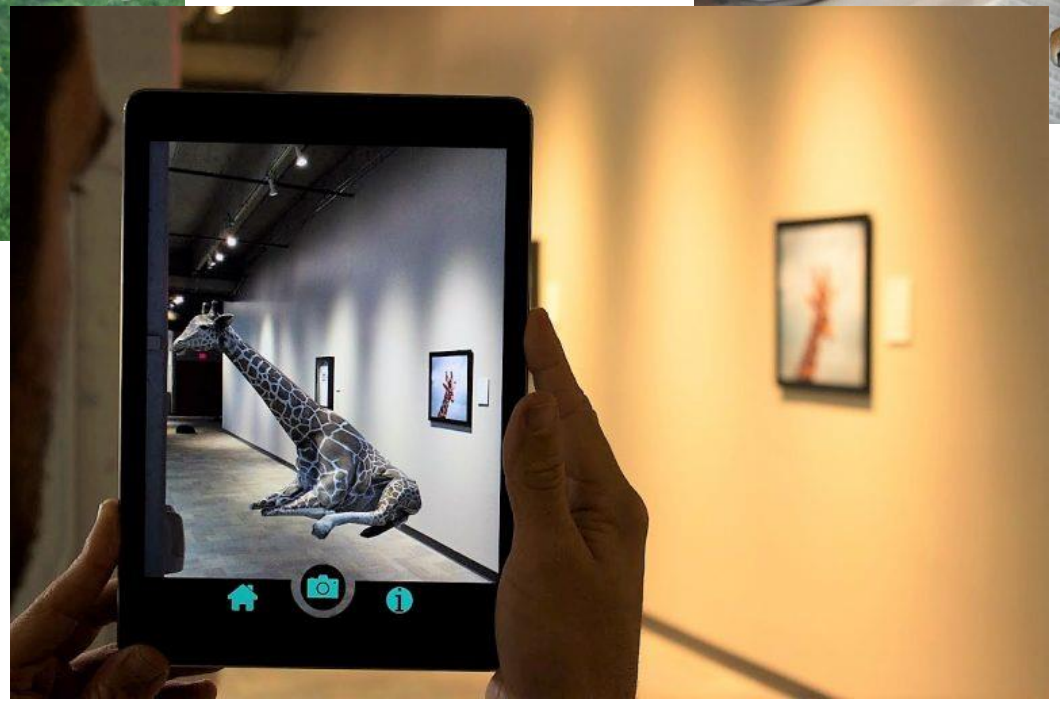
UNIVERSITY of SOUTH FLORIDA
ST. PETERSBURG CAMPUS

"If the technology we are using does not enhance the learning experience in some way, then don't use it."

What is Augmented Reality?







But Why AR?

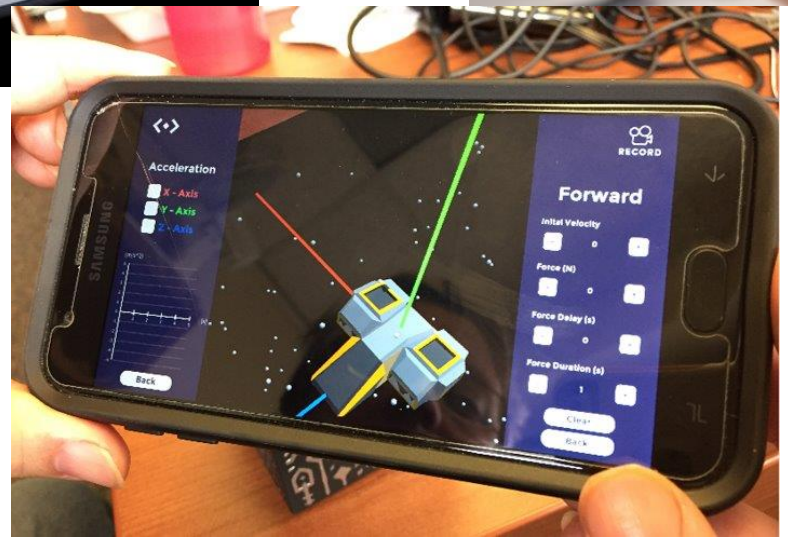
Senses

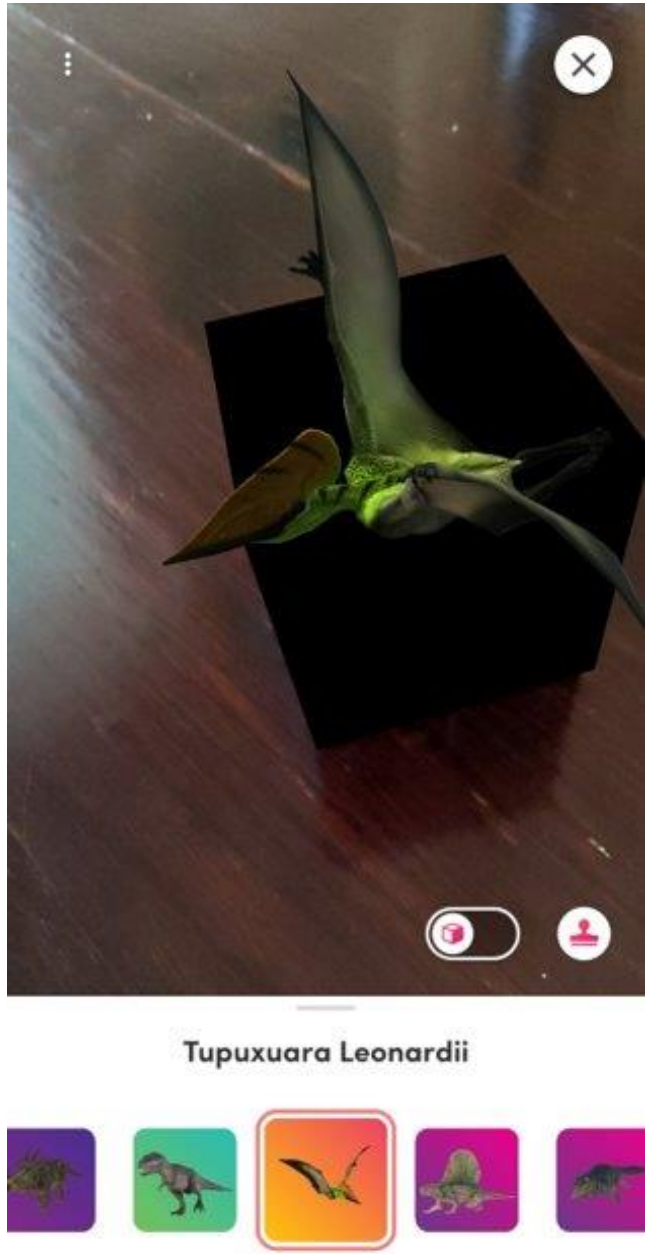
- Touch
- Sight
- Sound

Their World

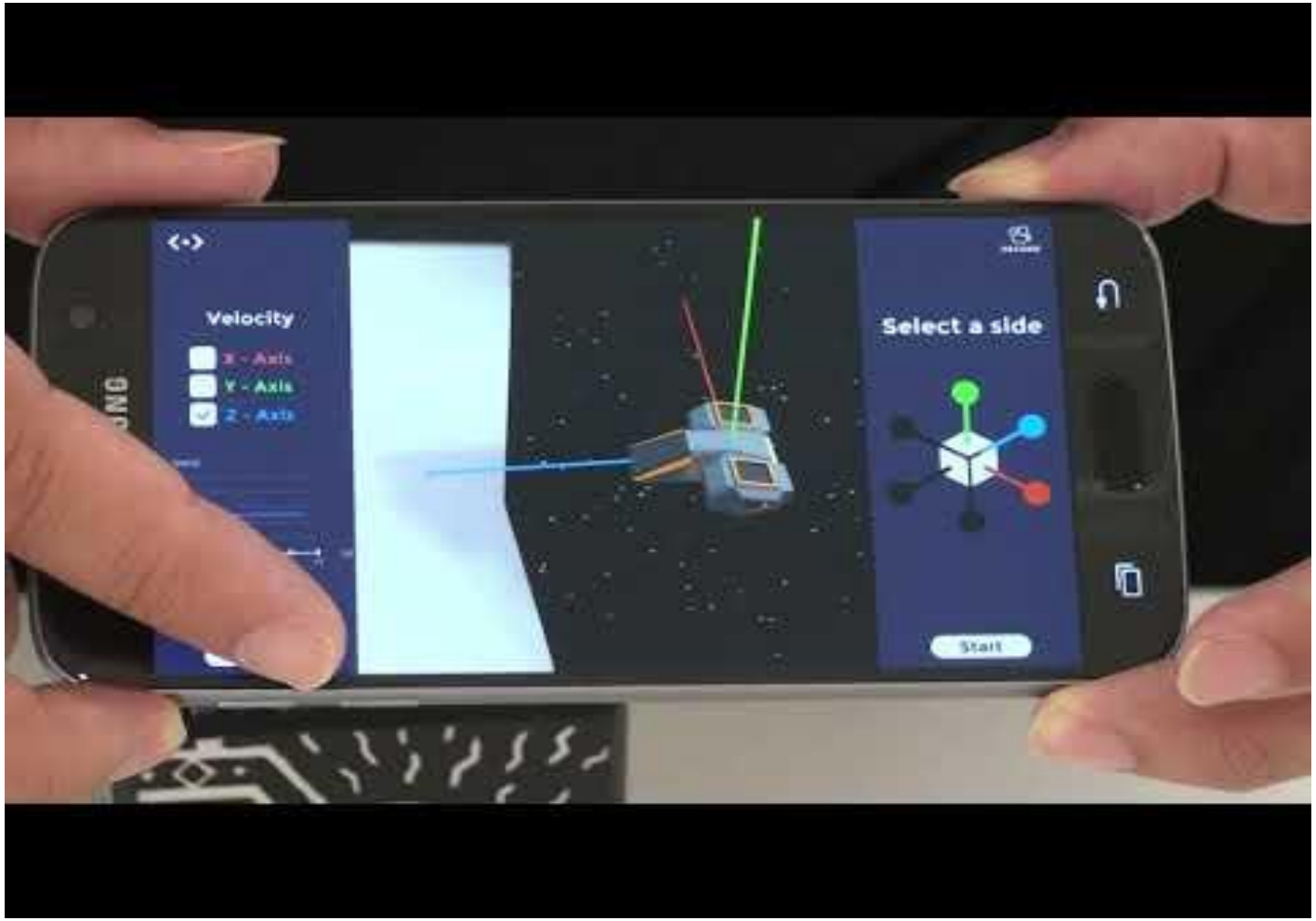
Merge

MERGE


Acceleration
X - Axis
Y - Axis
Z - Axis
RECORD
Forward
Initial Velocity
Force (N)
Force Delay (s)
Force Duration (s)
Back
Clear
Back

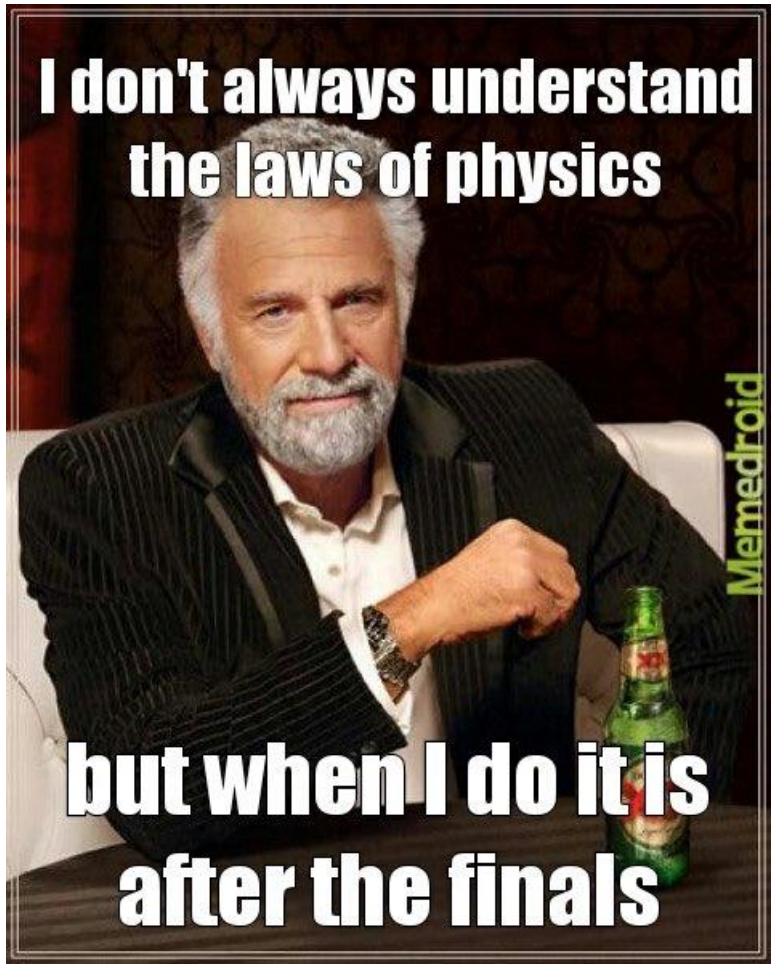

Tupuxuara Leonardii

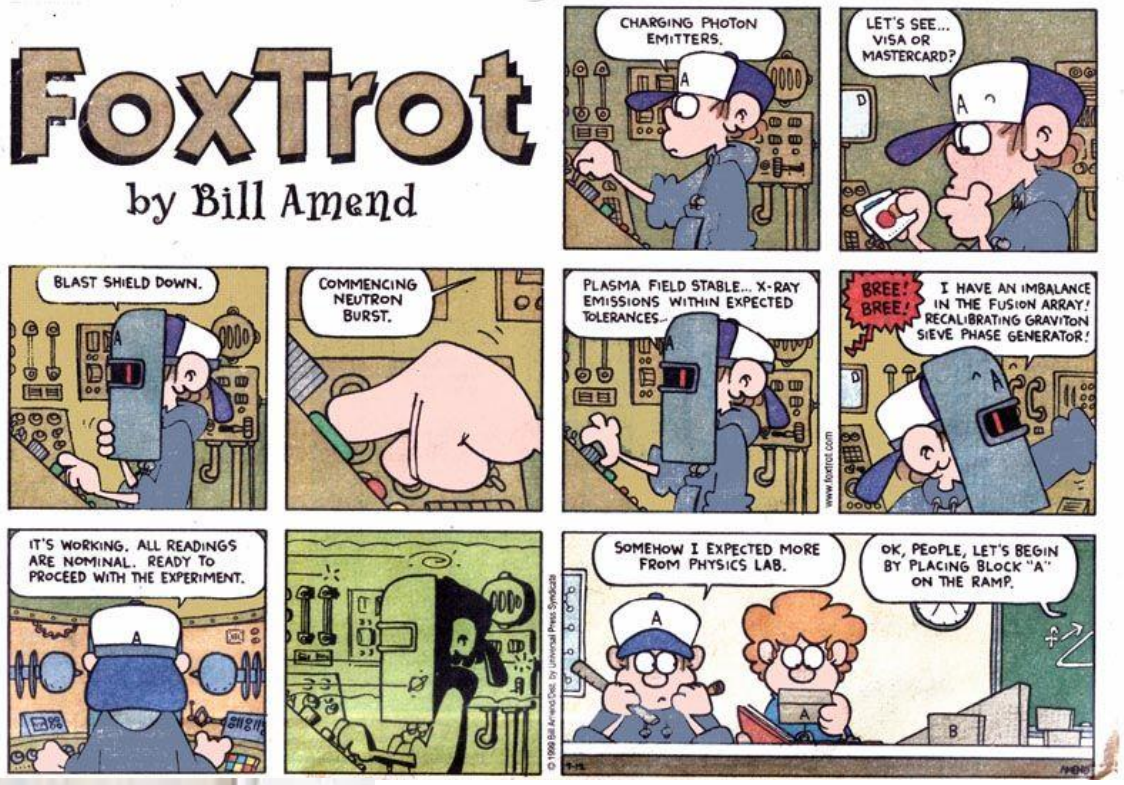
Force Simulation



Newton's Cannon Simulation

Future in Physics





Simulations being developed

- Force
- Gravity
- Rotational Motion
- Thermodynamics
- Circuits
- Optics

- Lab / Play Based
- Observations
- Manipulations of Variables
- Testing out Models developed

