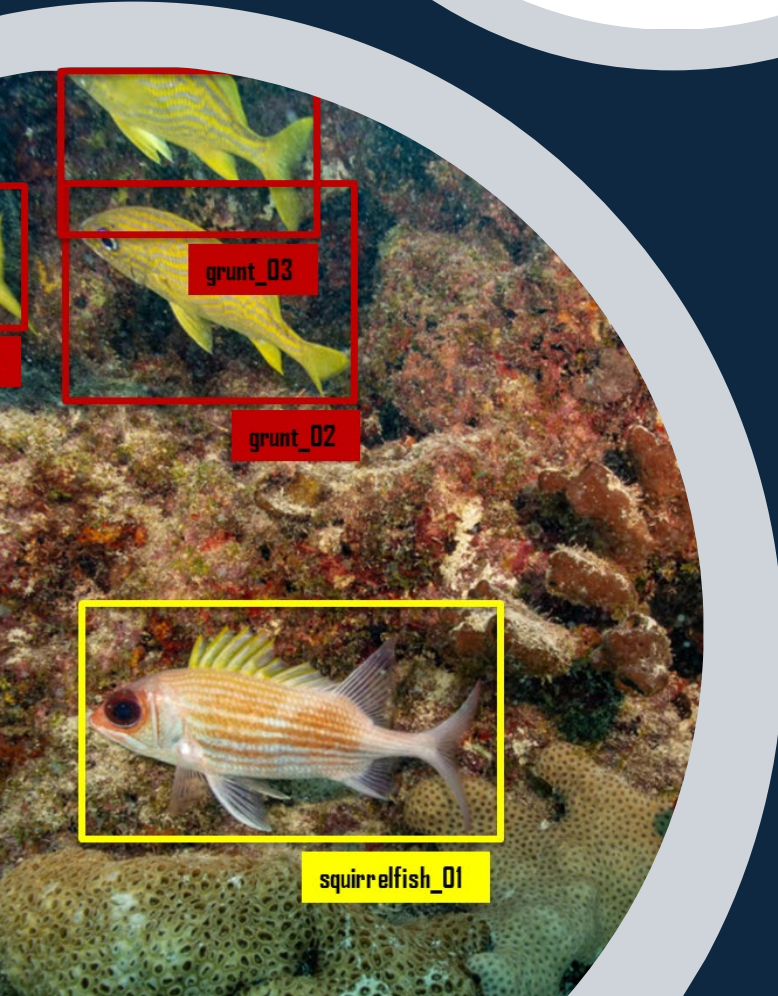
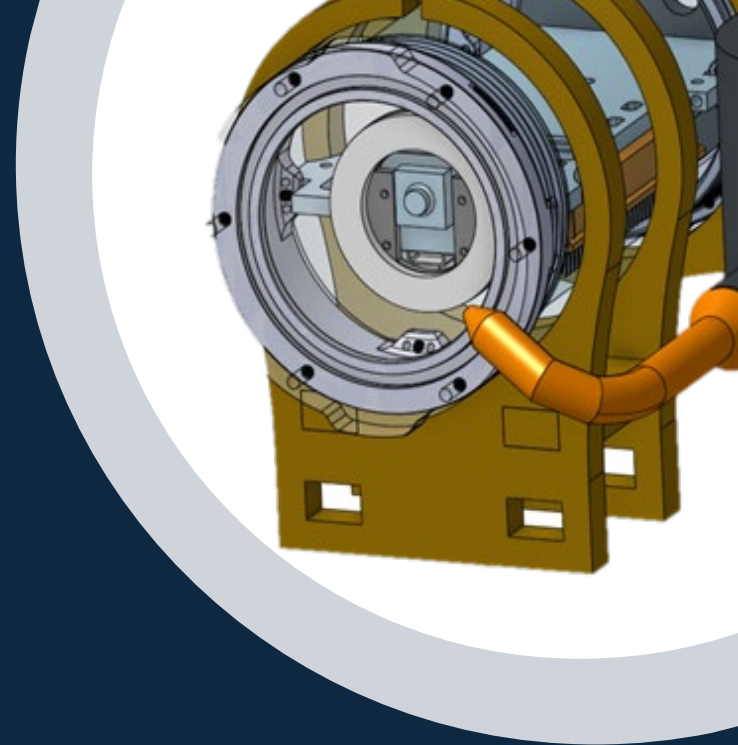
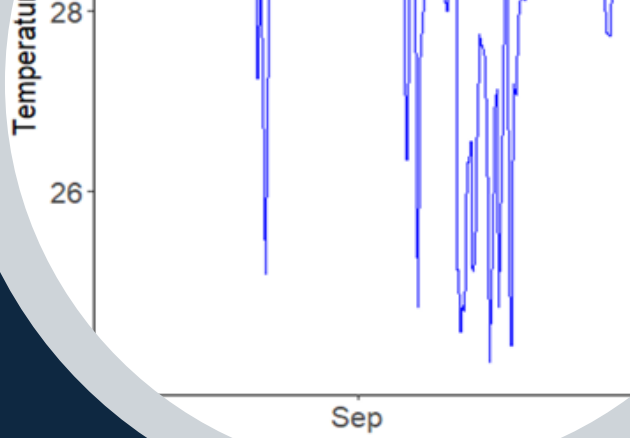
