



Co-Demonstrating Mobile and Static Assets Powered by Next- Generation Autonomous Offshore Power System

Diversification: Opportunity through
Evolution panel

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Proprietary Information.

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C-Power Background

- ▶ Ocean energy company providing wave-powered solution
- ▶ Technology originated and developed in >\$30 million of U.S. DOE, Navy, and DARPA funded projects
- ▶ A decade of engineering, modeling and testing and sea trials alongside 3rd party technical reviews by DNV
- ▶ Purpose-built product range covering kW- to MW-scale power requirements
- ▶ 51 patents granted to date

Our offshore power products

SeaRAY™



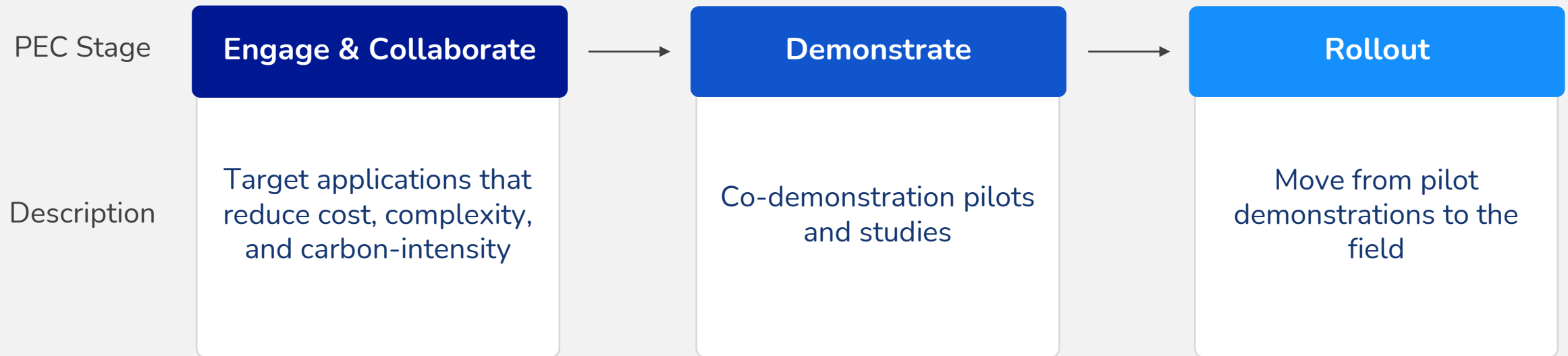
kW-scale

StingRAY™



MW-scale

Our Partner Engagement and Co-Development (PEC) program facilitates co-demonstration



PEC leverages C-Power's federally funded pilots to co-demonstrate with Tier 1 and Tier 2 suppliers, OEMs, and owner/operators.

SeaRAY development roadmap

DARPA – WEBS
2017



TigerRAY
Wave Power
System (WPS)
2021



Hawaii SeaRAY
Autonomous Offshore
Power System (AOPS)
2023



Oregon SeaRAY AOPS
2024



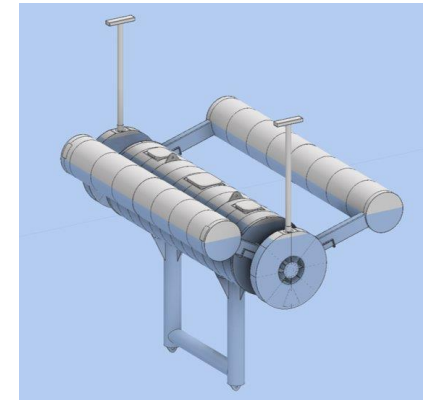
Drifting - Wave



Drifting - Wave



Moored – Wave+Solar



Moored – Wave+Solar

U.S. NAVY PHASE 1, 2 & 3 DEPLOYMENTS

SeaRAY Wave Power System (TigerRAY drifting model)

C·POWER™

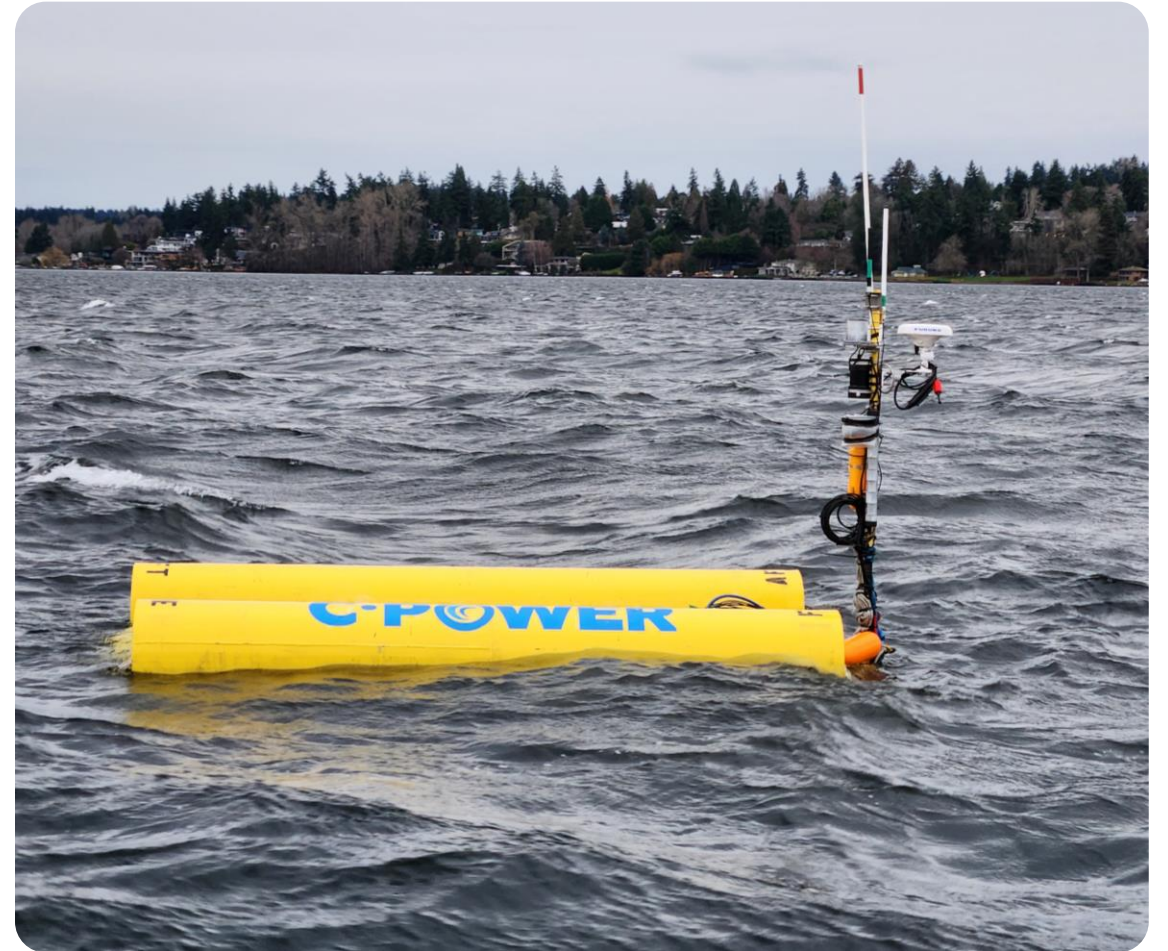
**TigerRAY loaded
on trailer for
shipment**