Natalie Sawaya

USF College of Marine Science

MARINE VIRUSES

How to be small and mighty

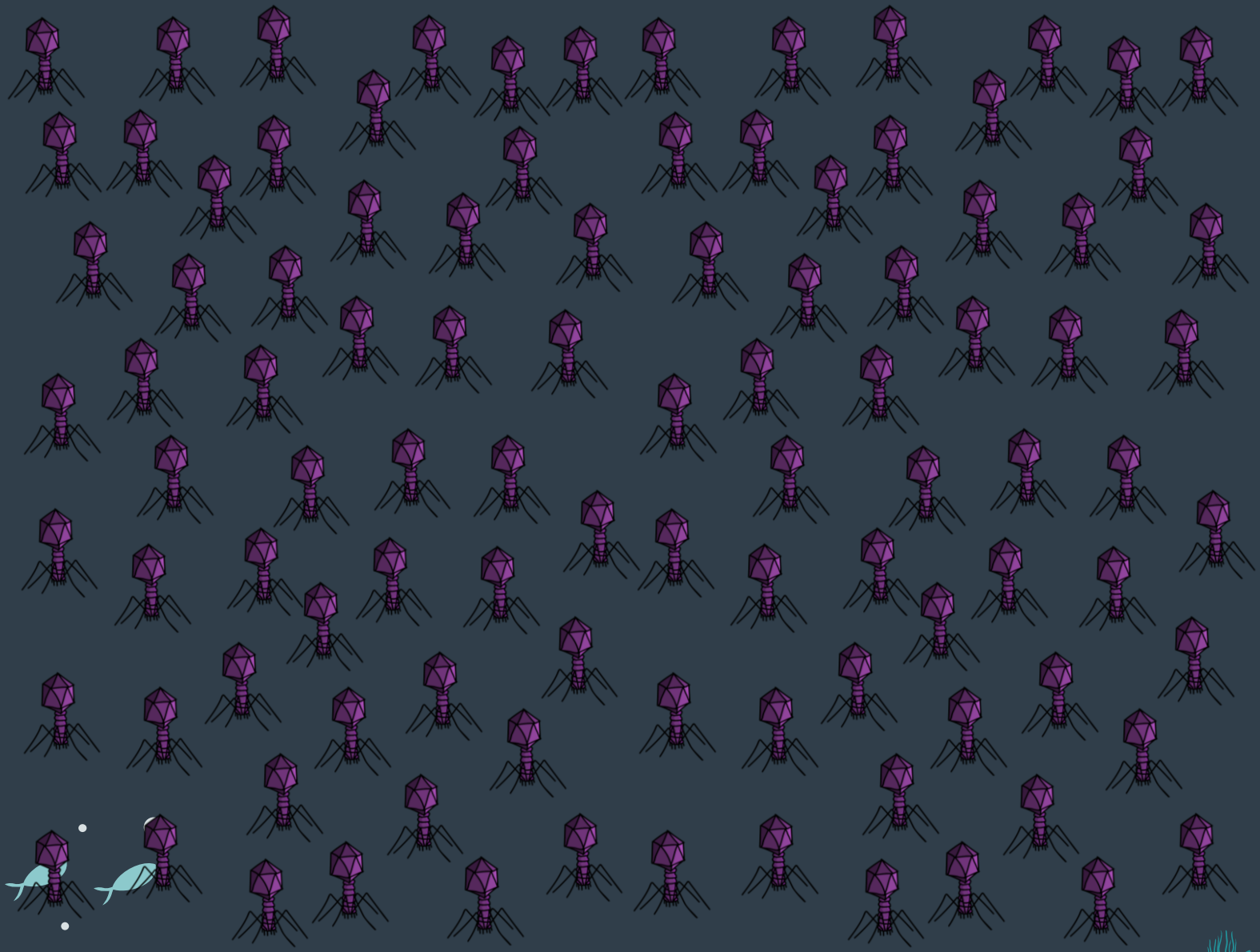
Figure by Natalie Sawaya

Viruses are critical players in the marine environment

Marine microbes: small but abundant

- Present in 1ml of surface sea water:

Marine microbes: small but abundant

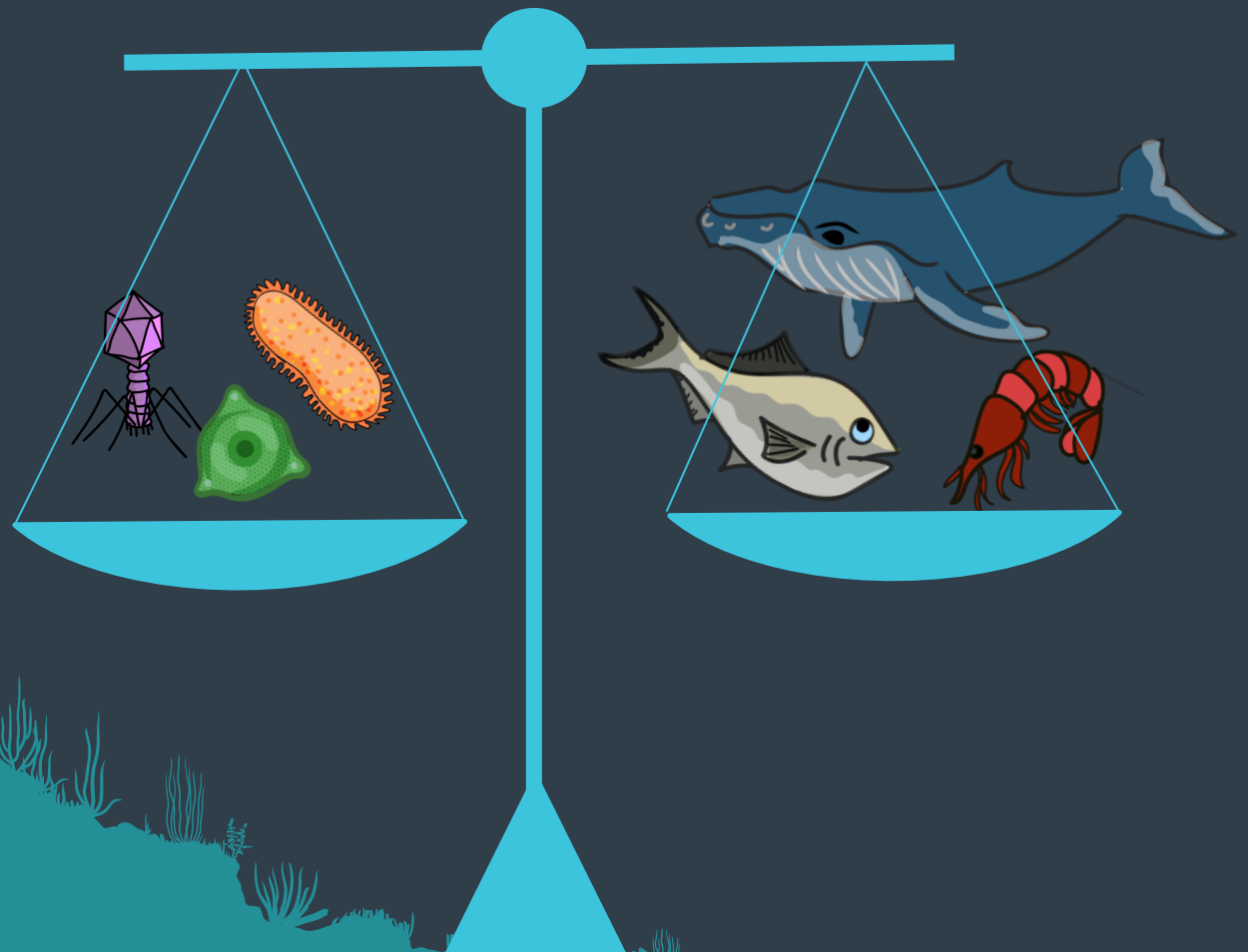


- Present in 1ml of surface sea water:
  - 10,000,000 viruses

Marine microbes: small but abundant

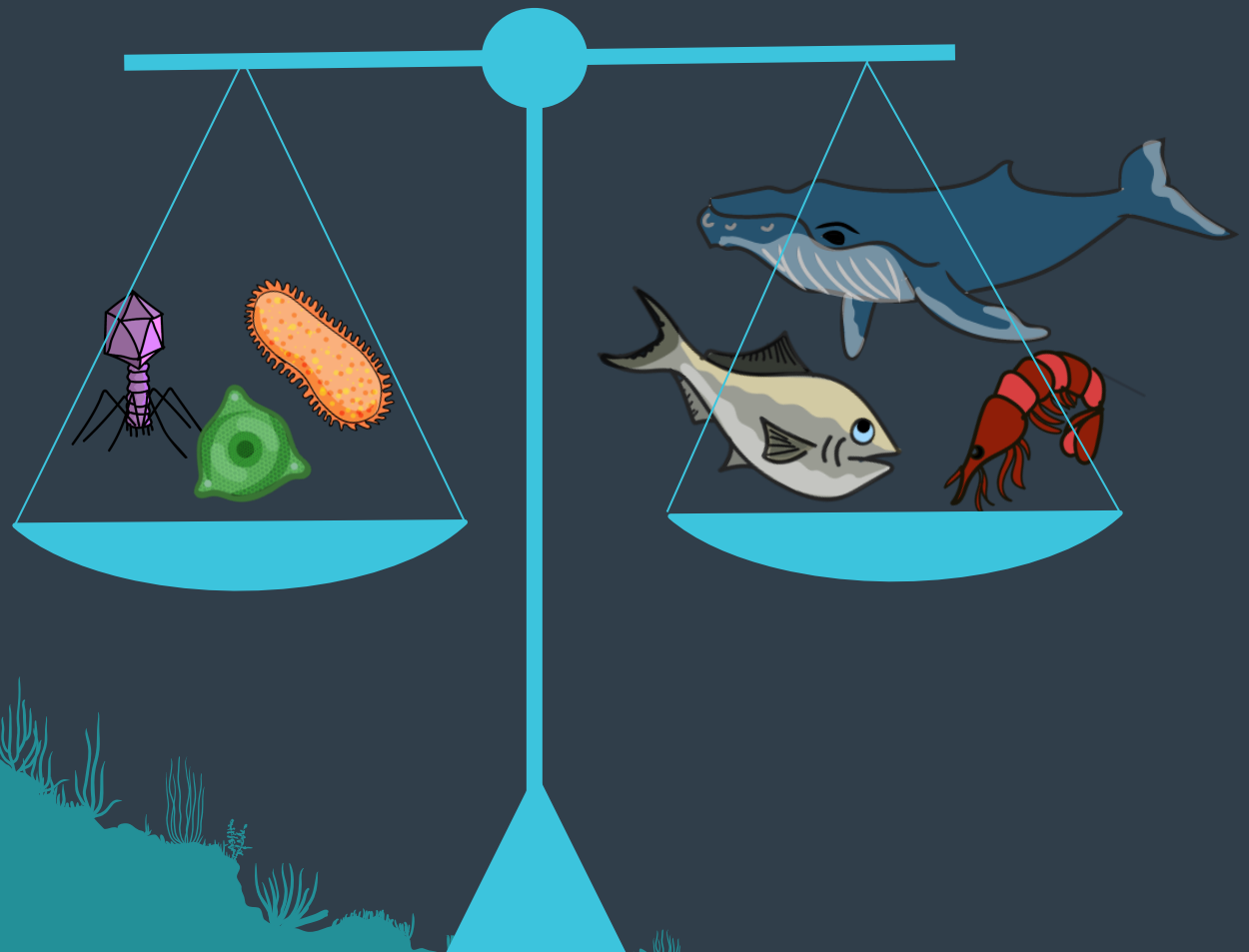
- Present in 1ml of surface sea water:
  - 10,000,000 viruses
  - 1,000,000 bacteria

Marine microbes: small but numerous



Microbes are productive

Marine microbes: small but numerous



Microbes are productive

- The entire microbial food web is 5-10x bigger than the mass of all multicellular organisms in the oceans!

Viruses are important for nutrient cycling

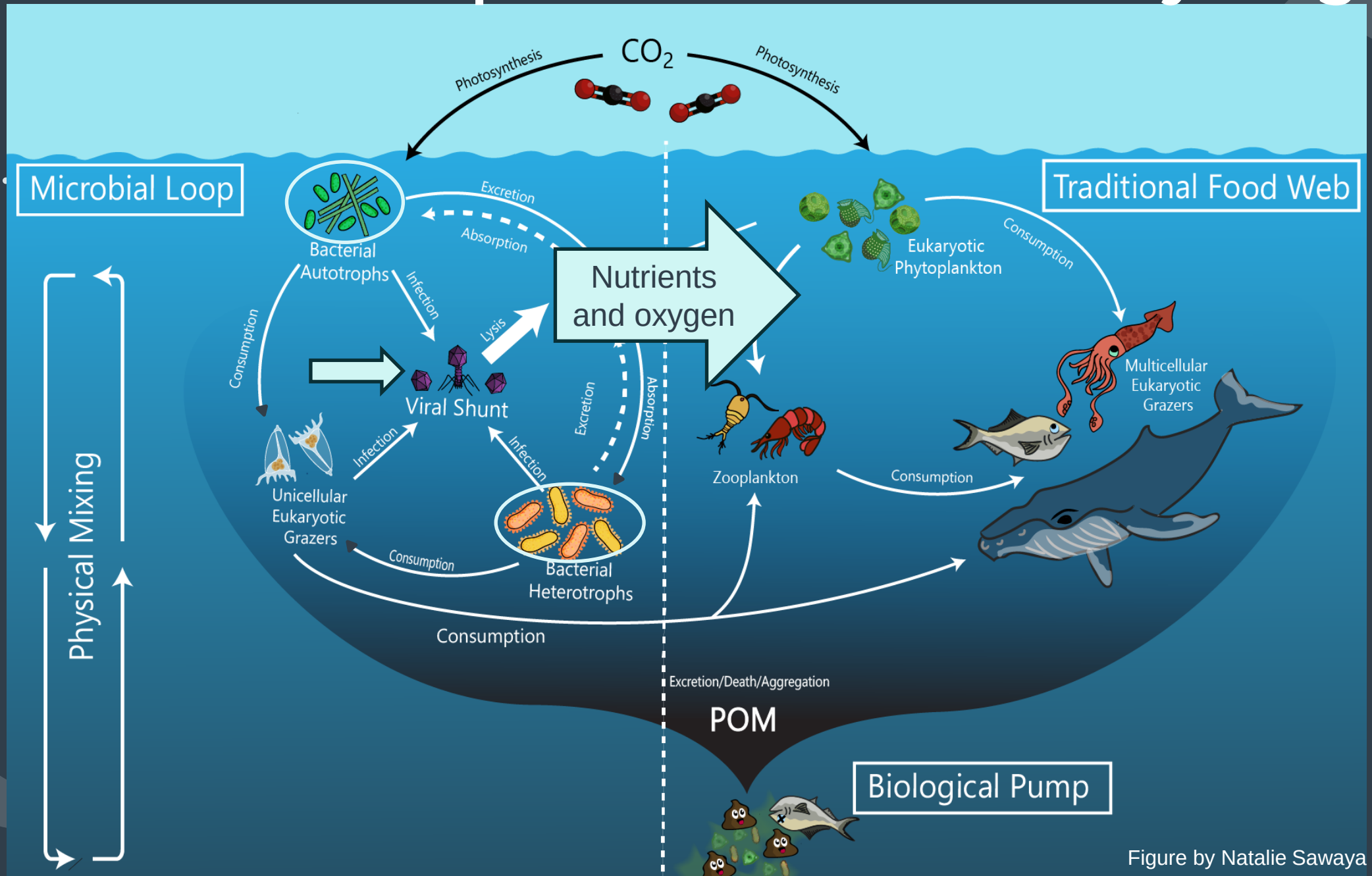
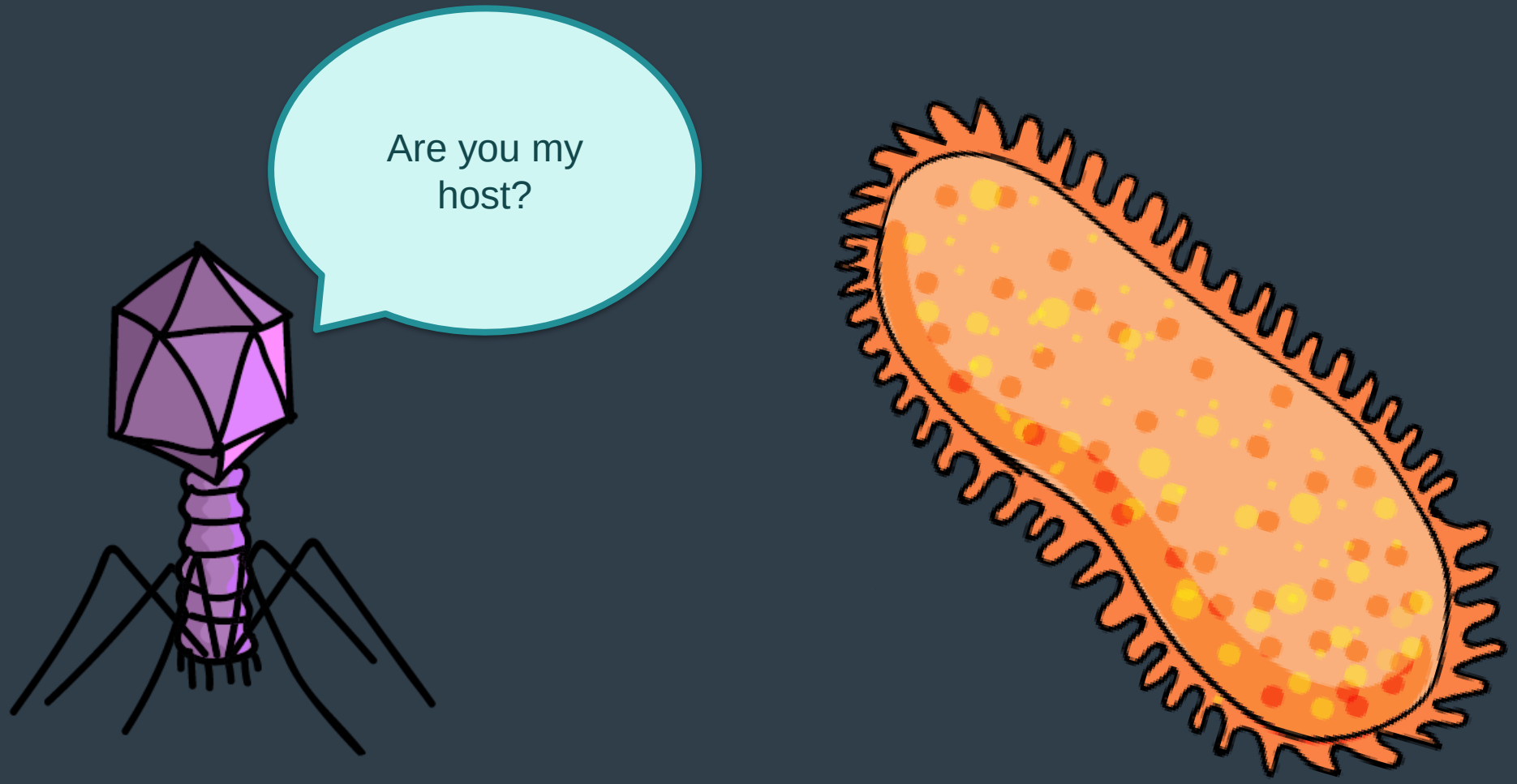
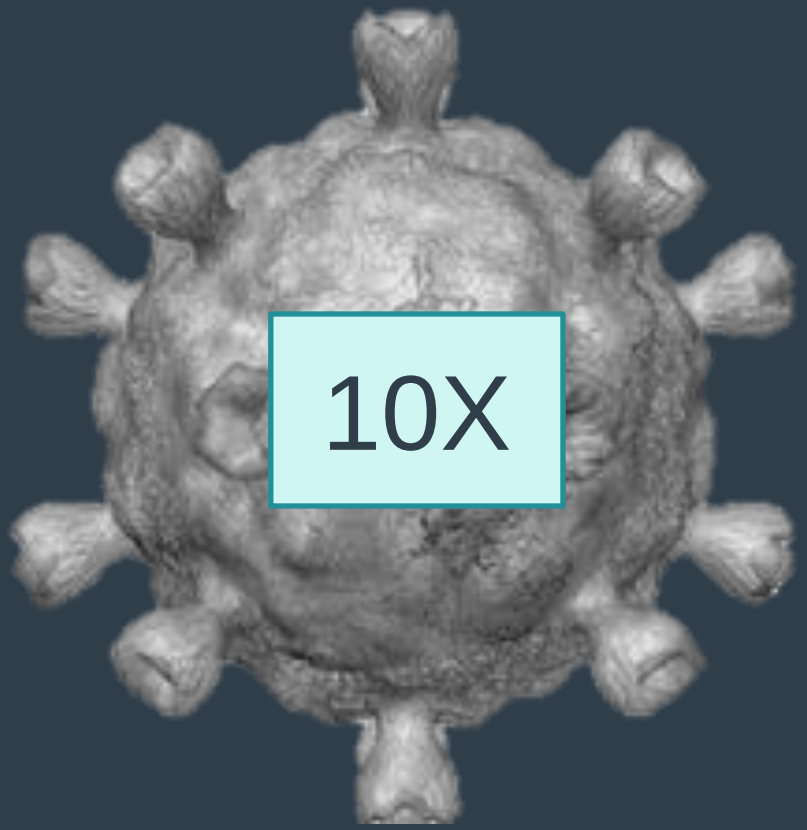