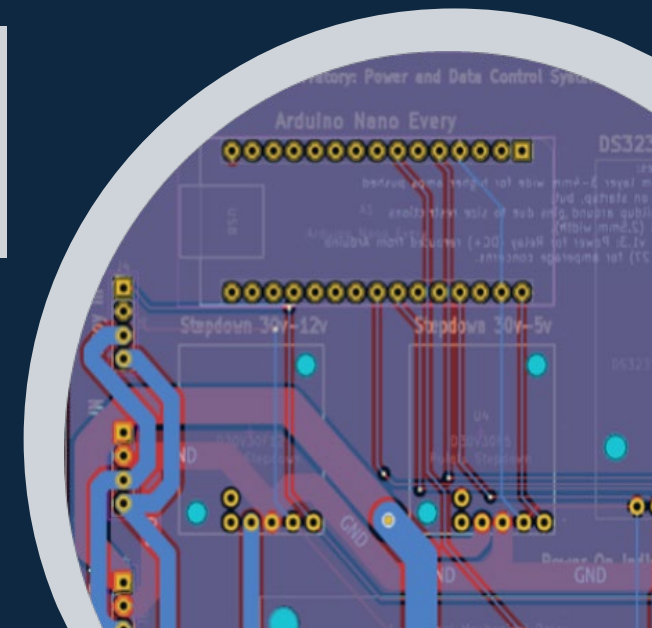
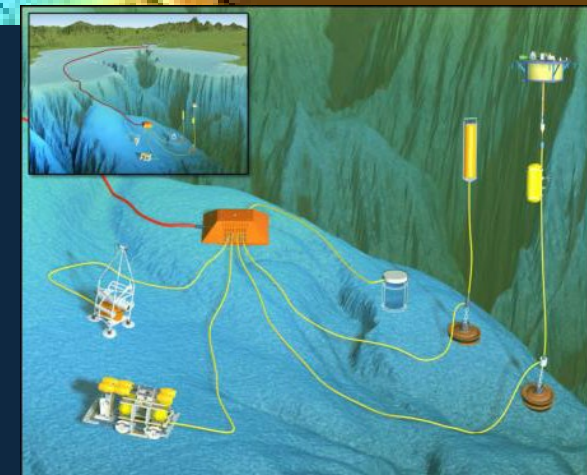
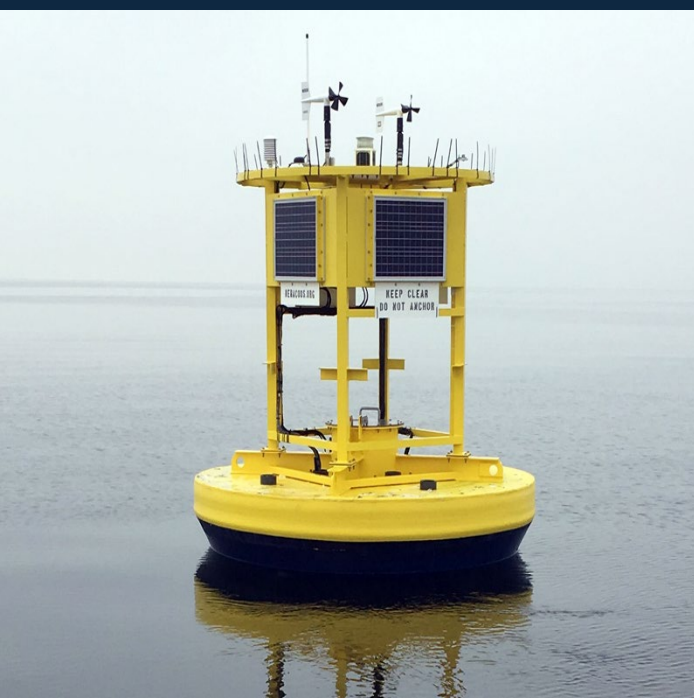