Phase 2 deployment



Phase 3 deployment

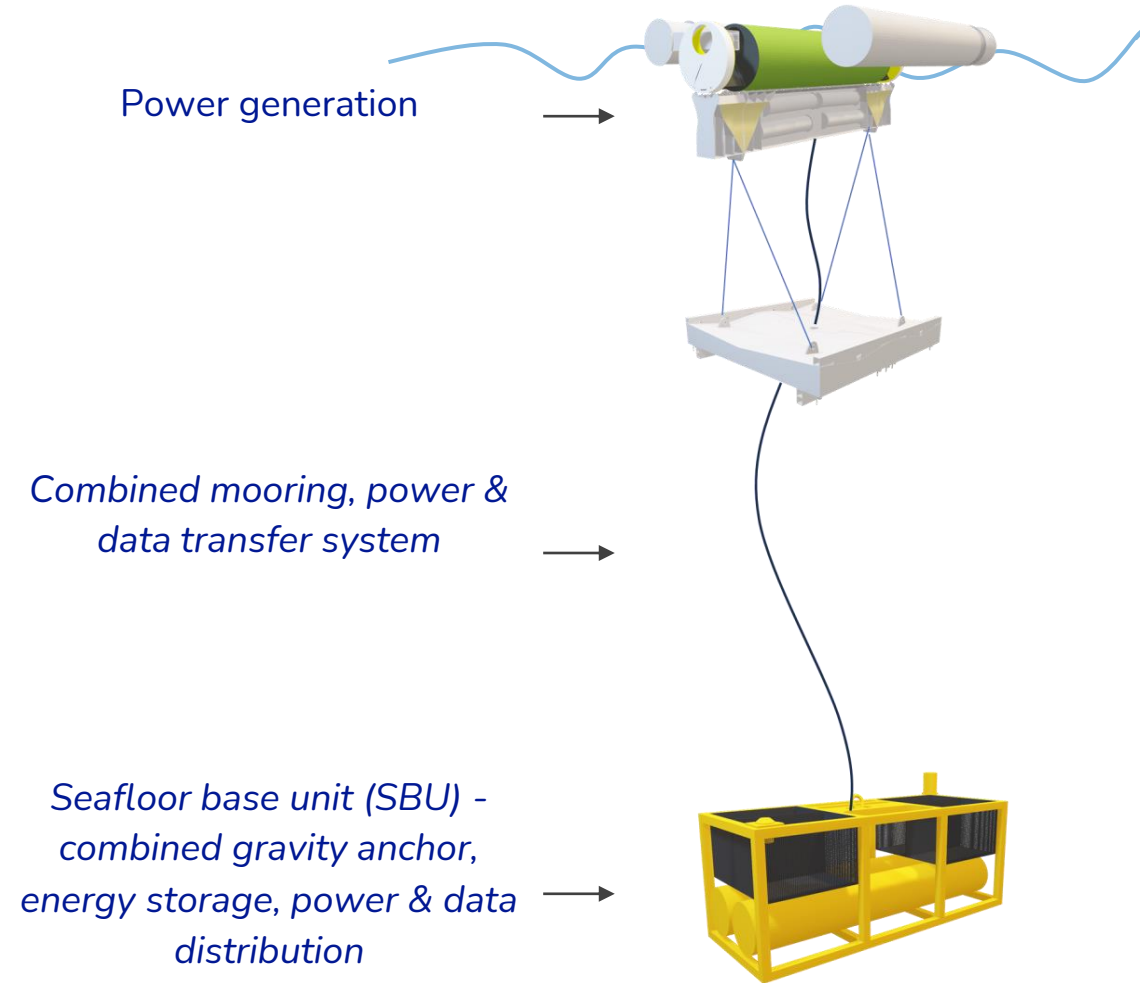


WAVE ENERGY TEST SITE (WETS), HAWAI'I

Hawai'i SeaRAY AOPS

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SeaRAY Autonomous Offshore Power System (AOPS)