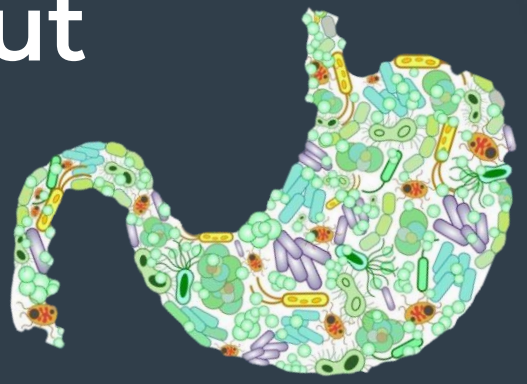
Figure by Natalie Sawaya

It can be difficult to identify the host of a virus



Gokushoviruses are small but found everywhere

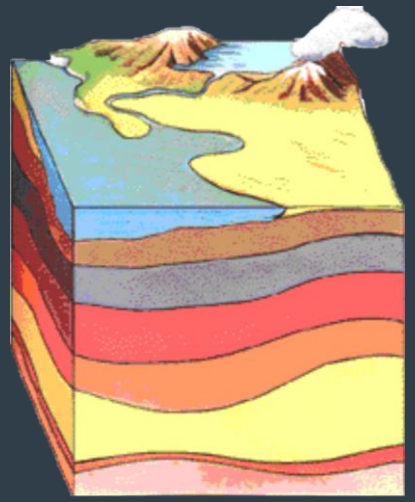




Human and animal guts

Lakes and springs

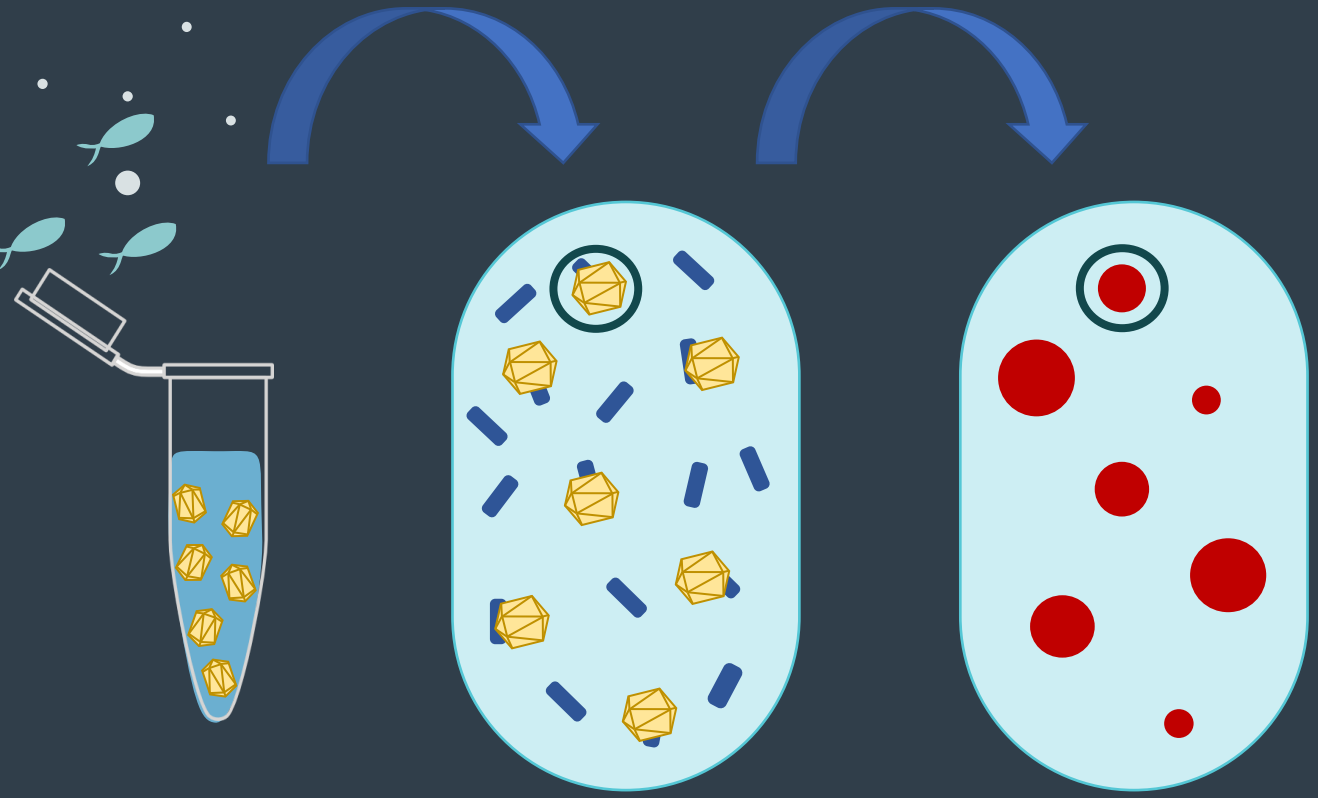
Ocean



Sediment

Which suggests they play an important role

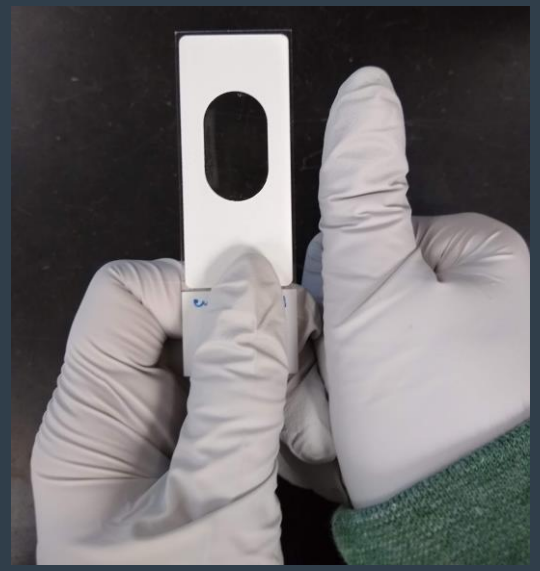
New method allows for first quantification of gokushoviruses



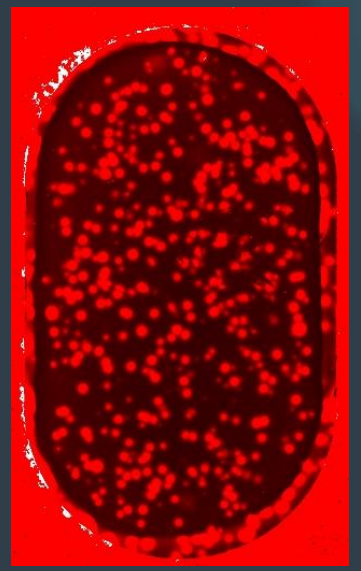
Sample with viral particles

Gel with viral particles and replication reagents

Fluorescent probe hybridizes to viral DNA

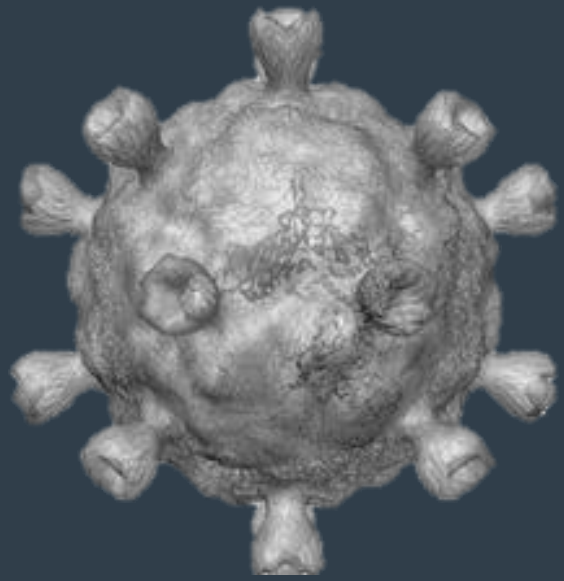


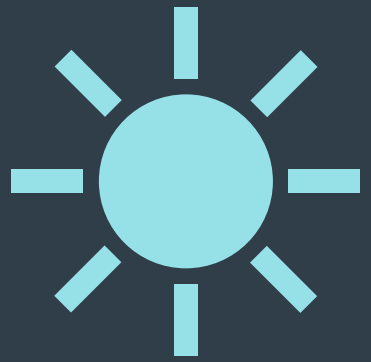
Gel (with viruses) is the size of a thumb

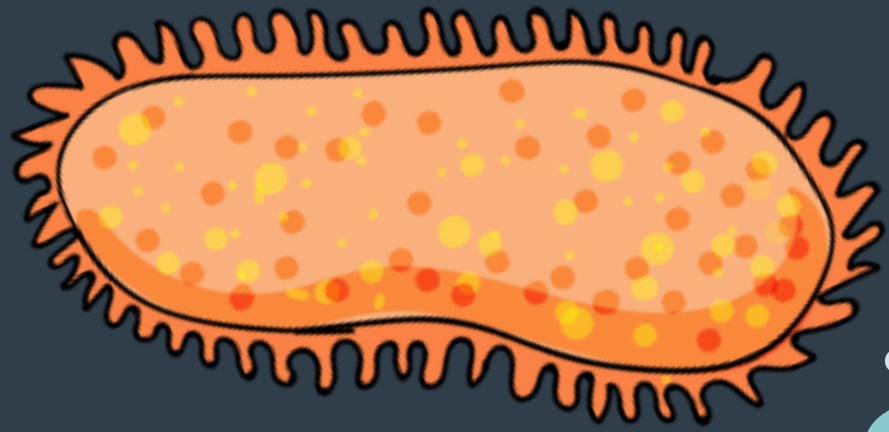


Tagged viruses

Finding hotspots of gokushovirus will help link to host







Method development takes time and dedication

Method development takes time and dedication

Obstacles are a part of science,
but collaboration, perservence, and funding
results in progress

First to quantify gokushoviruses!

environmental microbiology

Environmental Microbiology (2021) **23**(11), 6622–6636 doi:10.1111/1462-2920.15805

Adaptation of the polony technique to quantify *Gokushovirinae*, a diverse group of single-stranded DNA phage

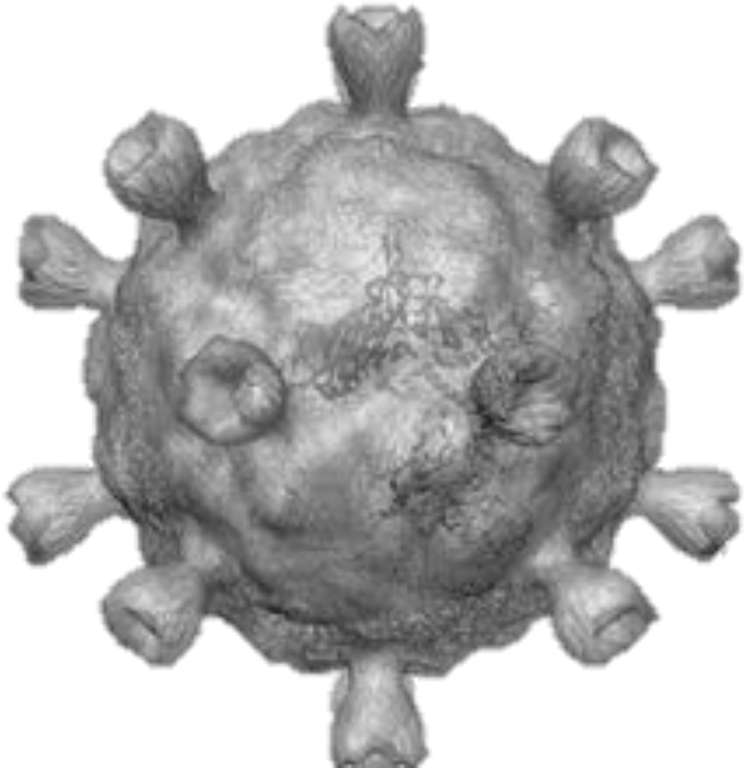
Natalie A. Sawaya,[1†] **Nava Baran**,[2†] **Shelby Mahank**,[1] **Arvind Varsani**,[3,4] **Debbie Lindell**[2*] **and Mya Breitbart**[1*]

[1]*University of South Florida, College of Marine Science, Saint Petersburg, FL.*

[2]*Faculty of Biology, Technion – Israel Institute of Technology, Haifa, 3200003, Israel.*

[3]*The Biodesign Center for Fundamental and Applied Microbiomics, School of Life Sciences, Center for Evolution and Medicine, Arizona State University, Tempe, AZ, 85287.*

[4]*Structural Biology Research Unit, Department of Integrative Biomedical Sciences, University of Cape Town, Cape Town, 7925, South Africa.*



The Breitbart lab believes communication is key

2022 lab photo

Microbiology crash course

St. Pete Science Festival

Girls Inc

Learn more!

