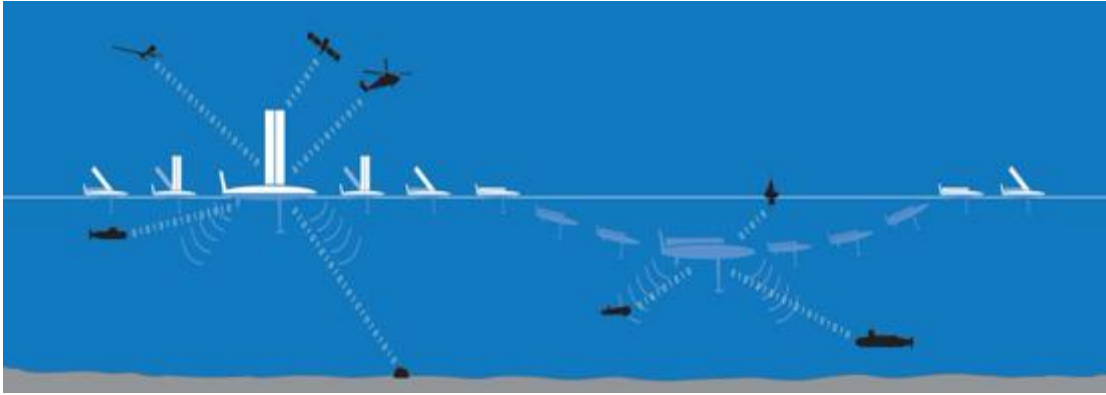


OCEAN AERO



**OCEAN AERO TRITON
BECI WORKSHOP 13JUN2022**

Triton (Gen III) AUSV at a Glance



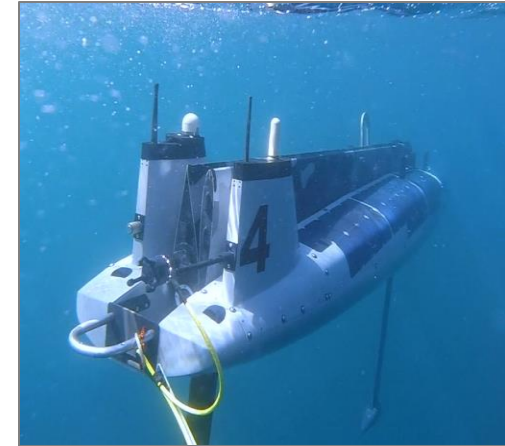
The world's only AUSV (Autonomous Underwater & Surface Vehicle)

Key Product Attributes

- Dual-modality (surface & subsurface)
- Solar & wind powered
- Mobile & easy to deploy & retrieve
- Payload versatile

Value Differentiator

- Avoid detection & surface weather
- Longer range due to recharging ability
- Eliminates on-site launching
- Wider range of surface missions



Preeminent ocean data collection platform; above, on, and below the ocean's surface.

Triton Gen III Details



Unique Value Proposition



- + Remote ship or shore deployment
- + High persistence
- + Unprecedented stealth

Critical Attributes

- Intelligence collection platform
- Surface & subsurface capabilities
- Solar & wind powered
- Scalable to operate in swarms
- Mobile & easy to launch/recover
- Surface Endurance: 3+ months
- Subsurface Endurance: 8+ days

Specifications

- Max Submergence Depth: 200m / 656 ft
- Surface Speed: 5+ knots
- Subsurface Navigation Speed: 2 + knots
- Weight: 350 kg / 775 lb
- Length: 4.4m / 14.5 ft
- Water Line to Top of Sail: 3m/10 ft
- Water Line to Keel Bottom: 1.5m / 5ft
- Hull Width: 0.8m / 2.66 ft
- Battery Power: 4kWh
- Solar Panels: 170W
- Payload: 22.7 kg / 50 lb
- Satellite, Wi-Fi, Backup Tracker, Underwater Acoustic Tracker

Versatile payload capability powered by the wind and sun enables long endurance, dual-modality missions

Science Applications and Payloads



Applications

- 1 Fisheries Biomass & Habitat Monitoring / HABS
- 2 Water Chemistry / Climate Monitoring
- 3 Apex Predator Monitoring
- 4 Marine Mammal Monitoring / IUU
- 5 Cultural Heritage
- 6 METOC / Hurricane Observation
- 7 Seabed Mapping, Substrate Classification
- 8 Vessel Traffic Monitoring

Payloads

Embedded Sensors

- Anemometer
- Air Temp
- Depth / Altitude
- SPRINT-Nav Mini INS/DVL
- AIS Receiver
- GPS/GNSS/PPS

Water Chemistry

- CTD
- Dissolved Oxygen Sensor
- Fluorometer
- Turbidity Sensor
- pH / pCO2
- Nutrients
- Radiance and Irradiance

