
GWF
GEOSPATIAL WORLD FORUM
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Technical Innovation to Accelerate Ocean Knowledge

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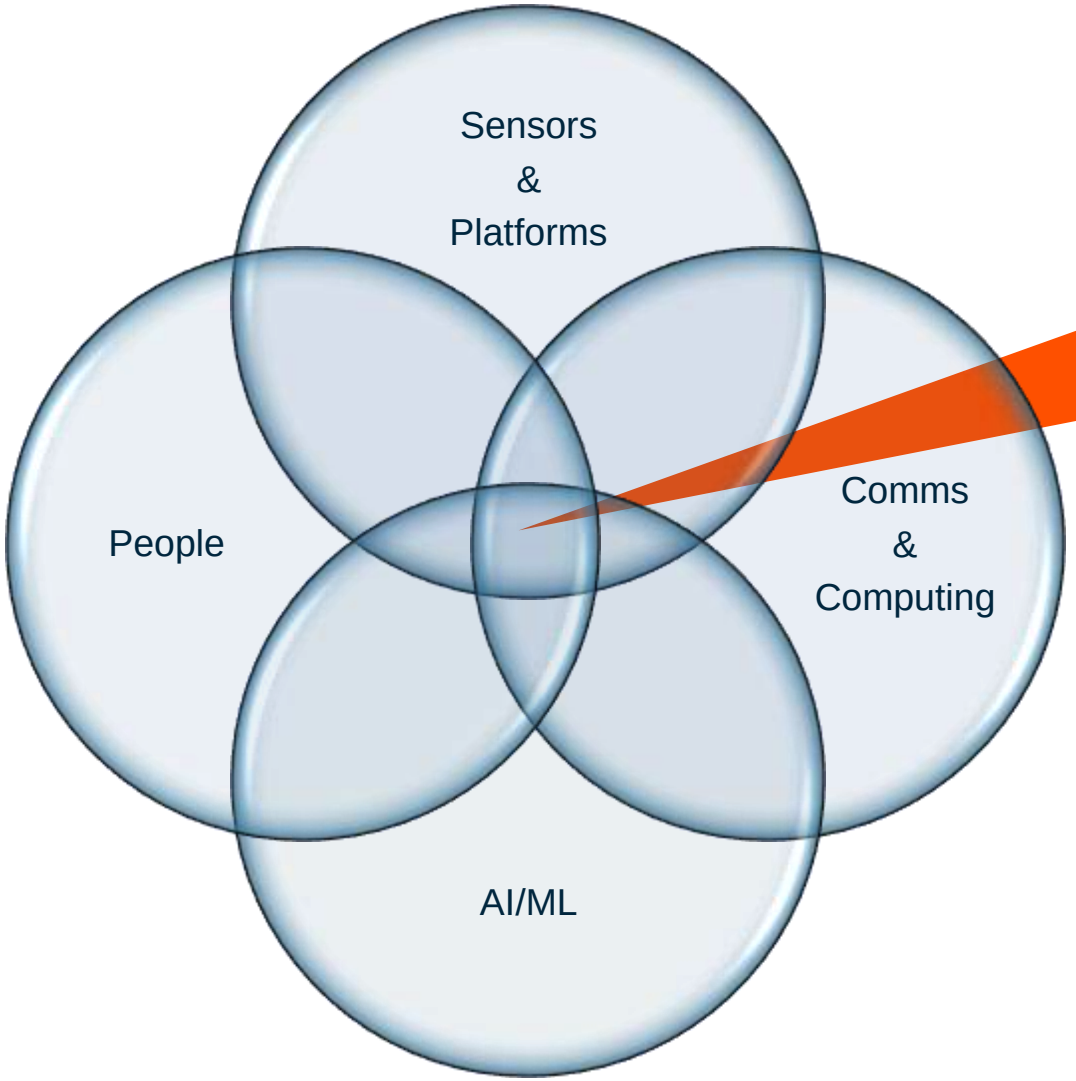
Saildrone is the world's leading collector of in situ ocean and climate data via uncrewed vehicles, above and below the sea surface.