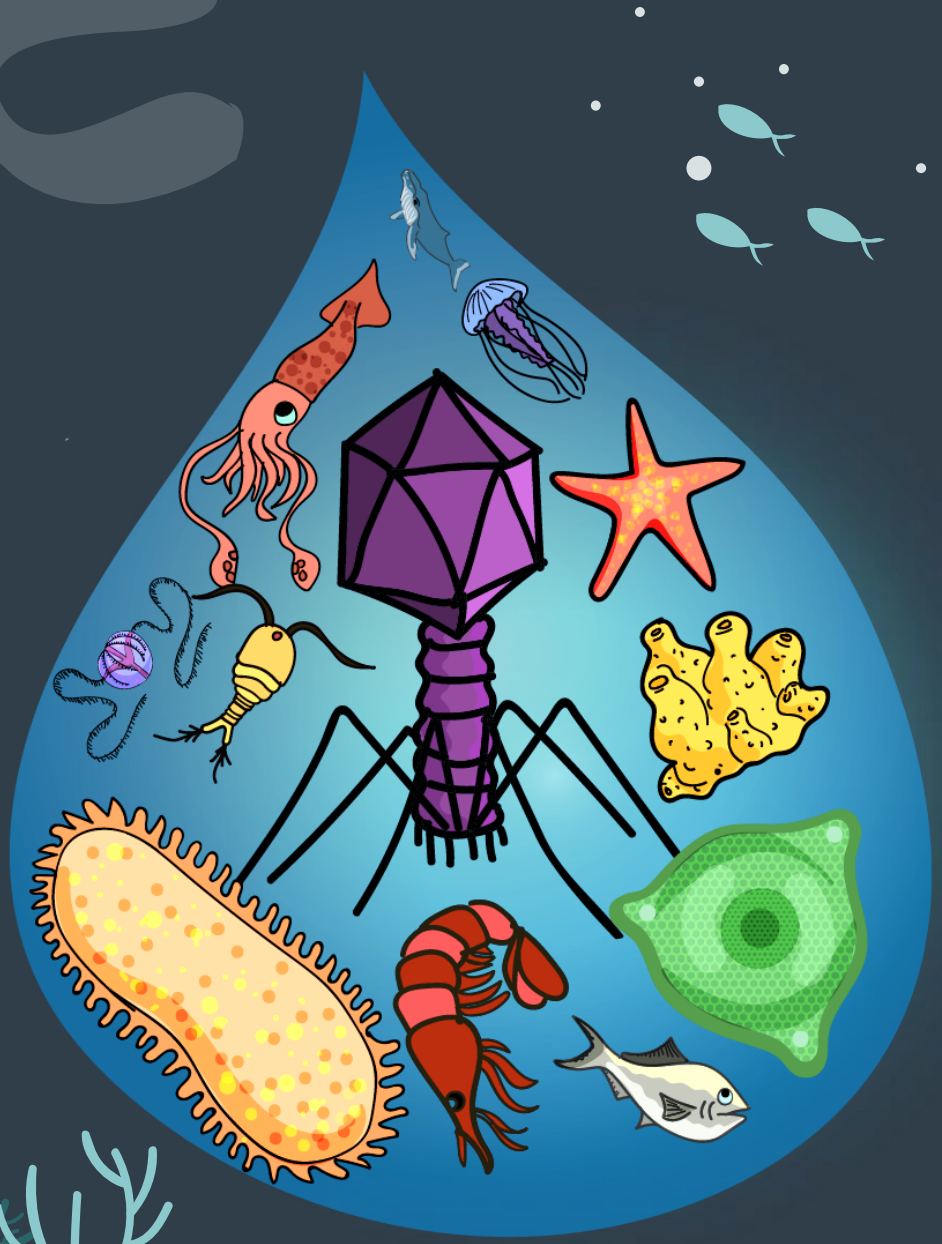


Figure by Natalie Sawaya

Thank you for joining me on this microscopic adventure!

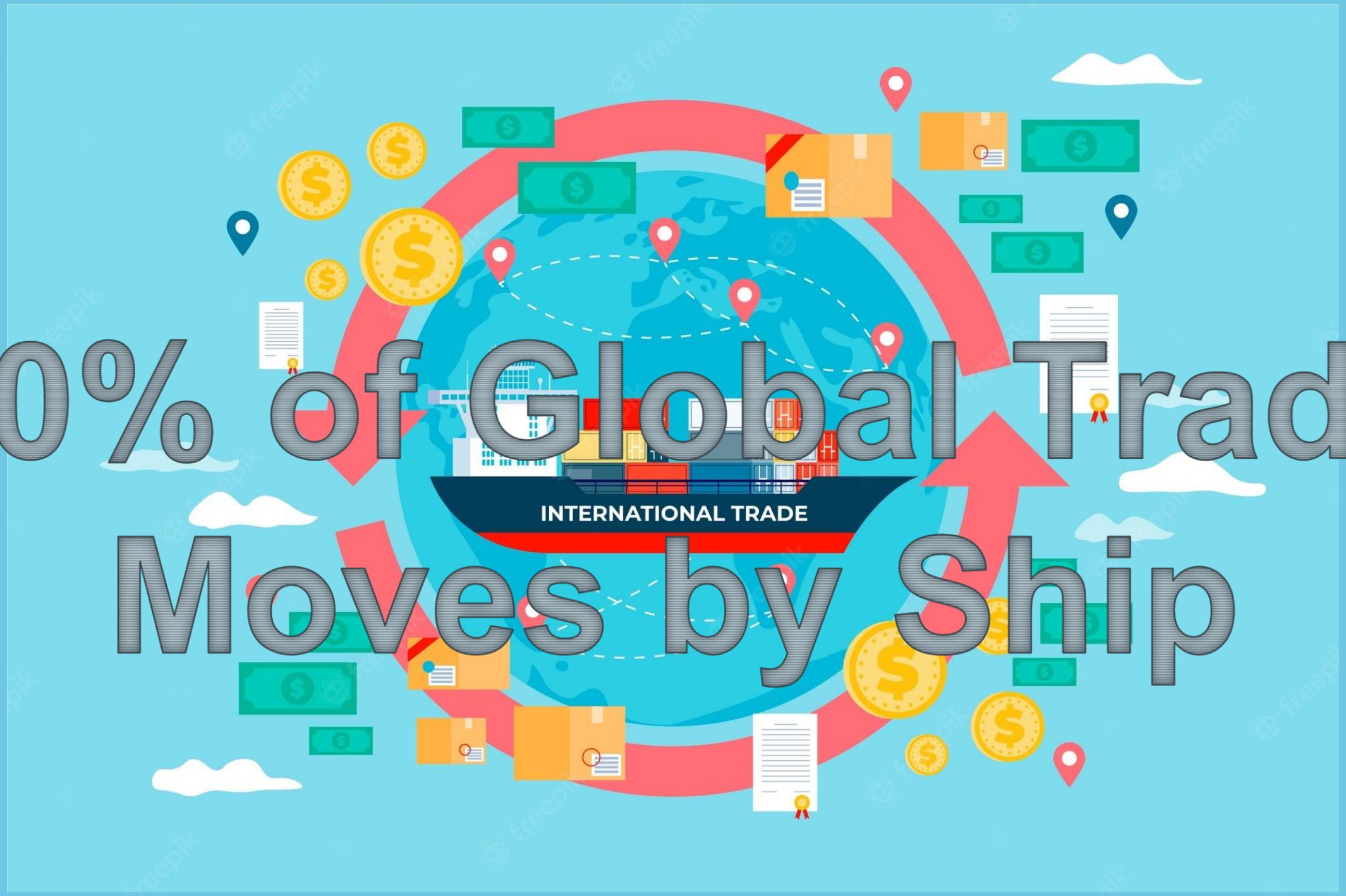
Ben Minichino

Pole Star Defense

POLE STAR DEFENSE

The Leader In Maritime Intelligence

70% of the Earth is Ocean



90% of Global Trade Moves by Ship

MARITIME DOMAIN AWARENESS

MDA

75 MILLION SHIP POSITIONS PER DAY

200+ SATELLITES CAPTURING DATA

260,000 VESSELS TRANSMITTING VIA SATELLITE EVERY DAY

WHERE WE ARE

Five International office locations: London, Hong Kong, Singapore Panama, and USA, with additional presence in Australia

A global network of over 100 distributors

POLE STAR DEFENSE

WHO WE ARE

Our Home:
Based in St. Petersburg, Florida, in the newly established Maritime and Defense Technology Hub.

Our Work:
Pole Star Defense proudly serves the USCG and Dept. of Homeland Security as United States National Data Center (NDC).

Our Community:
We are closely partnered with the USF's College of Marine Science supporting maritime research. We hire local first by providing opportunities to those seeking careers in IT, Maritime, and geospatial technologies.

Our People:
We are 40 strong in St. Pete and our team is comprised of Ops, ITSec, Dev, Business Dev, Program Mgt., Finance, HR, and Watch support.

WHAT WE DO

Our Mission:

We deliver technology to protect our customers' vessels, people, and homeland.

Our Solution:

Maritime intelligence that enables **time-critical decisions** and **mitigates risk** across all facets of maritime activity, all in a secure and scalable environment.

THE MARITIME LANDSCAPE

The Challenges

Vessel Monitoring

- Large number of events to monitor
- Tracking inefficiency
- Multiple point solutions

Illicit Activity

- IUU Fishing, transhipments, dark ships, etc.
- Increasingly complex sanctions evasion methods
- Piracy