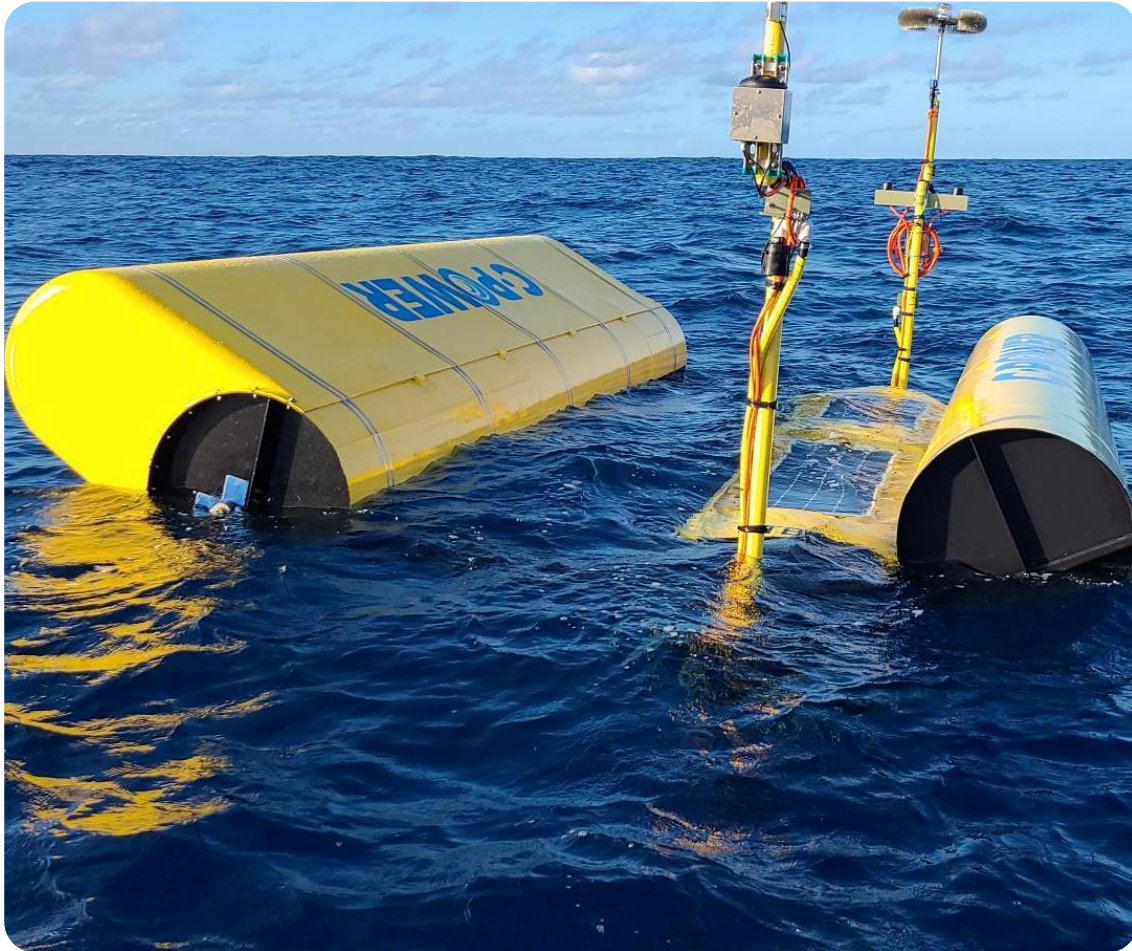
Delivery to Hawai'i



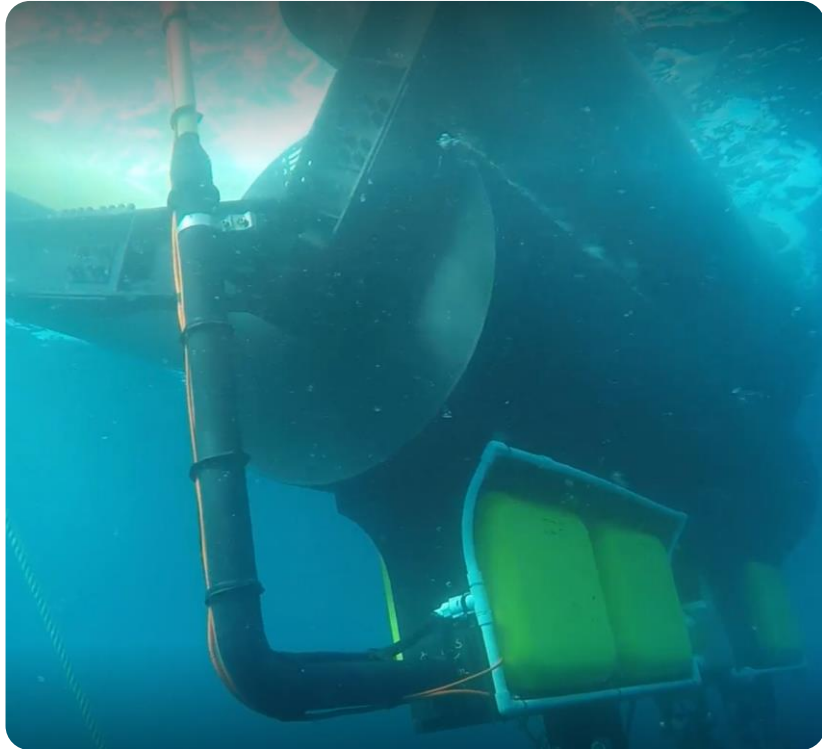
**In-harbor
operational trials**



Deployed Hawai'i SeaRAY AOPS



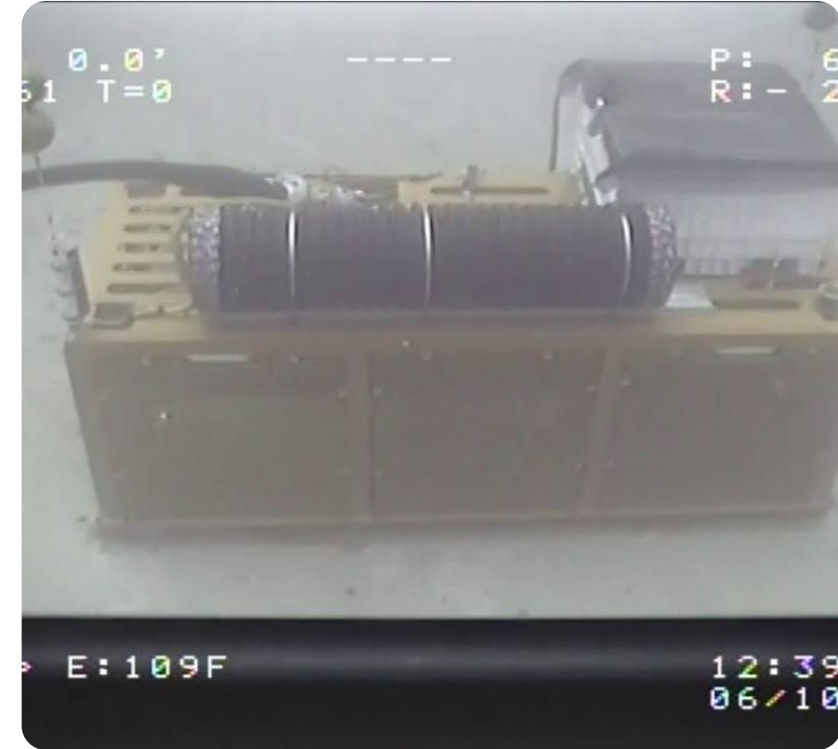
AOPS subsea components



SeaRAY



Heave plate and mooring line

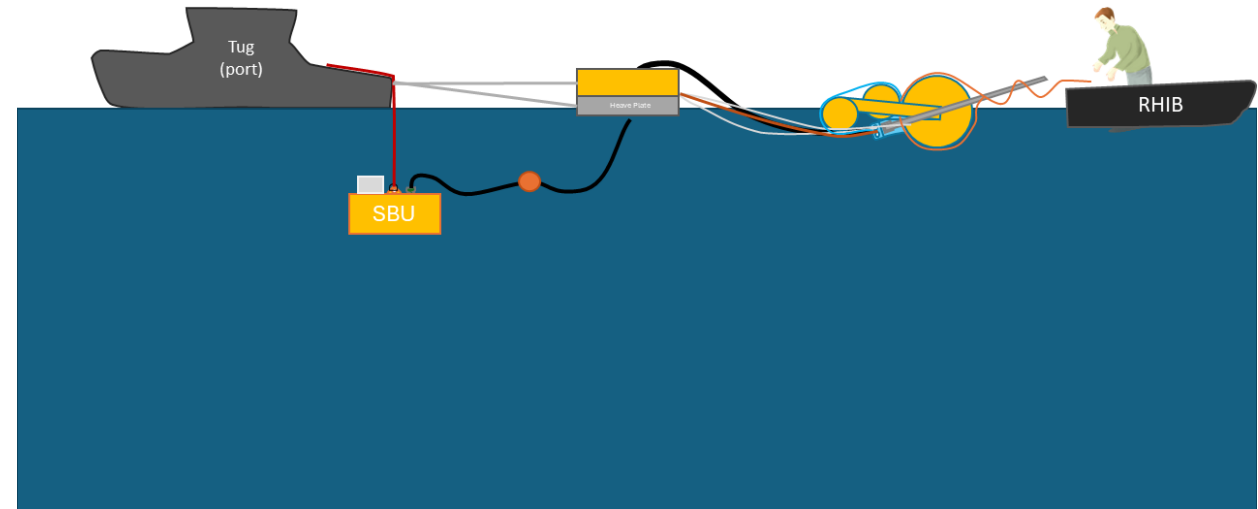


SBU

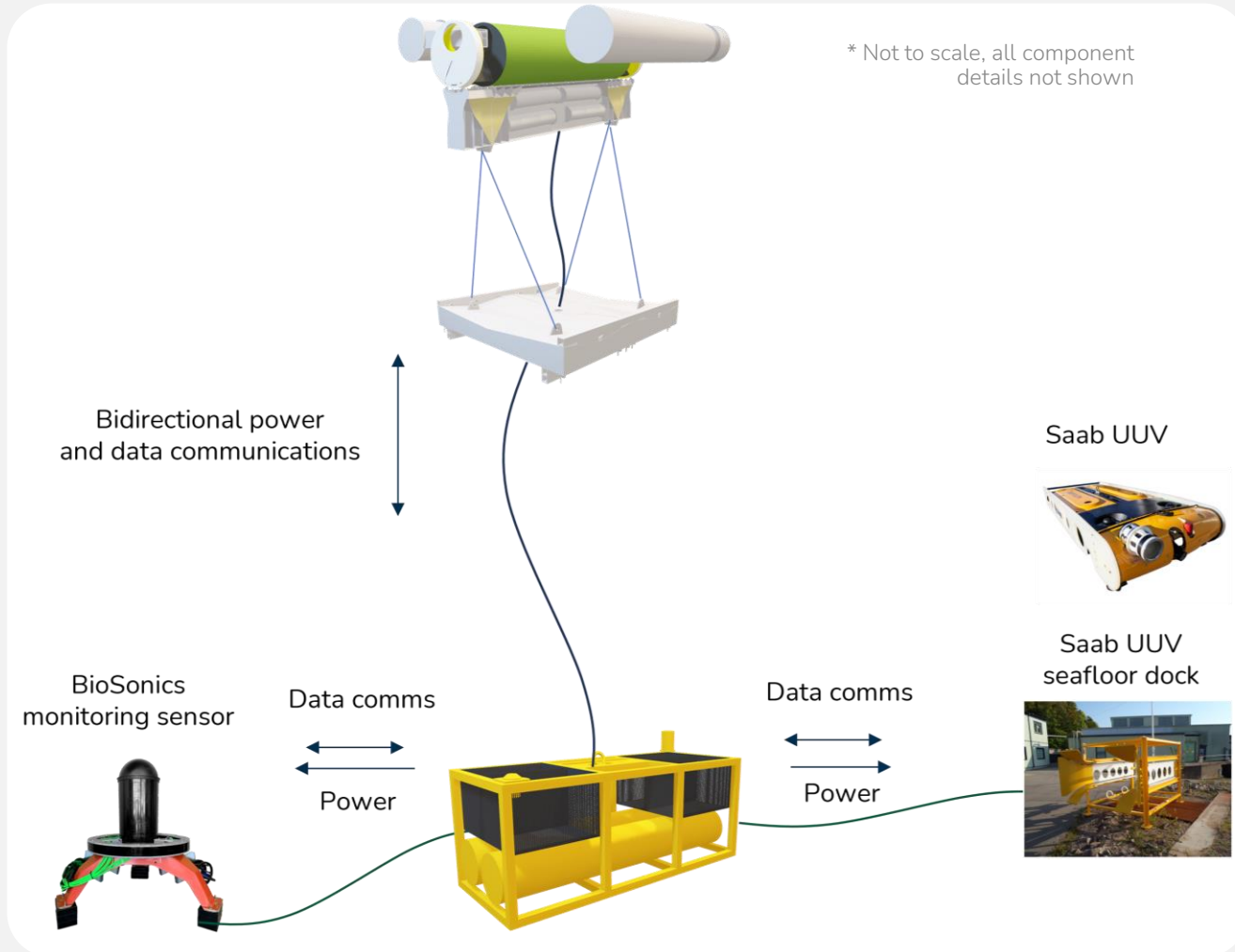
Phase 1 completion and tow in



Towed AOPS storyboard – Phase 2 Full string, towed deployment – anchor to surface



Hawai'i Phase 2 – Trident Warrior / RIMPAC 2024