OUR MISSION

To **sustainably** explore, map, and monitor the ocean to understand, protect, and preserve our world

OUR VISION

Is of a healthy ocean and a safe, **sustainable** planet



Accelerated Ocean Knowledge

- Global Ocean Access
- Big Data
- Improved Models
- Faster, More Informed Decisions

Technical Innovation

Capacity for Ocean Data collection is at an all time high and is now scalable.

- Traditional
  - Ships
  - Satellites
  - Buoys
  - Fixed platforms
- Uncrewed Systems
  - Providing unprecedented access to remote and dangerous areas
  - Scalable
  - Affordable

Platforms

A massive improvement in the capability (type, precision, and accuracy) of sensors coupled with the capacity of platforms.

Sensors

Why USVs?

Capability, capacity, low impact, and more

Environmentally Friendly
Operations with low or no carbon footprint or environmental impact

Efficient
Capabilities delivered at a fraction of the cost of traditional approaches

Reduced Risk
No crewed support vessel required, reducing the operational cost, complexity and risk

Persistent
Long-distance/long-term duration without returning to port or support vehicle for maintenance or refueling

Safety
USVs can operate in harsh conditions where it would be hazardous to send crewed ships

ML Enabled
Many offerings are now supported by machine learning solutions

Real Time Data Access
24/7/365 real-time access to critical information

Proven Technology
USVs have been proven in the harshest of ocean conditions

Uncrewed systems generally offer capability equivalent to traditional platforms with much lower carbon impacts.

- Solar or other alternative power generation
- Propulsion via wind, electric or diesel
- Production and transport of these smaller platforms is also carbon friendly

Shipboard personnel contributions to carbon are huge

- Travel to/from ports
- Food preparation
- Hotel services (A/C, showers, etc)

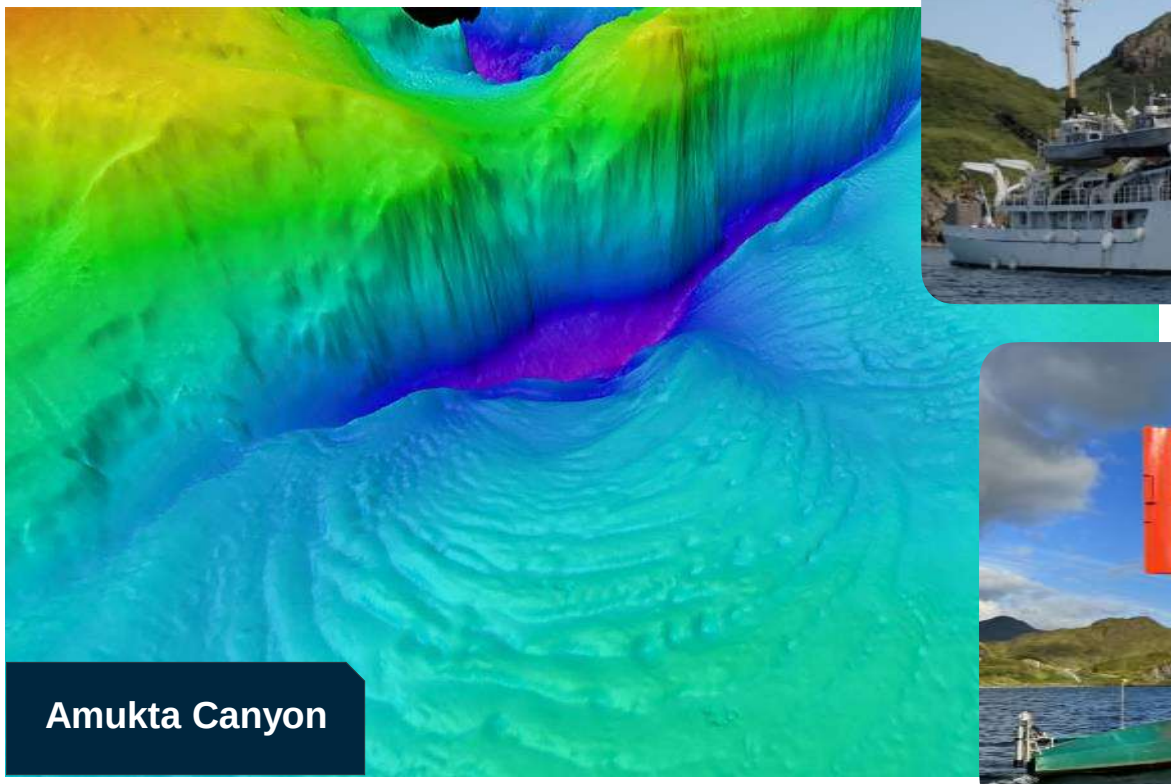
SAILDRONE'S FLEET, WHICH IN 2022 CONSISTED ALMOST WHOLLY OF OUR ZERO-CARBON EXPLORER CLASS USVs, **AVOIDED 99.9% OF OPERATIONAL EMISSIONS** FOR MARITIME DATA GATHERING.