Homeland Security

- Threats to homeland security
- Border protection
- Customs enforcement

WHAT WE PROVIDE

Our Solutions

Vessel Intelligence

Risk Intelligence

Vessel Tracking & Monitoring

Maritime Domain Awareness

Vessel Investigations

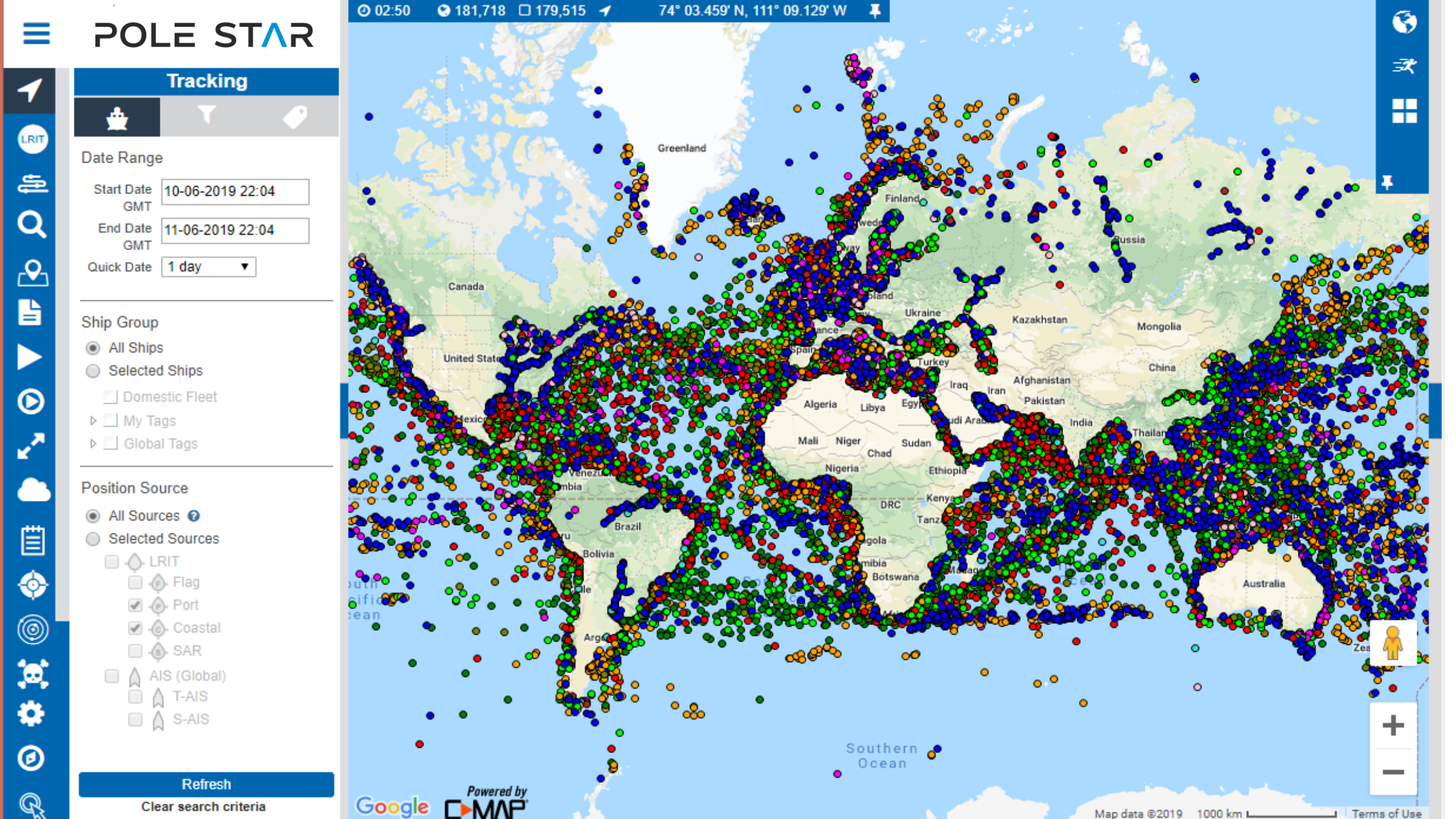
Sanctions Screening

Sustainability Screening

Maritime Data

Satellite Communications

Global Secure Data Centers & Cloud Infrastructure


POLE STAR
Tracking
Date Range
Start Date GMT
10-06-2019 22:04
End Date GMT
11-06-2019 22:04
Quick Date
1 day
Ship Group
All Ships
Selected Ships
Domestic Fleet
My Tags
Global Tags
Position Source
All Sources
Selected Sources
LRIT
Flag
Port
Coastal
SAR
AIS (Global)
T-AIS
S-AIS
Refresh
Clear search criteria
02:50
181,718
179,515
74° 03.459' N, 111° 09.129' W
Greenland
Canada
United States
Mexico
Venezuela
Colombia
Brazil
Bolivia
Peru
Chile
Argentina
Finland
Russia
Ukraine
Kazakhstan
Mongolia
China
Spain
Turkey
Iraq
Iran
Afghanistan
Pakistan
India
Thailand
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Niger
Chad
Sudan
Nigeria
Ethiopia
Kenya
DRC
Tanzania
Angola
Namibia
Botswana
Australia
Southern Ocean
Google
Powered by
C-MAP
Map data ©2019
1000 km
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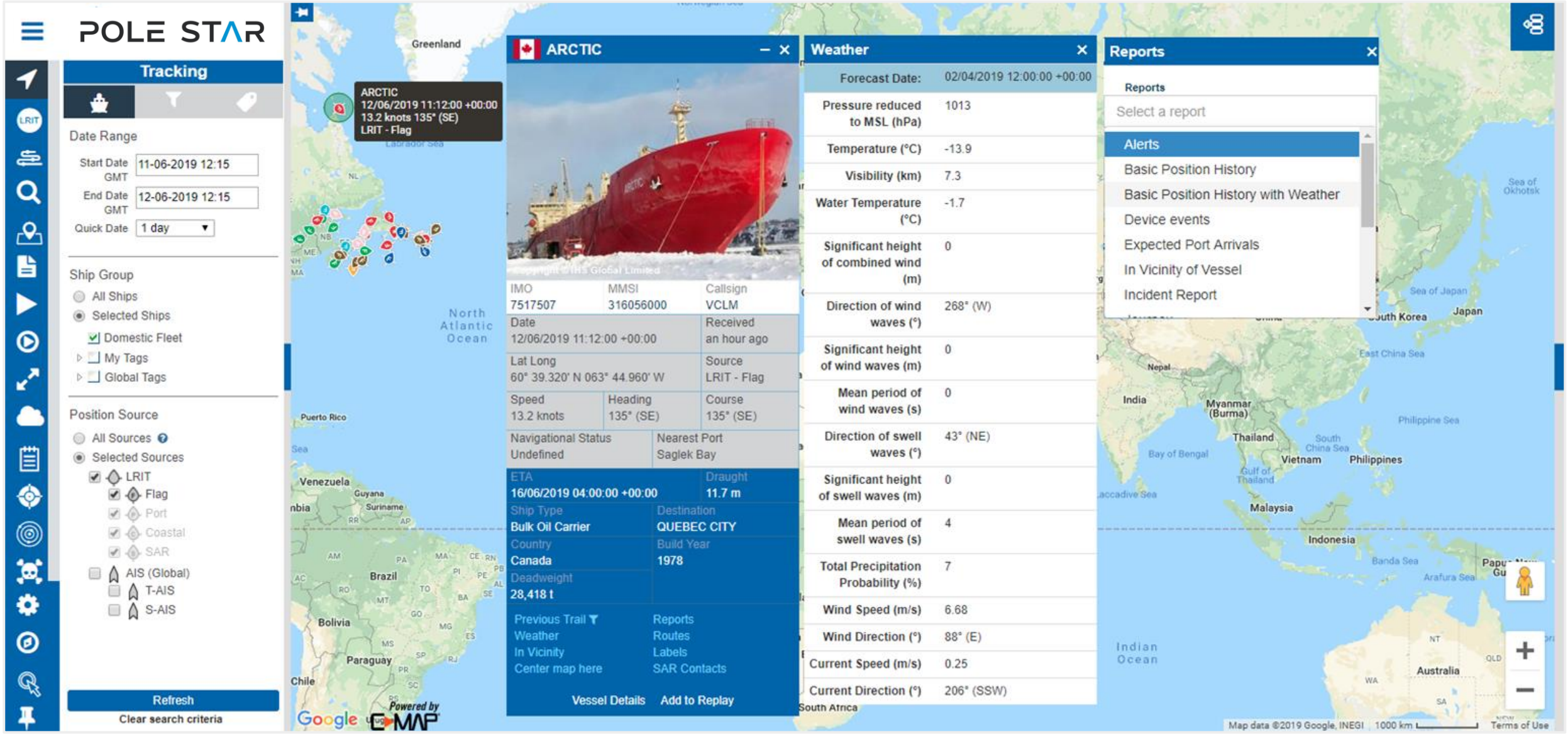
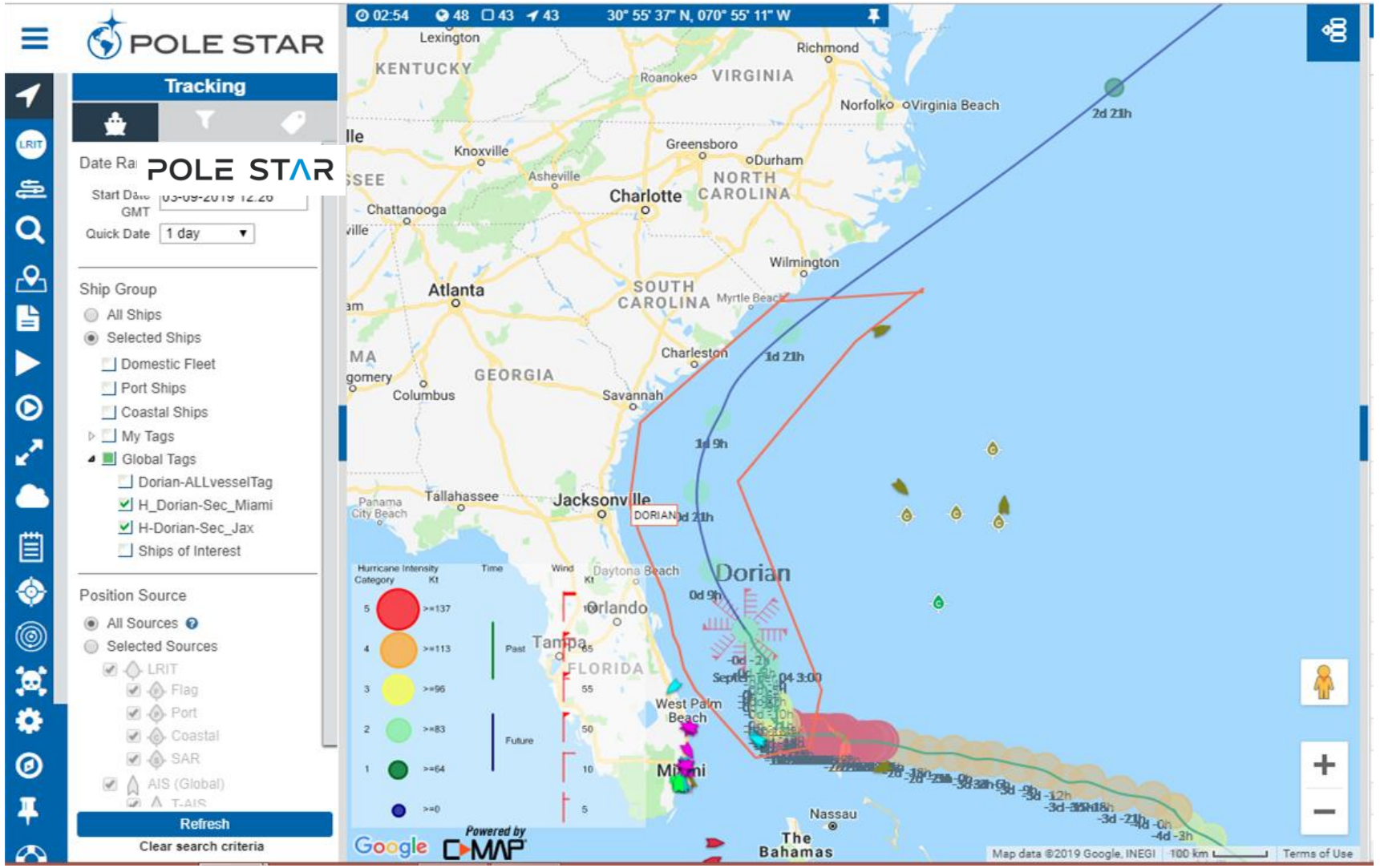
MDA FEATURES

Advanced Vessel Intelligence



Hurricane Path Alerts

- Weather forecasting
- Historic weather conditions
- Vessel alerting



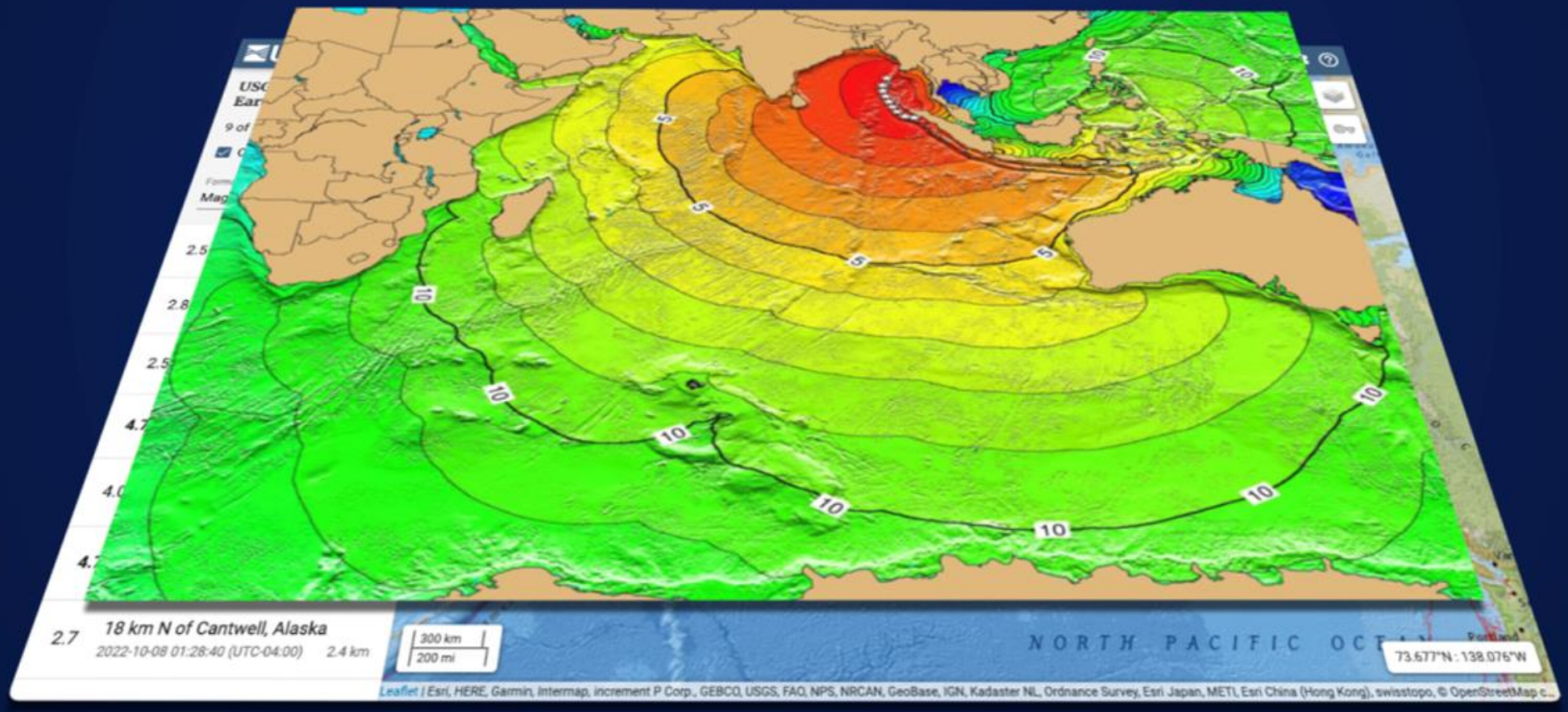
Functional Layers

USGS: Earthquake Data

POLE STAR DEFENSE

Functional Layers

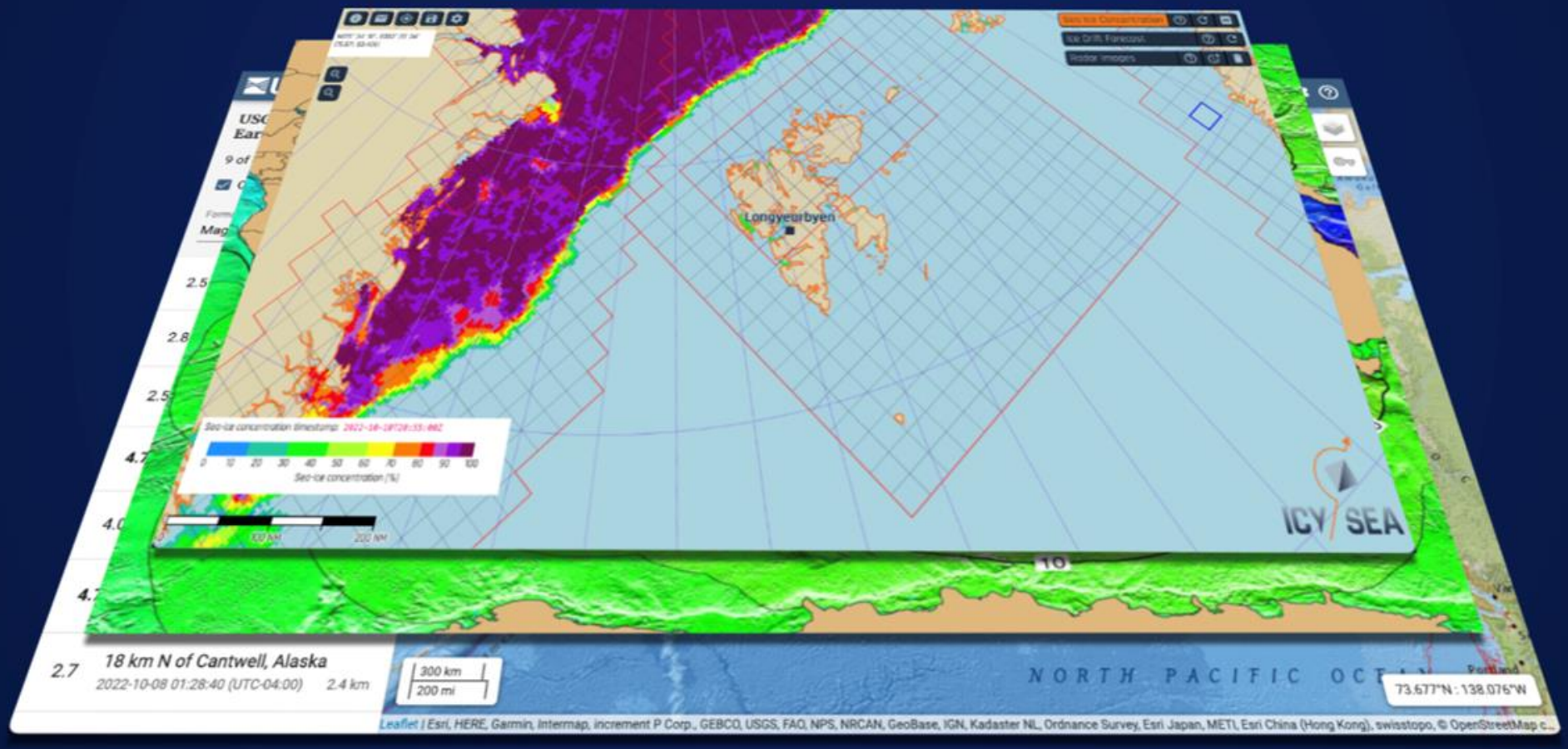
USGS: Tsunami Warning



POLE STAR DEFENSE

Functional Layers

IcySea: Ice Data



POLE STAR DEFENSE

Challenges for Maritime Domain Awareness

Overview of Oil Transshipment Area of Interest | ~2.5 Miles Offshore of Baniyas, Syria | October 6, 2019 | Maxar WorldView-3 Satellite Image

Data Fusion Enhancing Vessel Tracking

Adrian Darya-1 and Unidentified Oil Tanker | ~2.5 Miles Offshore of Baniyas, Syria | October 6, 2019 | Maxar WorldView-3 Satellite Image

POLE STAR DEFENSE

POLE STAR DEFENSE

Thank you

Ben Minichino
President
E: ben.Minichino@polestarglobal.com
M: 202-725-2715

Richard Goosen

Saildrone

Innovation District State Of Science 2023

Richard Goosen – Bathymetry Operations Manager

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SAILDRONE ST PETE UPDATE

2023 St Pete supported projects

- Quick overview
- NOAA BUOY MITIGATION 2022
- NOAA HURRICANE MISSION 2022
- Aleutian Uncrewed Bathymetric Survey
- Upcoming Vehicles

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Saildrone is the world's leading collector of in situ ocean and climate data via uncrewed vehicles, above and below the sea surface.

Environmentally friendly | ML enabled | Secure data portal | Based in the USA

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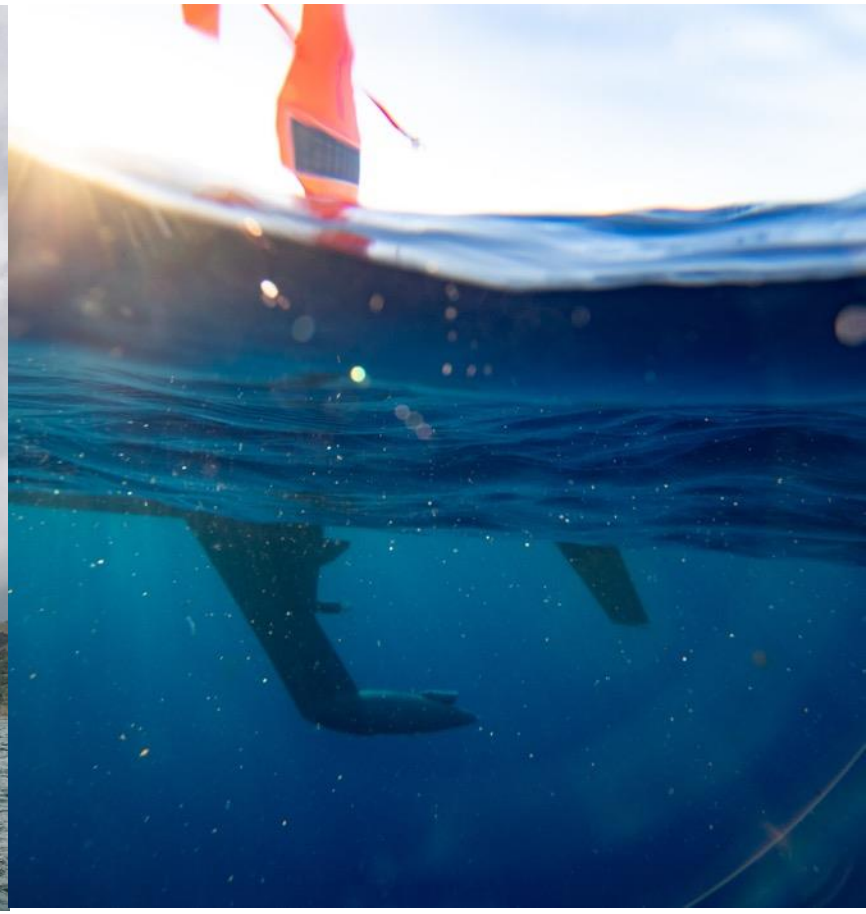
A GLOBAL FLEET OF OCEAN DRONES

Wind and solar-powered, monitoring the planet in real time, above and below the surface.