- ▶ World's largest maritime military exercise (26 nations participated in 2022, 34 expected in 2024)
- ▶ 1st PEC program co-deployments
 - BioSonics seafloor monitoring sensor
 - Saab UUV
- ▶ Experiment execution July 2024

PACWAVE TEST SITE, OREGON

Oregon SeaRAY AOPS



Oregon SeaRAY AOPS

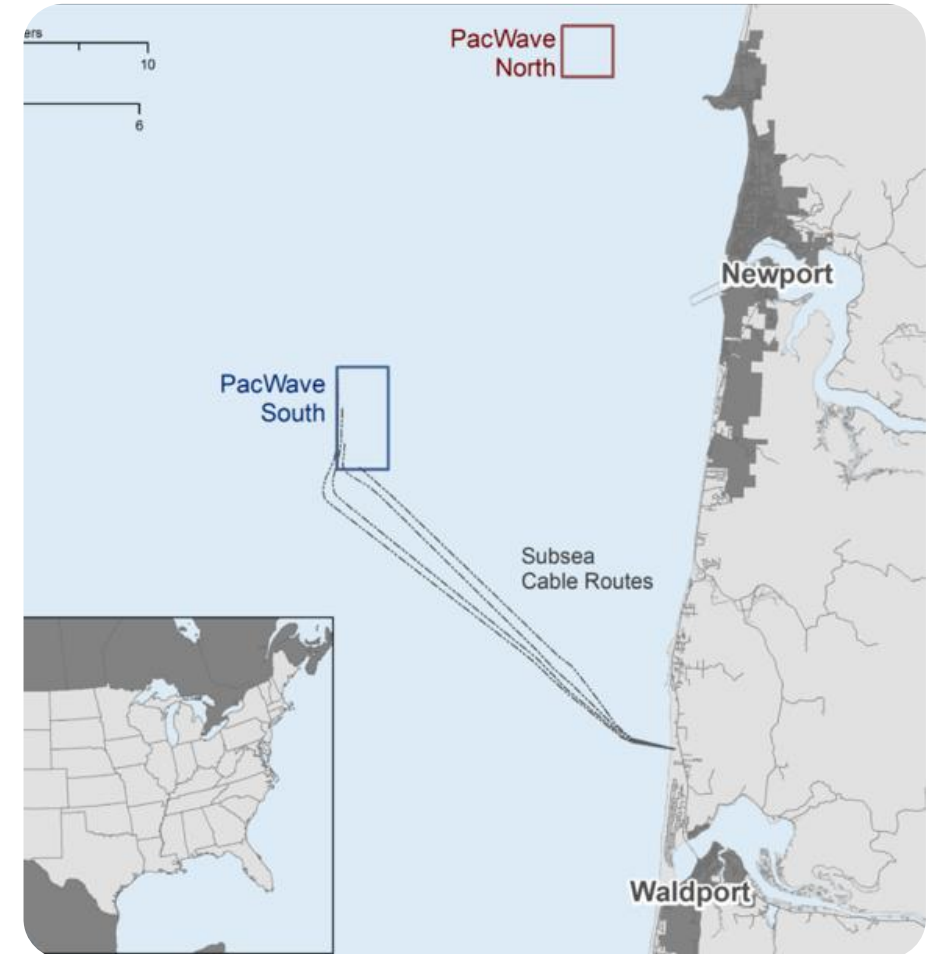
C-Power and U.S. Department of Energy sponsored

4th generation SeaRAY AOPS

- ▶ Oregon model more than 2x output of Hawai'i model
- ▶ Shippable in standard ocean containers
- ▶ New capabilities benefit all targeted market sectors
- ▶ Moored system with 18-month deployment at PacWave South test site

PEC co-demonstrations

- ▶ Static and mobile assets
- ▶ Surface and seafloor
- ▶ Broad range of applications and market sectors



Supported assets and partners

Sonardyne Origin 600 ADCP

- Seafloor base mounted

Wavefront Systems Sentinel 2 IDS

- Seafloor base mounted

Fugro sensor package

- Sensors include eDNA sampler, hydrophone, observatory camera, and Ph + turbidity measurements
- Mounted on seafloor lander