FOR EVERY TONNE OF CO_2e PRODUCED IN OUR 2022 OPERATIONS, **WE AVOIDED 1.43 TONNES OF CO_2e** THAT WOULD HAVE BEEN PRODUCED HAD SAILDRONE USVS NOT BEEN UTILIZED.

Carbon Impacts

Aleutians Uncrewed Ocean Exploration

A long-term survey around the Aleutian Islands and off the coast of California to address ocean exploration gaps in remote areas with USVs.



Amukta Canyon

97.3% Carbon Avoidance

DEEP SEA BATHYMETRY

The Ocean Workforce

- People using remote technologies are often required to operate both the platform and the sensors
- This is not new, but can be very different from traditional crewed vessel operations
- New tools possibly required: high speed & reliable home internet, multiple monitors, home office or remote operations center, satellite communications
- New skills: advanced network troubleshooting, cloud operations, multiple platform management, remote monitoring
- Most importantly, a complete understanding of how a particular platform is constructed, how it maneuvers, its limitations, and how to use it effectively when you are possibly thousands of kilometers away.

People

Fieldwork Redefined?

- Remote platforms provide a real opportunity to greatly increase data quantity and consistency
- Data analysis and management becomes more important than ever
- New or refined processes must be developed to handle remote data flow and storage
- Remote operations opens the aperture for a larger, more diverse workforce.
  - Previously, or recently, physically disqualified individuals.
  - Off ramp for family considerations

Ocean Workforce

Ocean Data Gamechangers

Improvements in computing and satellite communications are opening the door for greater interaction with platforms conducting ocean research

- Onboard (edge) compute stacks
  - GPUs, VMs, 100Gb ethernet
  - Upgradeable quickly
  - Storage continues to get cheaper and smaller form factor
- Cloud Operations
  - Allow for storage and transfer of large datasets
  - Primed for cloud-based analysis and processing of data
- Satellite Communications
  - Starlink works!
  - Offloading full resolution multibeam data in near real-time
  - Zero latency to interact with USV systems

Communications and Computing

Self-aware Ocean Platforms?