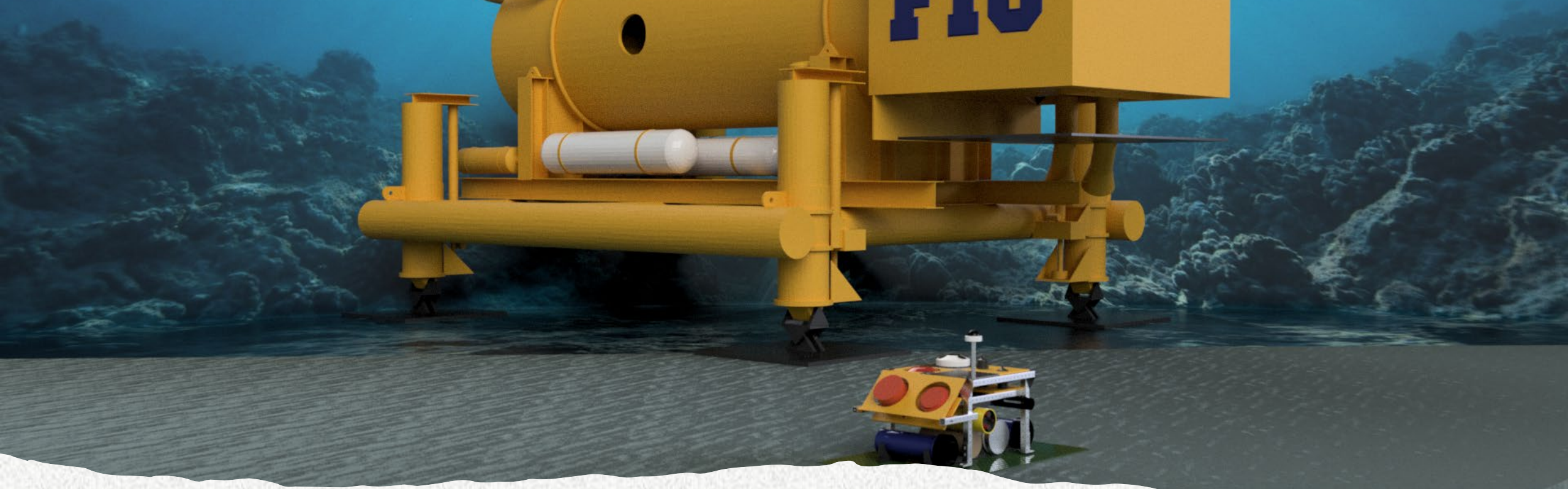


The Aquarius Coral Reef Observatory: A Flexible Remote Sensing Solution in the Florida Keys