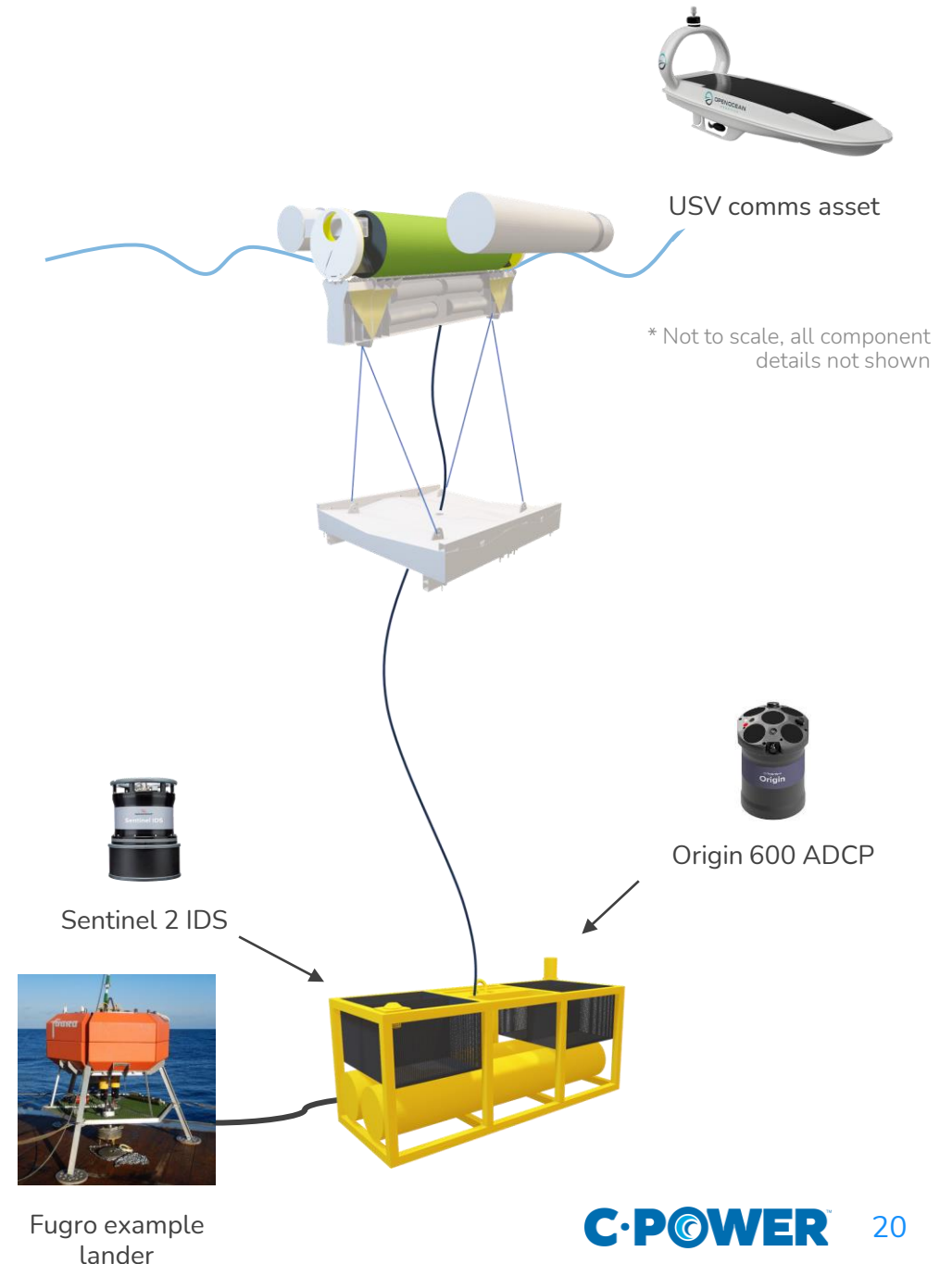
Open Ocean Robotics USV data muler

- Surface system

Shell Technology - Marine Renewable Program

- Project support

Subsea7 (TBD)



Major AOPS enhancements

A – Surface components

- ▶ Longer service life
- ▶ Increased generation capacity
- ▶ Next gen power electronics & SCADA
- ▶ Satellite communications

B – Mooring components

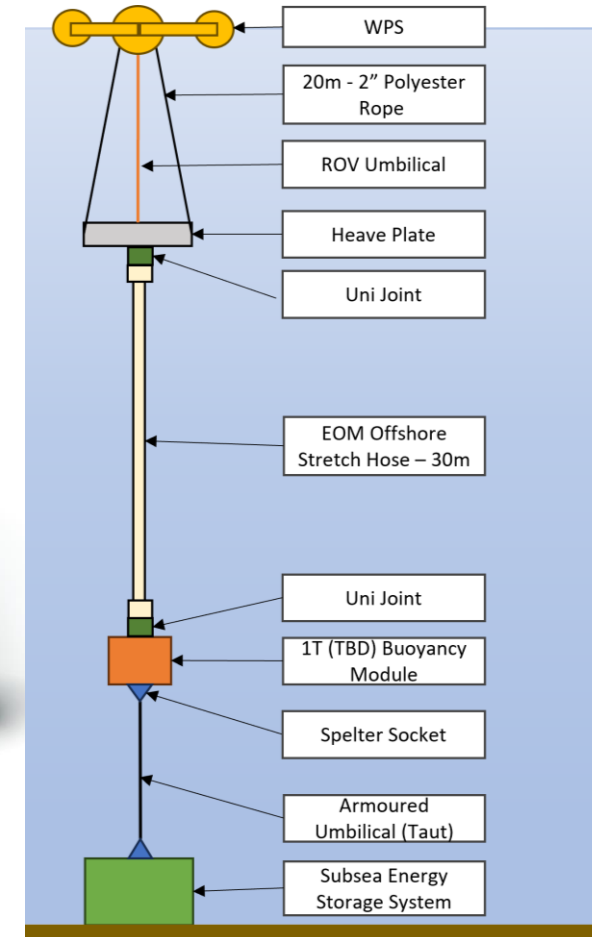
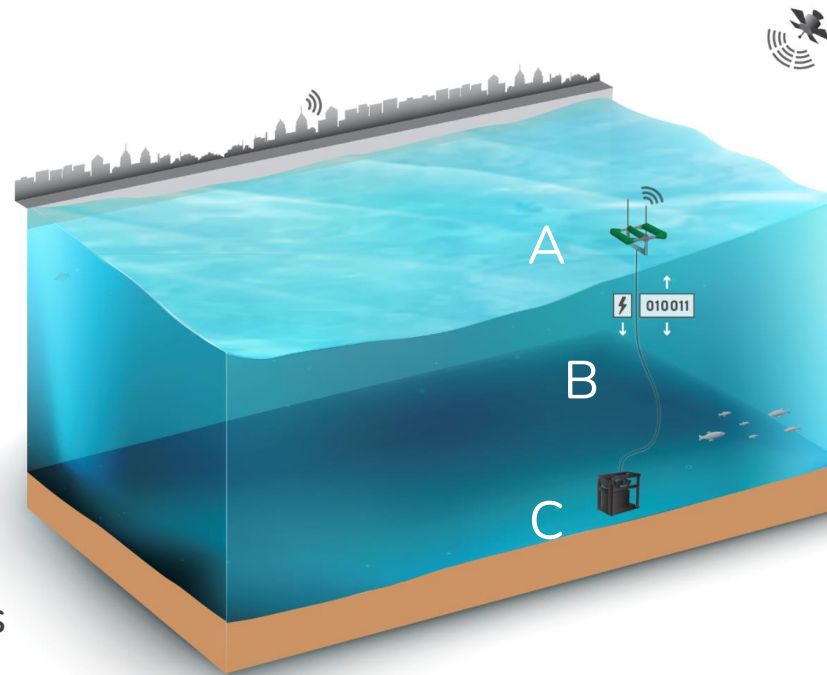
- ▶ Deep-water ready mooring