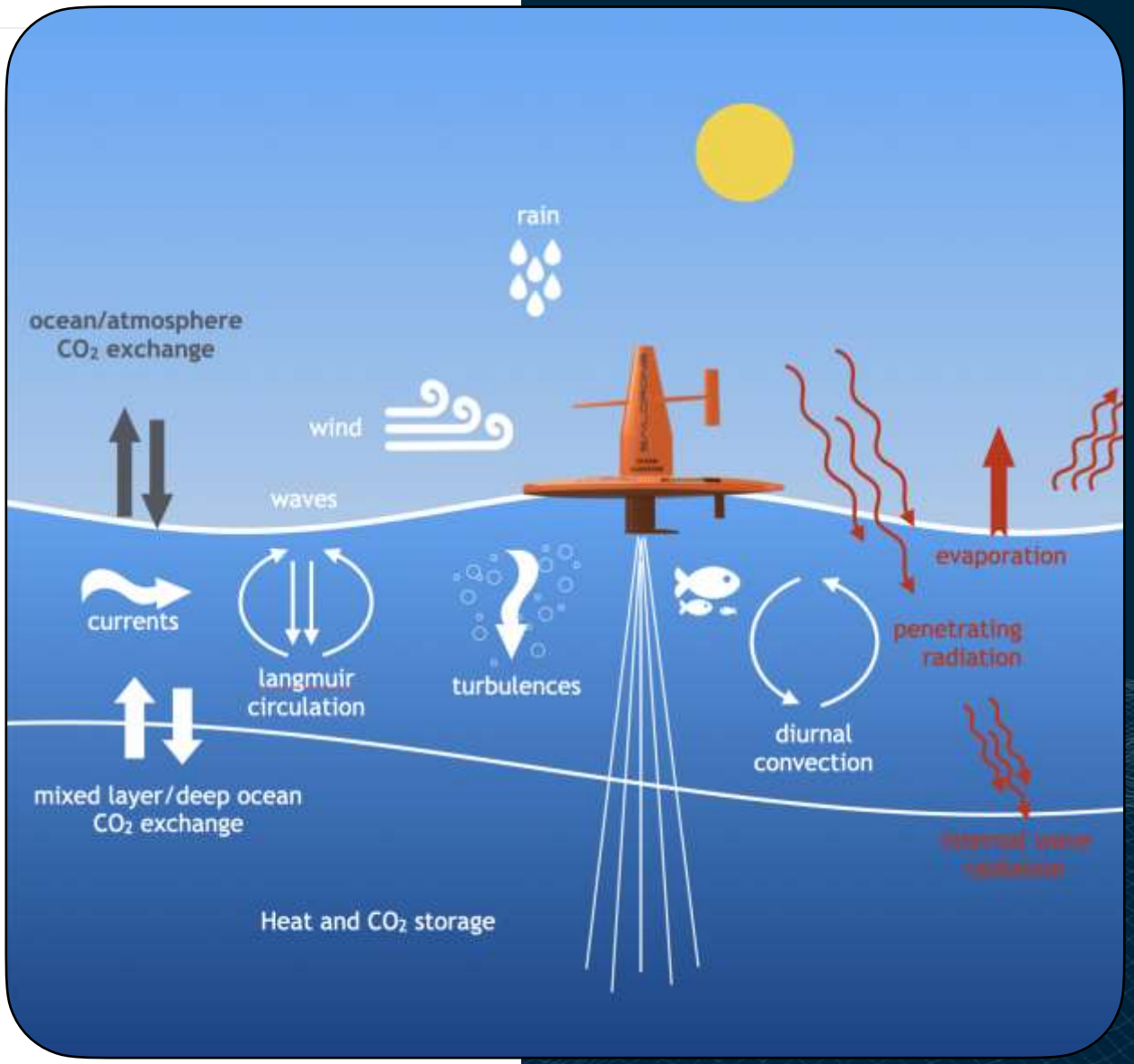
- AI/ML gives a great opportunity to tackle our big data problems and design systems that can adaptively sample based on observed conditions without human interaction
- Prediction: Multibeam processing will be done by automated systems within 10 years
- This can only be achieved if qualified people are involved in training the systems and that expertise is in a nascent stage
- Even so, final QA/QC will likely require sign off by a qualified person—the systems should provide quality metrics and highlight those decisions that require human analysis based on pre-defined rules
- Proliferation of remote platforms will significantly increase data quantity. If we can't process faster and speed delivery to our customers, we have missed the mark
- Edge computing with AI/ML provides faster analysis of critical ocean data.

AI & ML Benefits

Summary

We live in exciting times!

Technology is allowing unprecedented access to our oceans with novel platforms, superb sensors, nearly unlimited communications, and an impressive, engaged cadre of professionals dedicated to saving our oceans.



Introducing the new Saildrone Surveyor

Questions

Thank you!