Fisheries Biomass

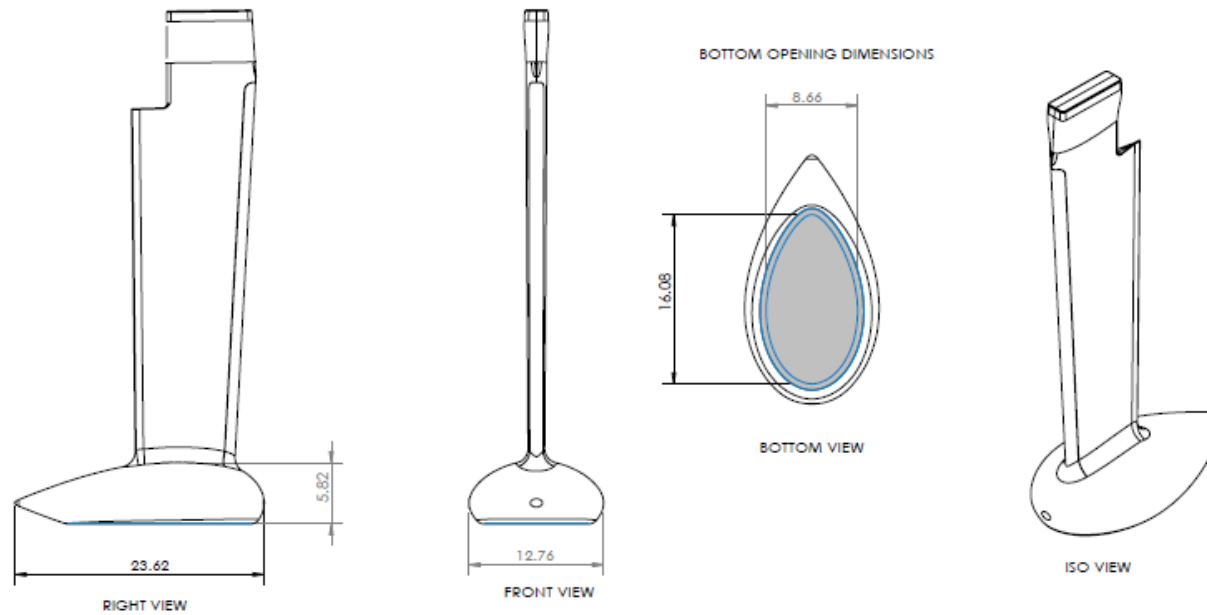
- Fisheries Echosounder
- eDNA collection
- Radiance and Irradiance
- Nutrients
- Cameras (IR,VIS)
- Fish tags
- Sedimentation

Marine Mammal Monitoring

- Cameras (IR,VIS)
- Hydrophone
- Fish tags
- AI/ML Software

Strong use case across multiple marine science applications, 24/7 autonomous data collection

Payloads – Modular Keel and Payload Bay



Autonomous Offshore HAB Sampling Surveys in the Pacific Northwest



[University of Washington's Applied Physics Laboratory](#), [Ocean Aero](#) and partners have embarked on a project to enable offshore harmful algal bloom sampling using the autonomous surface vehicle Triton. Increased opportunities for offshore HAB sampling will contribute to the [Pacific Northwest HAB Bulletin](#) and significantly enhance our ability to detect, forecast, and monitor HABs developing offshore.



This augmented sampling capability will offer more opportunities for early detection—before offshore HABs and toxins reach inshore areas where there is increased risk to human health and fisheries. All of this would contribute significantly to reducing the risk and economic impacts of HABs in the Pacific Northwest.

Processing will be completed within ~24-30 hours of the first sample being collected, with results transferred to an online data display to be developed by the Northwest Association of Networked Ocean Observing Systems on the [HABs website](#).



Partners: Applied Physics Laboratory/UW, Ocean Aero, [UW Olympic Natural Resources Center \(ONRC\)](#), [NANOOS](#), [Oregon State University/Cooperative Institute for Marine Resources Studies \(CIMRS\)](#), [NOAA](#)

Through the ONRC-managed Olympic Region Harmful Algal Bloom (ORHAB) Partnership: Makah Tribe, Quileute Tribe, Quinault Tribe, Hoh Tribe, Washington Department of Health, Washington Department of Fish and Wildlife, UW School of Oceanography, NOAA Olympic Coast National Marine Sanctuary. Through CIMRS: Oregon Department of Fish and Wildlife.

Competitive Set



| Value Drivers → | | Dual Modality | Survivability | Endurance | Stealth | Launch & Recovery | Mobility | Solar Recharging | Payload Size | Payload Weight | Payload Power | Speed |
|-----------------|-------------------------|---------------|---------------|-----------|---------|-------------------|----------|------------------|--------------|----------------|---------------|-------|
| Dual | <u>Ocean Aero</u> | G | G | G | G | G | G | G | Y | Y | G | Y |
| Surface | <u>Liquid Robotics*</u> | R | Y | G | G | Y | G | G | R | Y | Y | R |
| | <u>Saildrone</u> | R | Y | G | R | R | R | G | G | G | G | G |
| | <u>Autonaut*</u> | R | Y | G | Y | G | G | G | R | Y | Y | R |
| | <u>AMS (Datamaran)</u> | R | Y | G | R | R | Y | G | G | G | Y | R |
| | <u>ASV*</u> | R | Y | R | R | R | Y | G | G | G | Y | G |
| Underwater | <u>Remus*</u> | R | G | R | G | G | G | R | Y | Y | Y | Y |
| | <u>Bluefin*</u> | R | G | R | G | G | G | R | Y | Y | Y | Y |
| | <u>Slocum*</u> | R | G | G | G | G | G | R | R | R | R | R |

Ocean Aero technologically ahead and maturing amongst top 3 most relevant contenders

Ocean Aero's Triton Class



<https://www.oceanaero.com/>

<https://vimeo.com/668407988/bd10df118a>

Fully Autonomous, Underwater & Surface Vehicle | It Sails & Dives