Maritime Domain Awareness

Intelligence, Surveillance & Reconnaissance (ISR)
Force Protection | Law Enforcement & Maritime Safety
Ecosystem Monitoring

Ocean Mapping

Single-beam and multibeam bathymetric data collection for navigation and charting, telecommunications, offshore energy, and physical oceanography to 23,000 feet (7,000 m) depth.

Ocean Data

Collecting essential ocean and climate variables.
Fisheries | Metocean Data Collection | Ecosystem monitoring | Satellite Calibration/Validation

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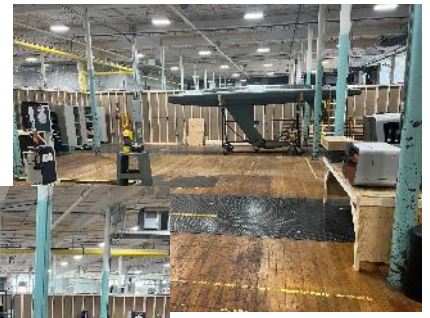
Saildrone Headquarters
Alameda, CA



Acoustics Operations
Fall River, MA

Ocean Mapping Headquarters
St. Petersburg, FL

Sales, GR & Legal
Washington, DC

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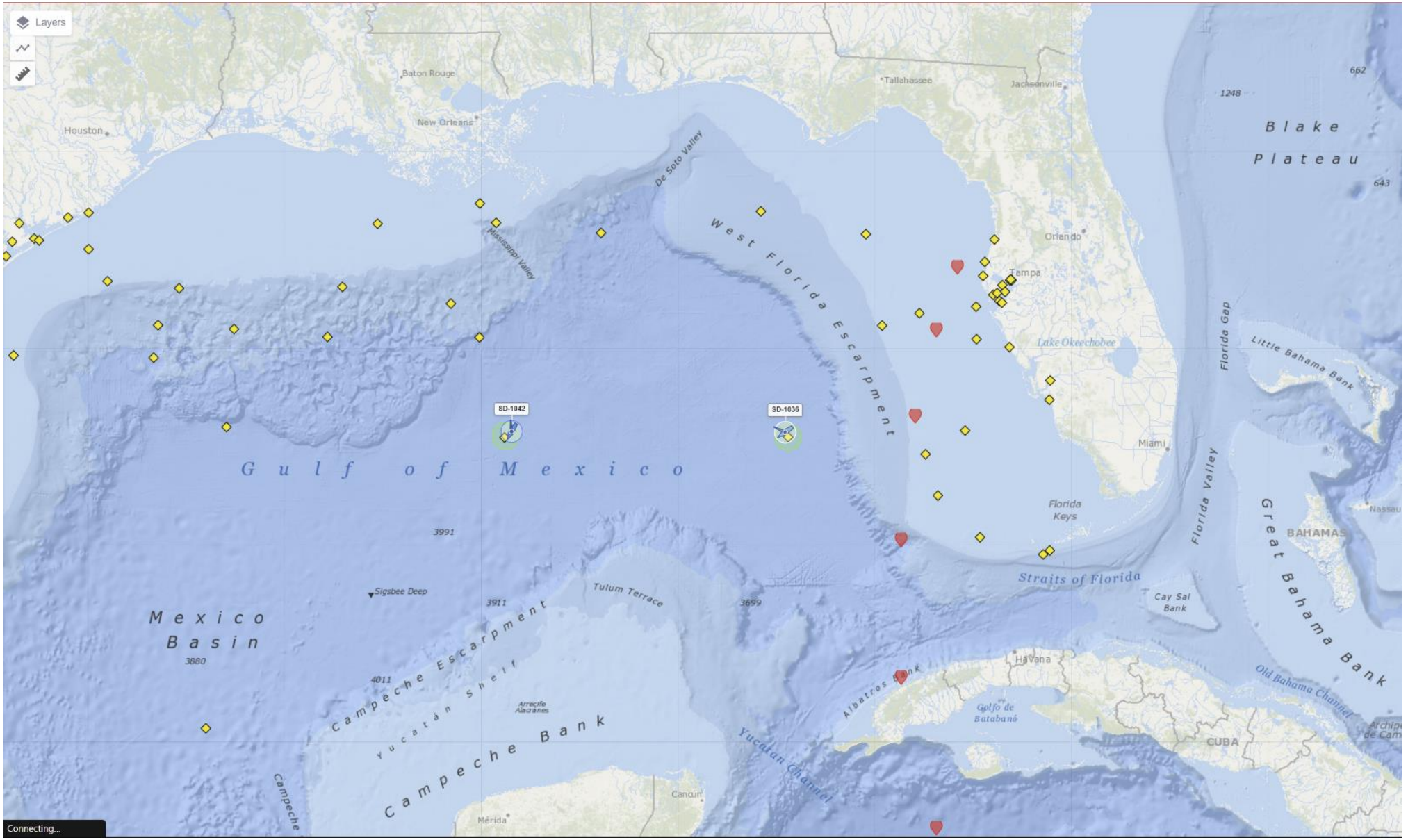
NOAA BUOY MITIGATION

2 Explorer USV from St Pete



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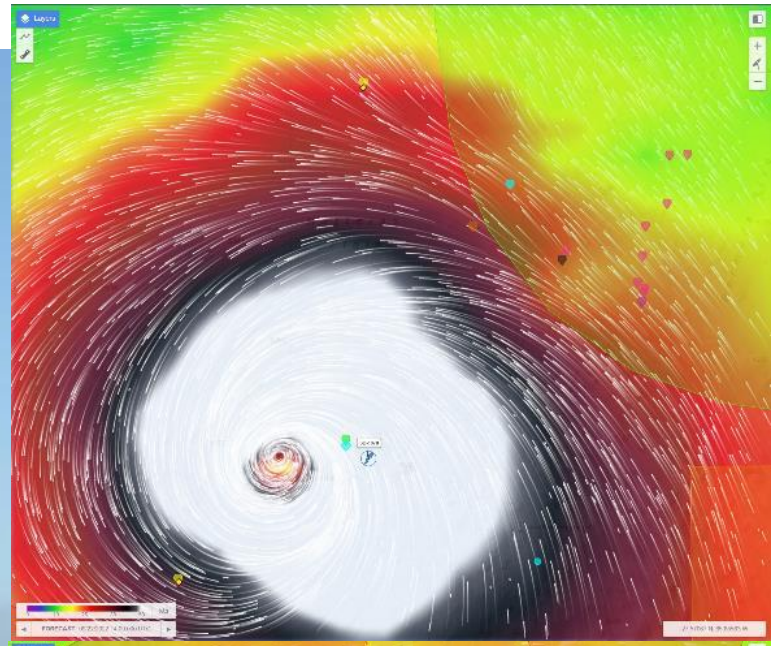
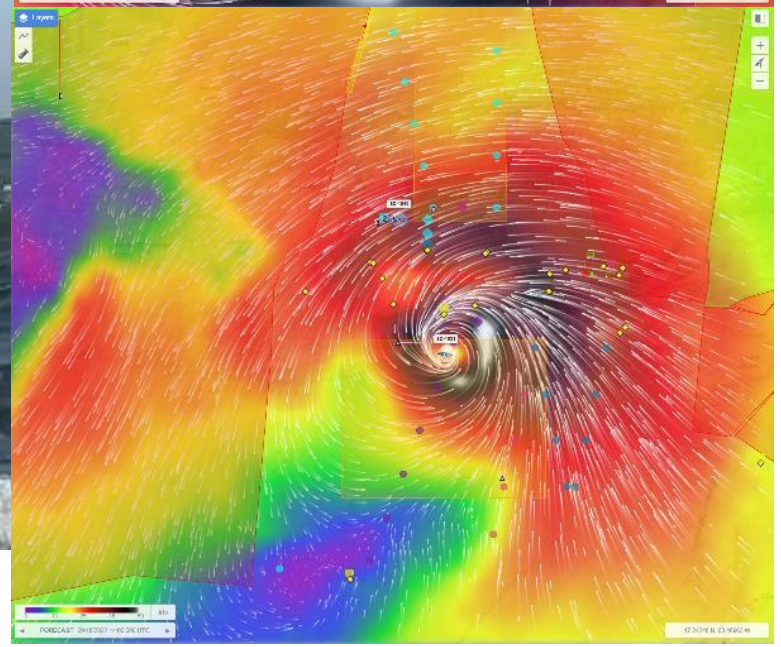
NOAA HURRICANE MISSION 2022

7 Explorer USV, 1 launched from St Pete





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NOAA HURRICANE MISSION 2022

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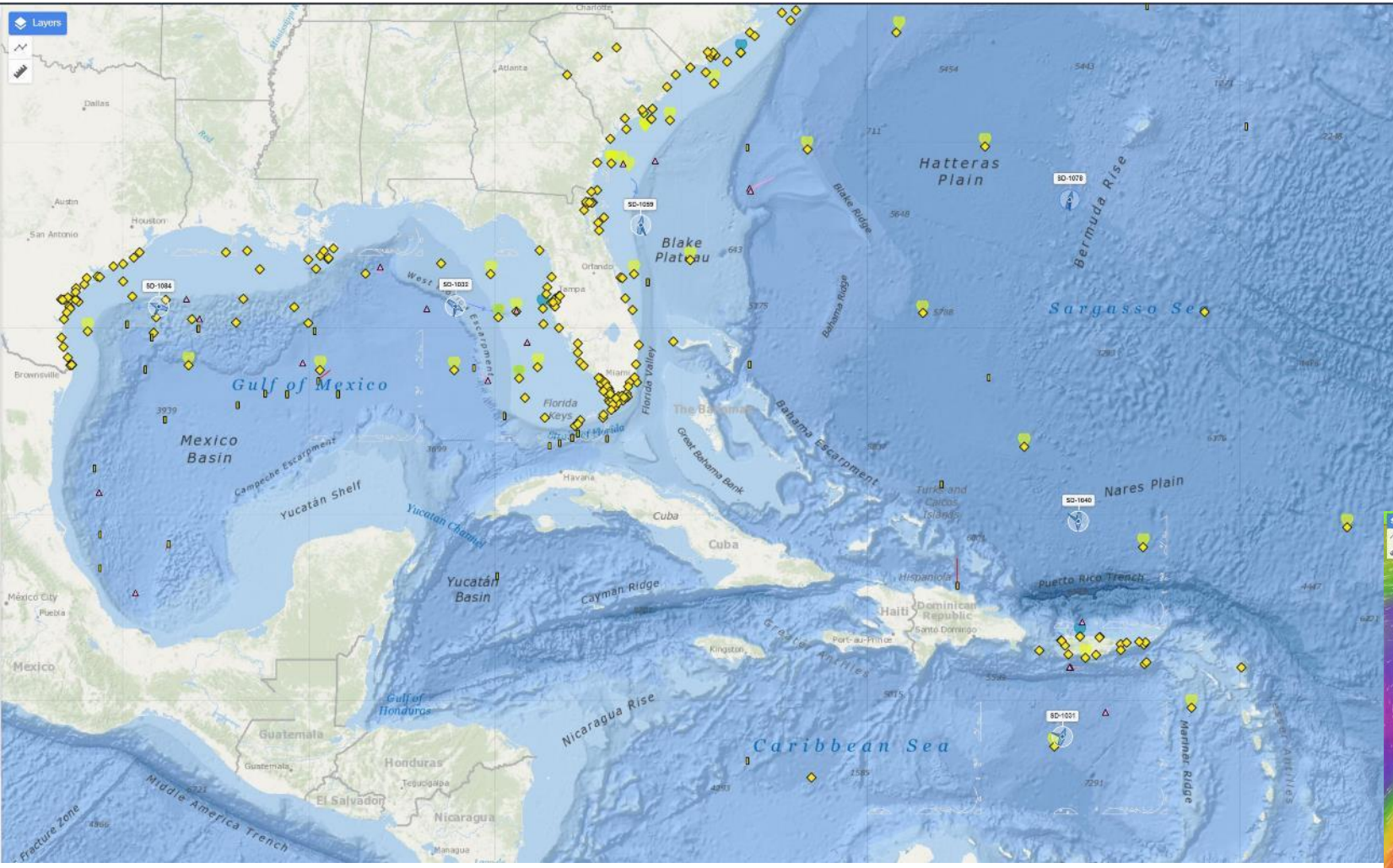