C – Seafloor components

- ▶ Broader asset support capabilities

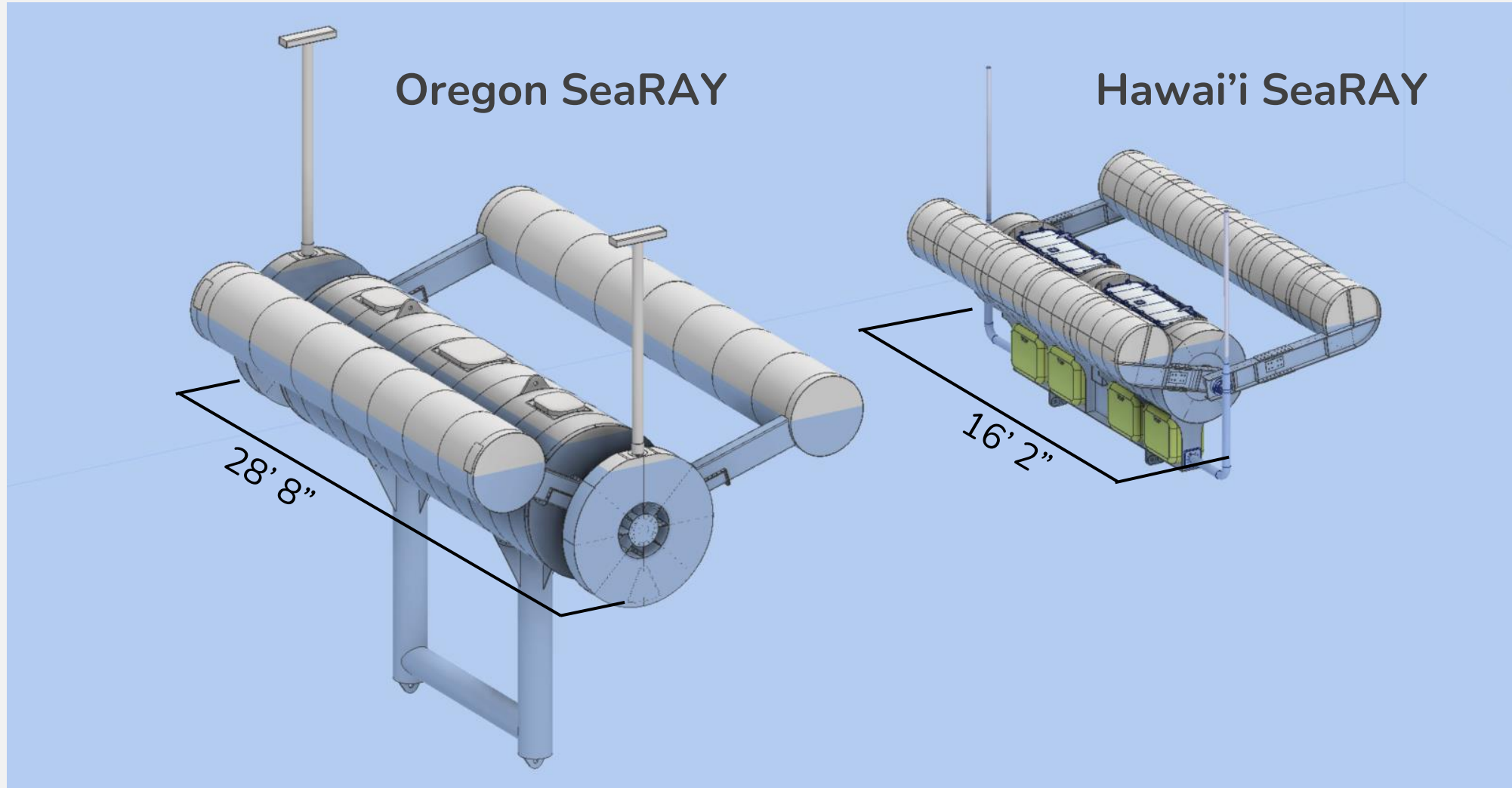
Other

- ▶ O&M & logistics strategy improvements



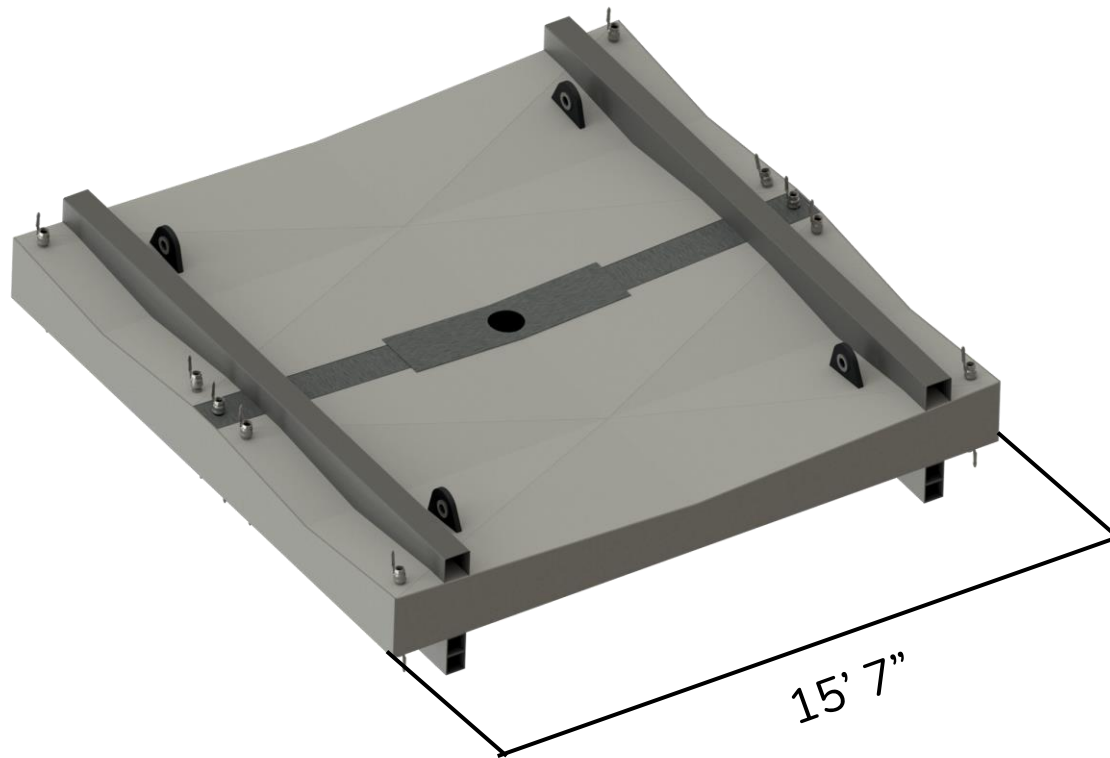
Deepwater mooring

Hull upgrades and size comparison

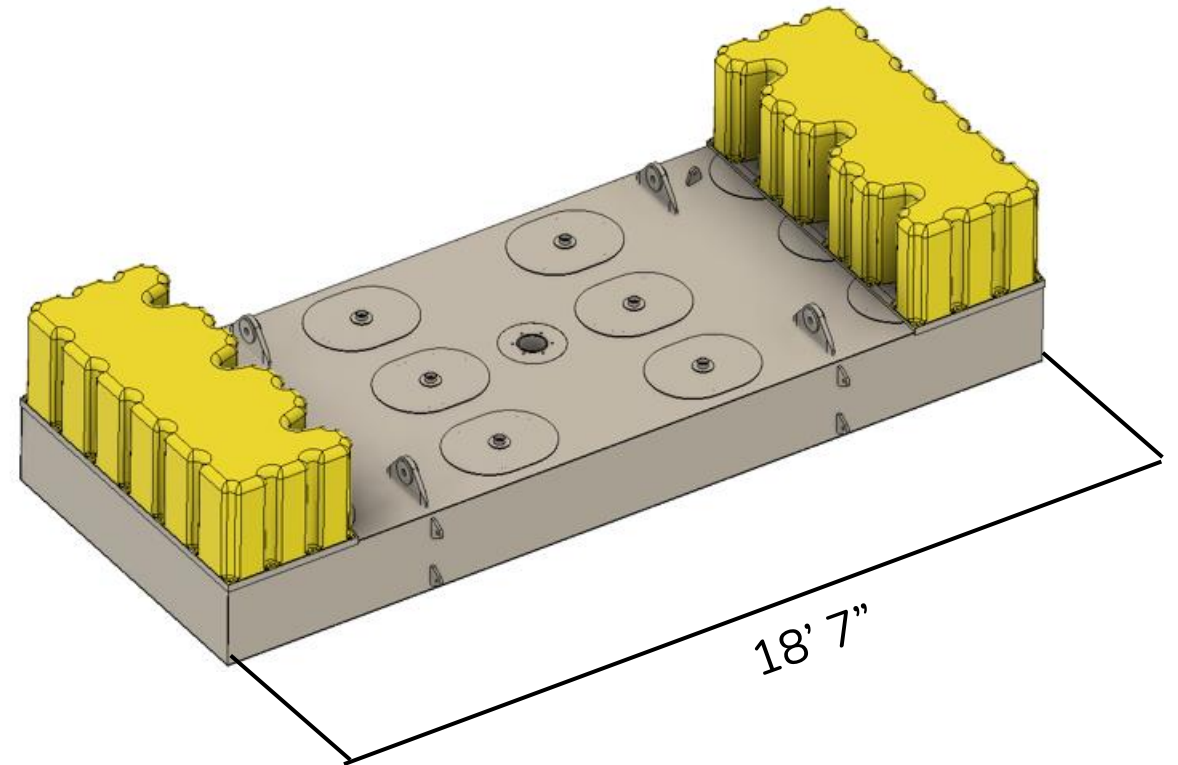


Heave plate optimization

Oregon SeaRAY



Hawai'i SeaRAY



Accelerating field deployments through co-demonstration

- ▶ Two part strategy
 - Market discovery
 - Implement, integrate, and co-demonstrate
- ▶ Market driven product roadmap
 - Making sufficient energy supplies available vs how much can be produced at any time
 - Streamlined deployment/recovery
 - Non-complex, deepwater-ready mooring
 - Hardened systems and physical and cyber-security
 - Broadened asset support
- ▶ Customer and partner participation
 - 8 **Demonstrate** partners across multiple in-water pilots
 - 40 **Engage** participants



Thank you.

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