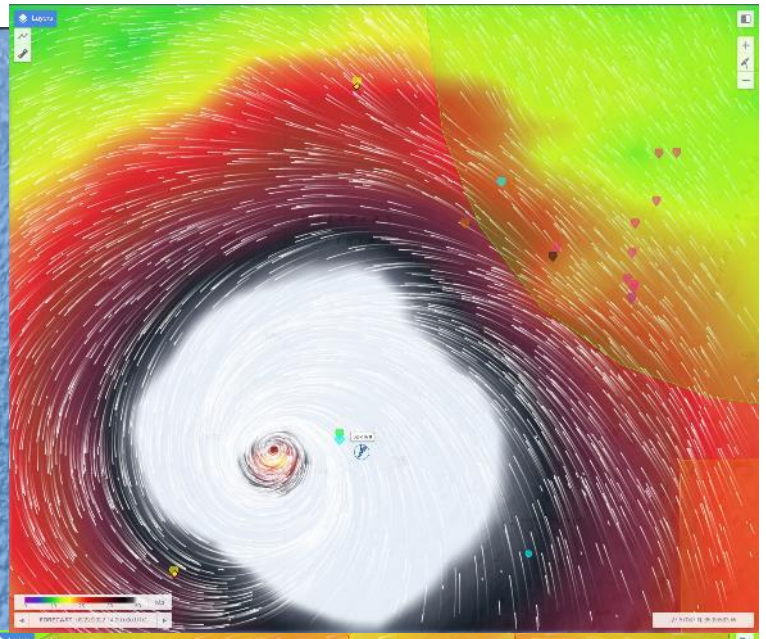

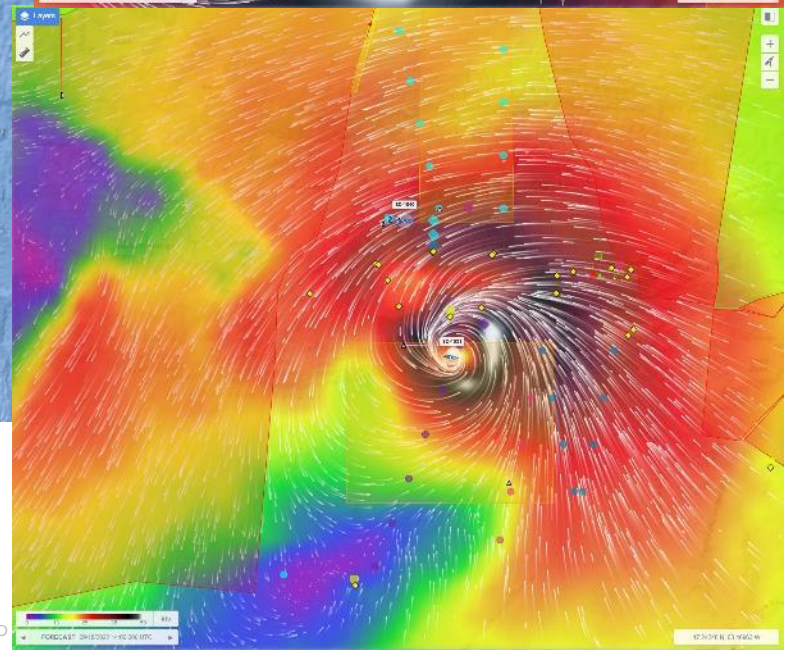

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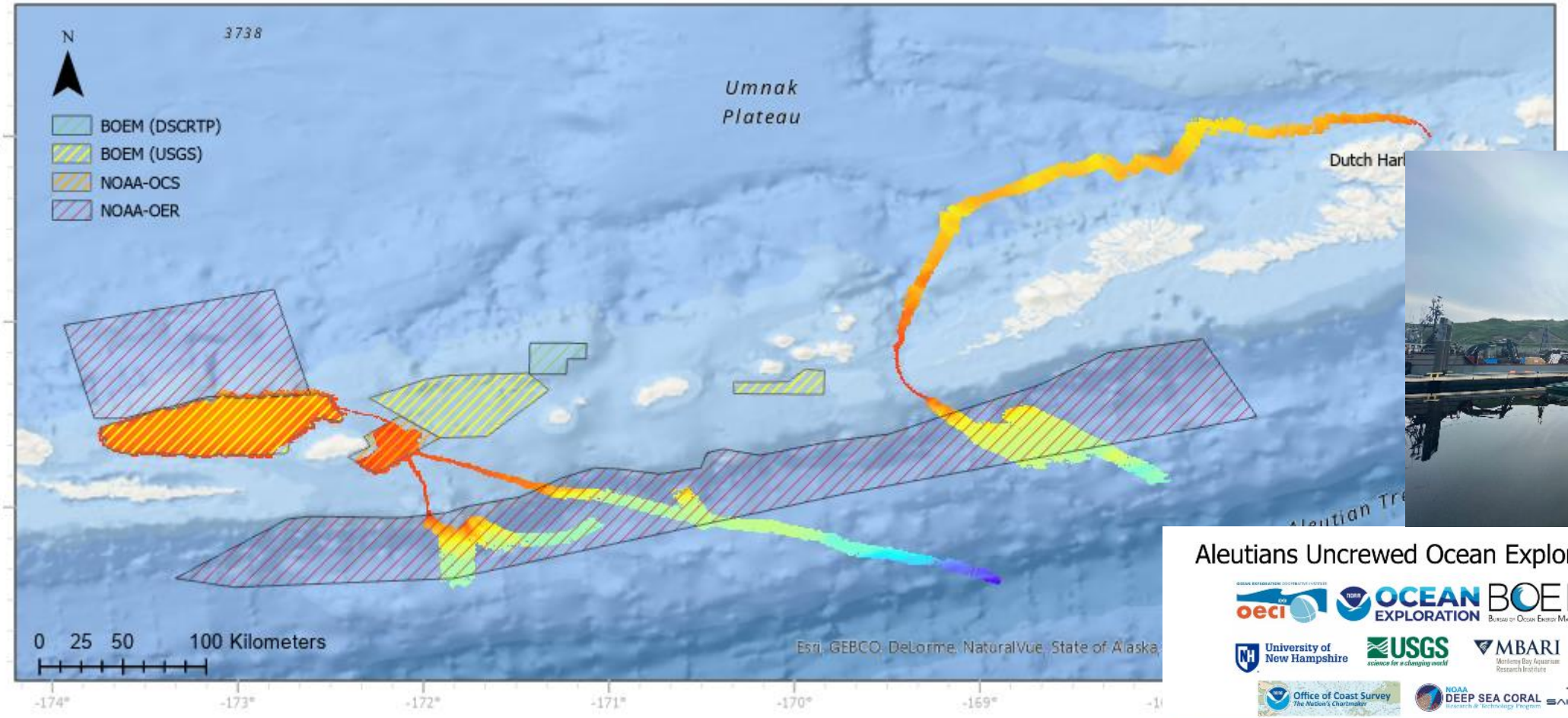
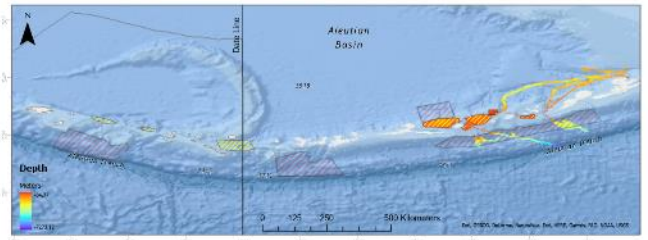
Aleutian Islands Uncrewed Bathymetric Survey

Surveyor USV



Aleutians Uncrewed Ocean Exploration

oeci · OCEAN EXPLORATION · BOEM Bureau of Ocean Energy Management · University of New Hampshire · USGS science for a changing world · MBARI Monterey Bay Aquarium Research Institute · Office of Coast Survey The Nation's Chartmaker · NOAA DEEP SEA CORAL Research & Technology Program · SAILDRONE



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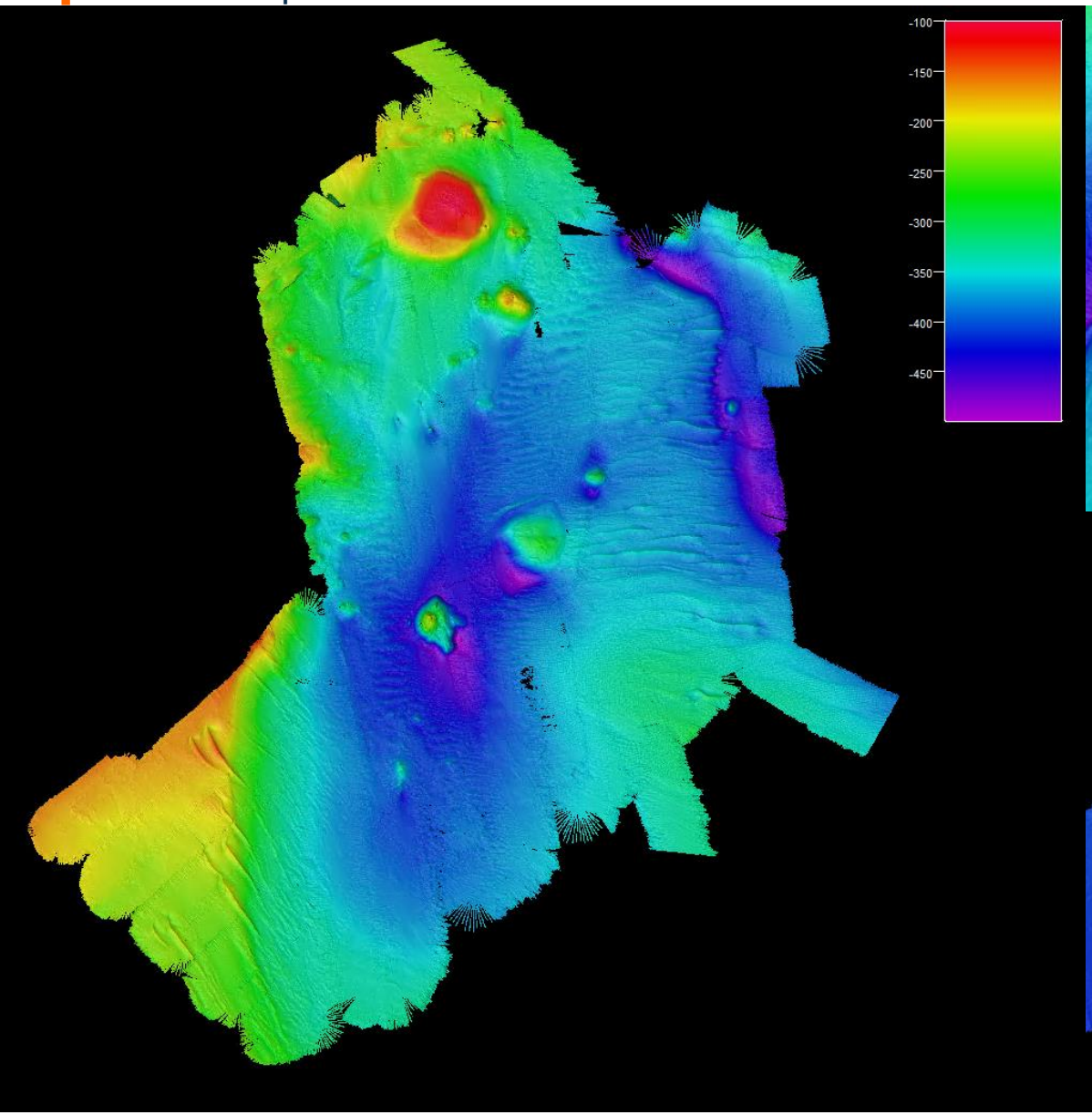
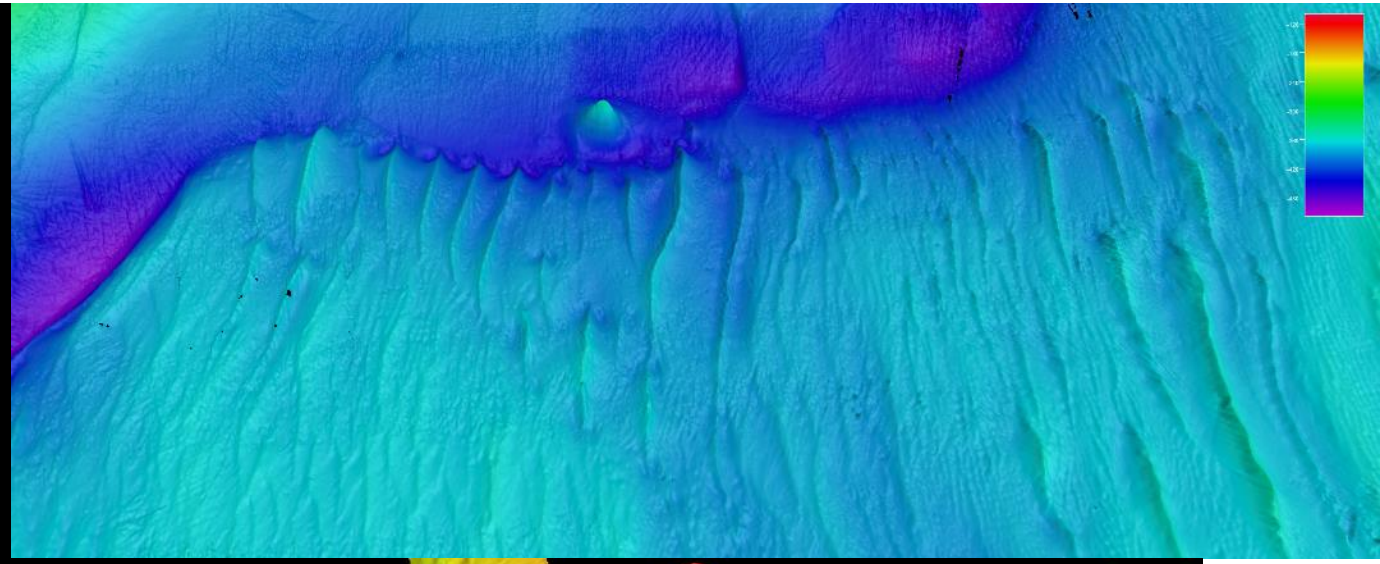
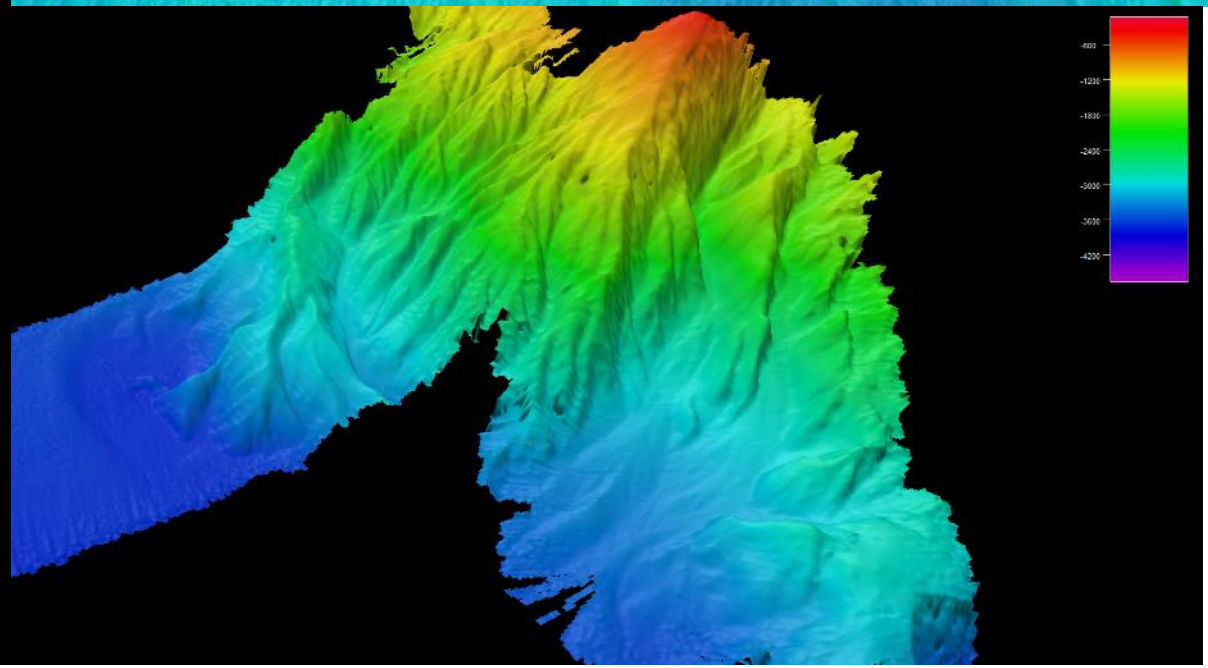
Aleutian Islands Uncrewed Bathymetric Survey

Data Examples







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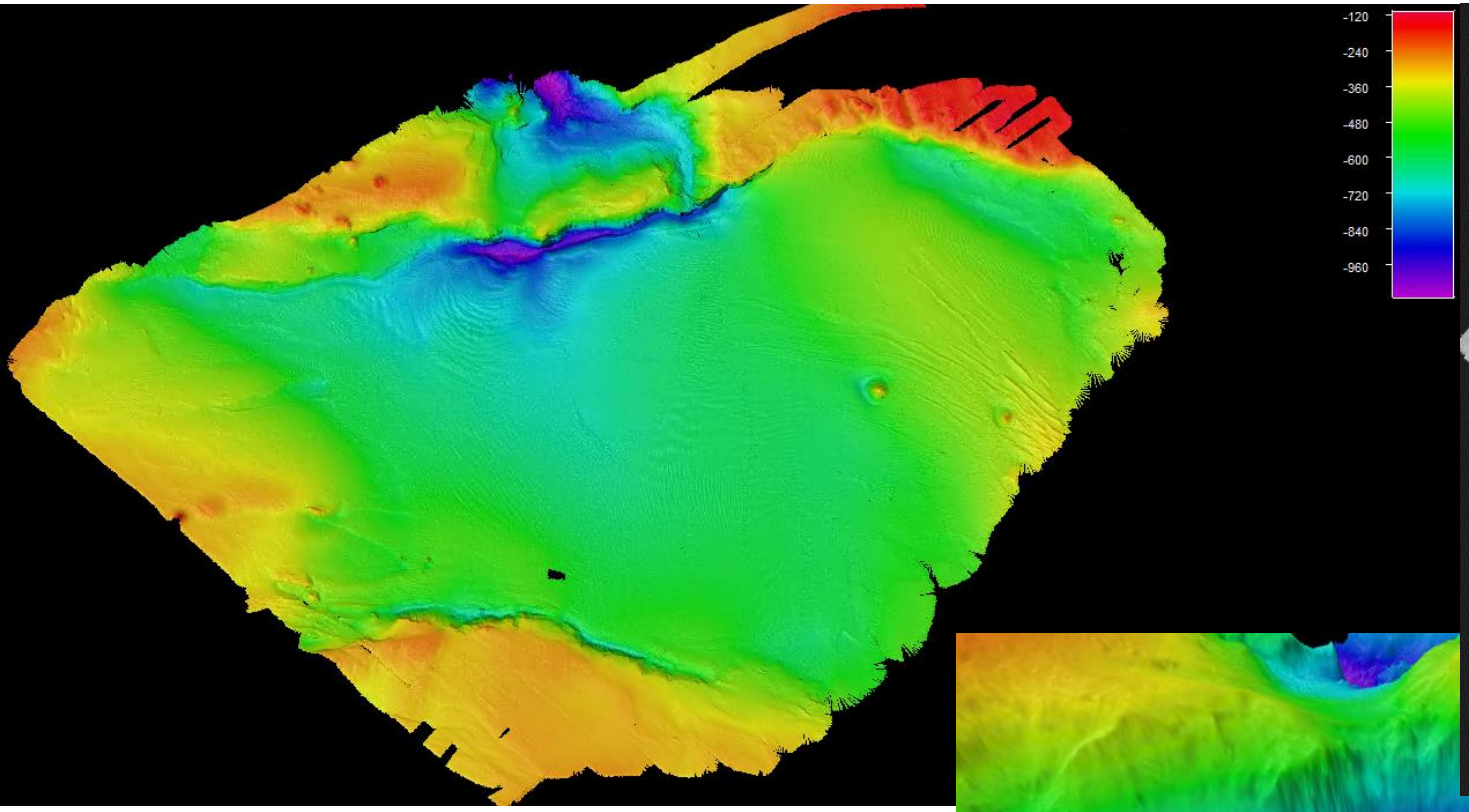
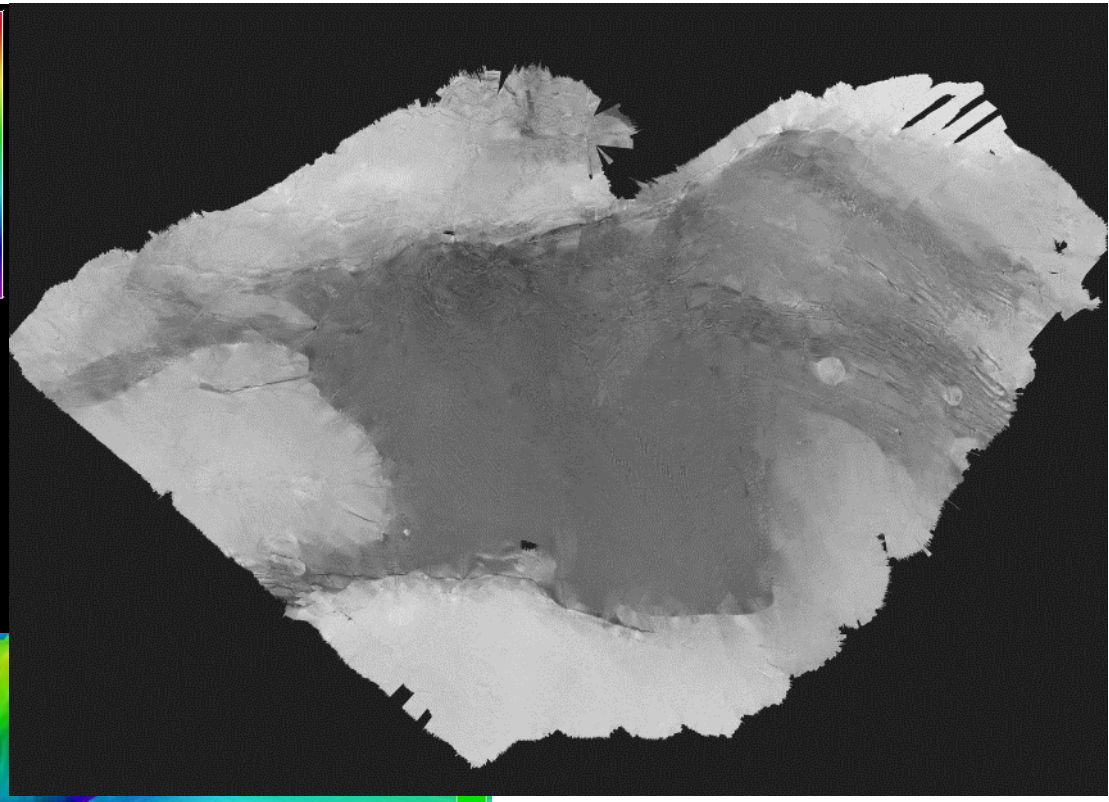
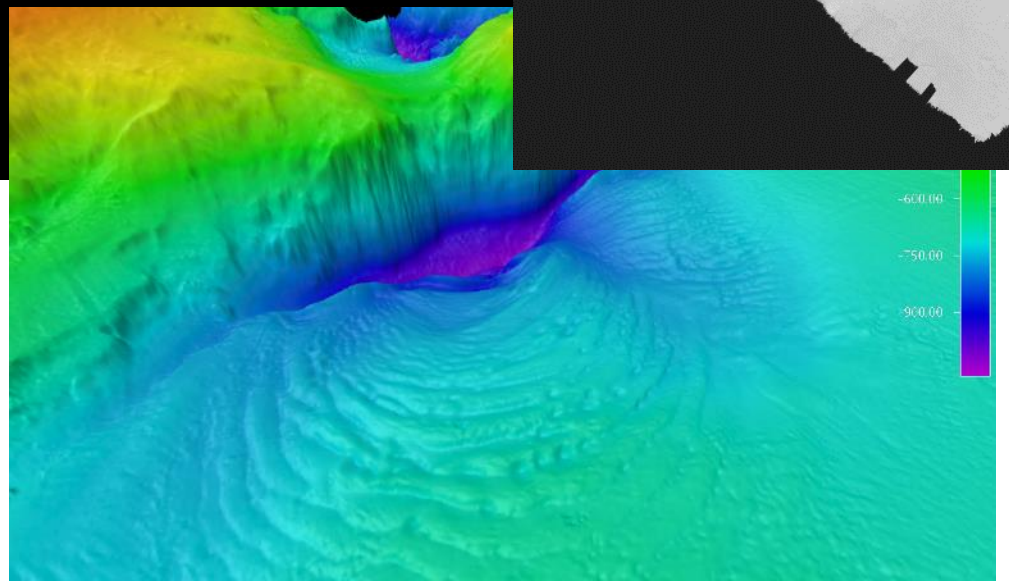
Aleutian Islands Uncrewed Bathymetric Survey

Data Examples







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UPCOMING ST PETE VEHICLES

Vehicles we expect to see in 2023

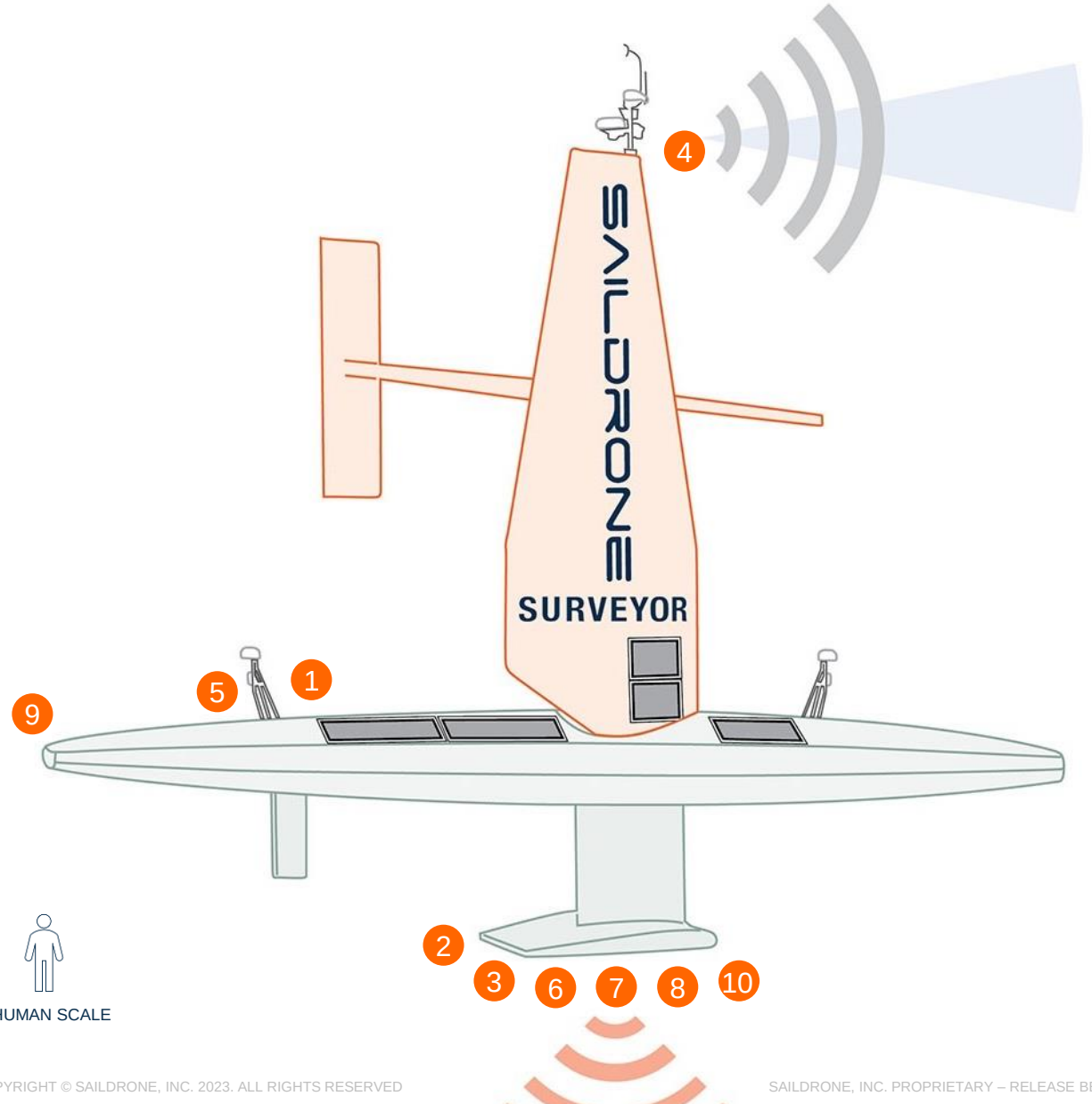
VEHICLE SPECIFICATIONS

Hull length:	65 ft (20 m)
Wing height:	44 ft (13 m)
Draft:	11 ft (3 m)
Primary propulsion:	Wind (Saildrone wing)
Auxiliary propulsion:	78 hp high-efficiency diesel
Mapping speed:	6 knots
Endurance:	2,500 nm @ 6 knots under power; 6 months under sail
Payload power:	2,000 W steady state 4,000 W peak

Bathymetry sensors on
Surveyor SD 1200 gondola

SAILDRONE SURVEYOR

World’s largest and most advanced, uncrewed surface vehicle for ocean mapping and exploration



PAYLOAD OPTIONS

No.	Variable	Sensor
1	Positioning	Seapath 380+ GNSS/INS system
2	Deep-water bathymetry	Kongsberg EM 304 multibeam sonar
3	Shallow-water bathymetry	Kongsberg EM 2040 multibeam sonar
4	Wind speed & direction	B&G WS730S
5	Barometric pressure	Yacht Devices YDBC-05N
6	Ocean currents	Simrad EC150 ADCP
7	Ocean currents	Teledyne Pinnacle 45 ACDP
8	Fish biomass	Simrad EK80 echo sounder
9	Sound velocity profiler	Valeport sound velocity (cast depth: 500 m)
10	Surface sound	Teledyne SVP 70 (fixed on bottom of gondola)

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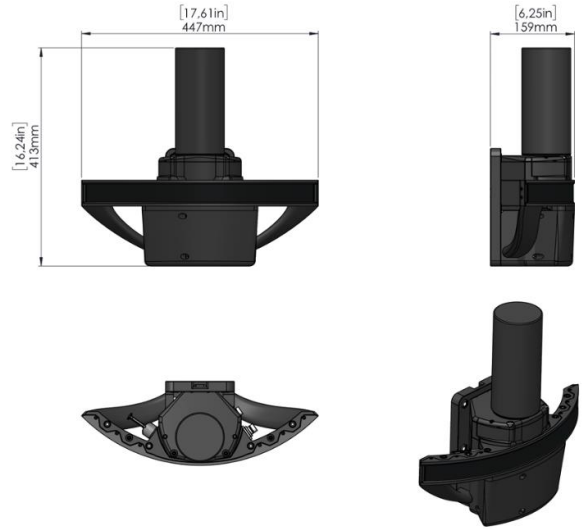
UPCOMING ST PETE VEHICLES

Vehicles we expect to see in 2023

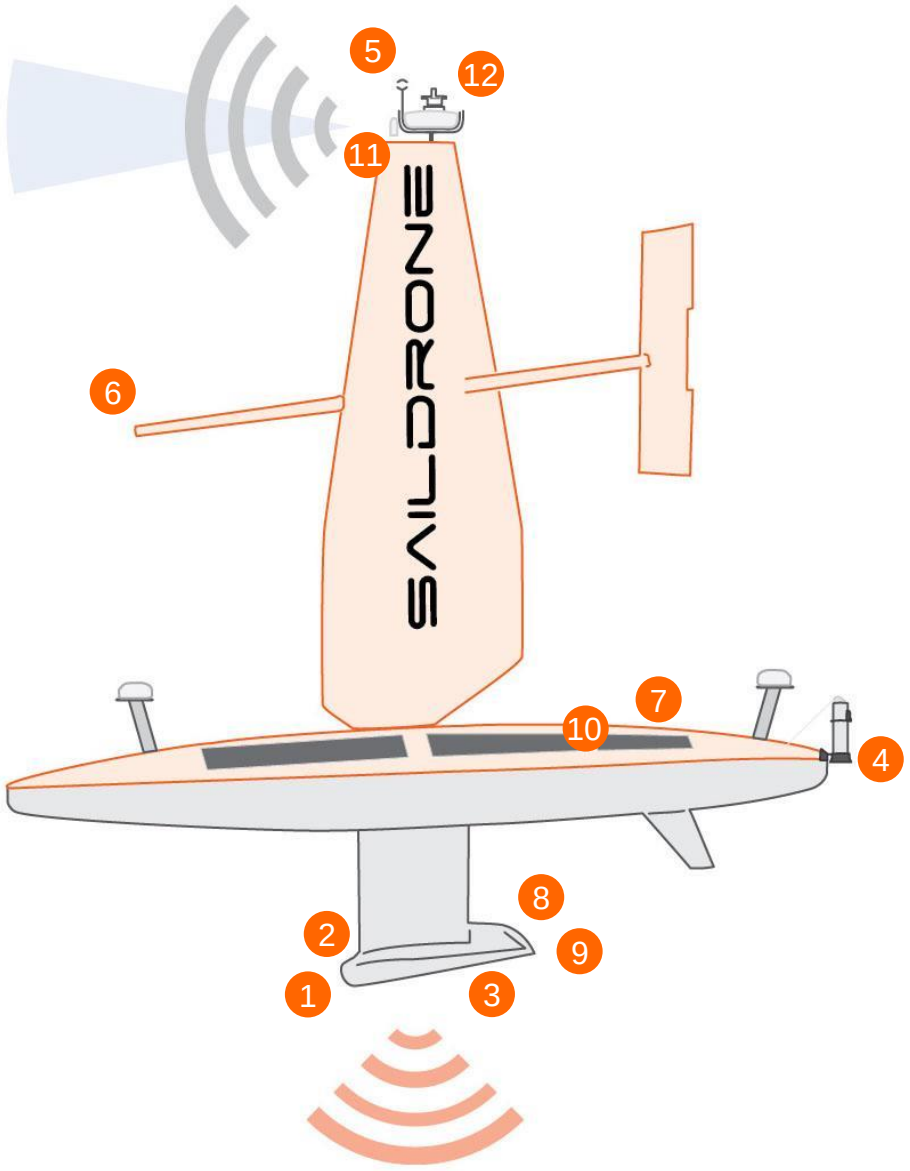
VEHICLE SPECIFICATIONS

Hull length:	33 ft (10 m)
Wing height:	21 ft (6 m)
Draft:	7 ft (2 m)
Primary propulsion:	Wind (Saildrone wing)
Auxiliary propulsion:	4 kW electric motor
Mapping speed:	5 knots
Endurance:	3+ months
Payload power:	300 W avg. | 2 kW peak



SAILDRONE VOYAGER – BATHYMETRY

Uncrewed shallow-water multibeam mapping vehicle



PAYLOAD OPTIONS

No.	Variable	Sensor	
1	Bathymetry	Norbit Winghead i80s 300 meters	ACOUSTIC
2	Positioning	Integrated POS MV OceanMaster	
3	Sound velocity	Integrated sound velocity profiler	
4	Sound velocity & winch	Integrated sound velocity profiler to 150 m depth	
5	Wind speed & direction	Gill 1405-PK-038	ATMOSPHERIC
6	Air temp & humidity	Rotronic HC2-S3 with rad shield @ + 6.4 m	
7	Barometric pressure	Vaisala Barocap PTB210 @ +0.2 m	
8	Salinity & temperature	Seabird SBE 37 @ -1.5 m	
9	Dissolved oxygen	Seabird SBE 37 ODO @ -1.5 m	
10	Wave height & period	Dual GPS aided IMU	OCEAN
11	AIS transceiver		
12	Smart camera array	360° High-resolution optical cameras with AI/ML target detection	MDA

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SAILDRONE

PAST SPEAKERS

Join Us!

2023 St. Petersburg Science Festival

Saturday, February 18
10am-4pm

University of South Florida St. Pete
and Poynter Park – along the waterfront

Free event for families

Visit our website stpetescifest.org for additional details.

Questions: info@stpetescifest.org

The Festival is held in conjunction with MarineQuest
For more information: MyFWC.com/MarineQuest

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STATE OF SCIENCE

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