Benjamin M Binder & James W Fourqurean
Florida International University



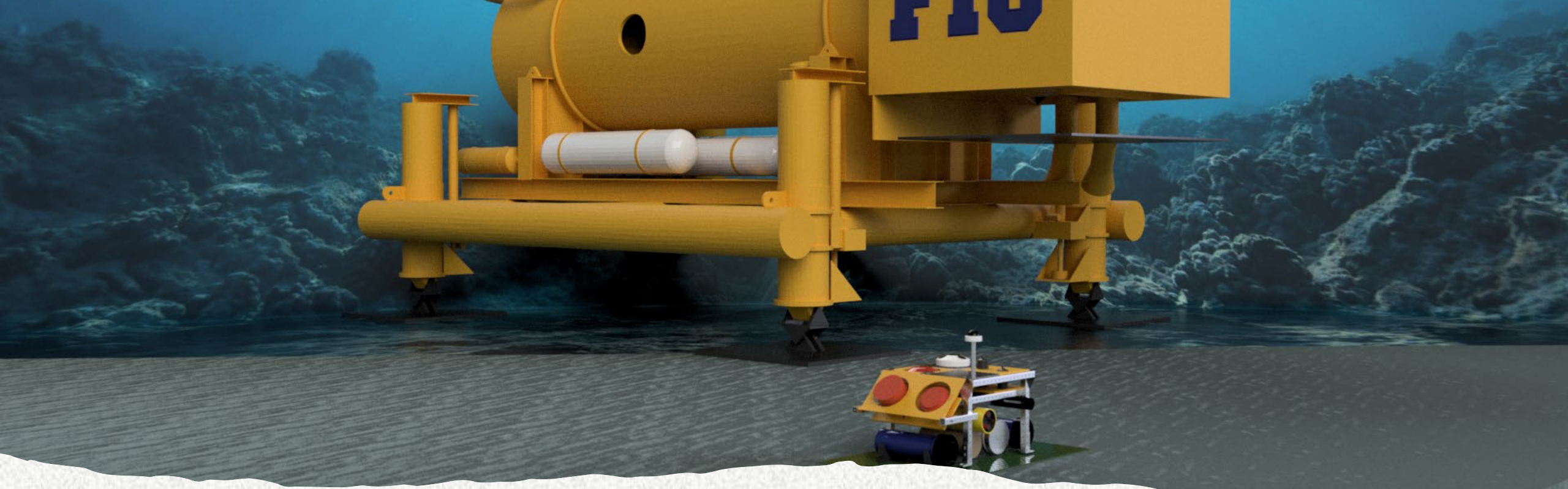




The Aquarius Observatory

Conceived of as a way to expand capabilities of the Aquarius Reef Base.

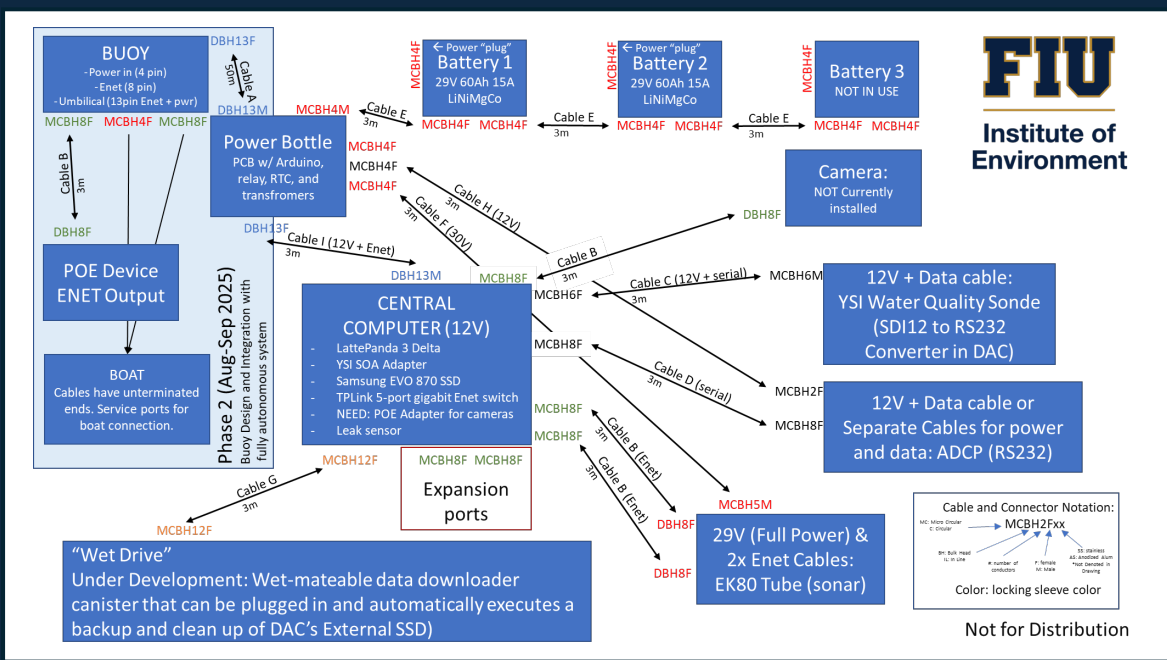
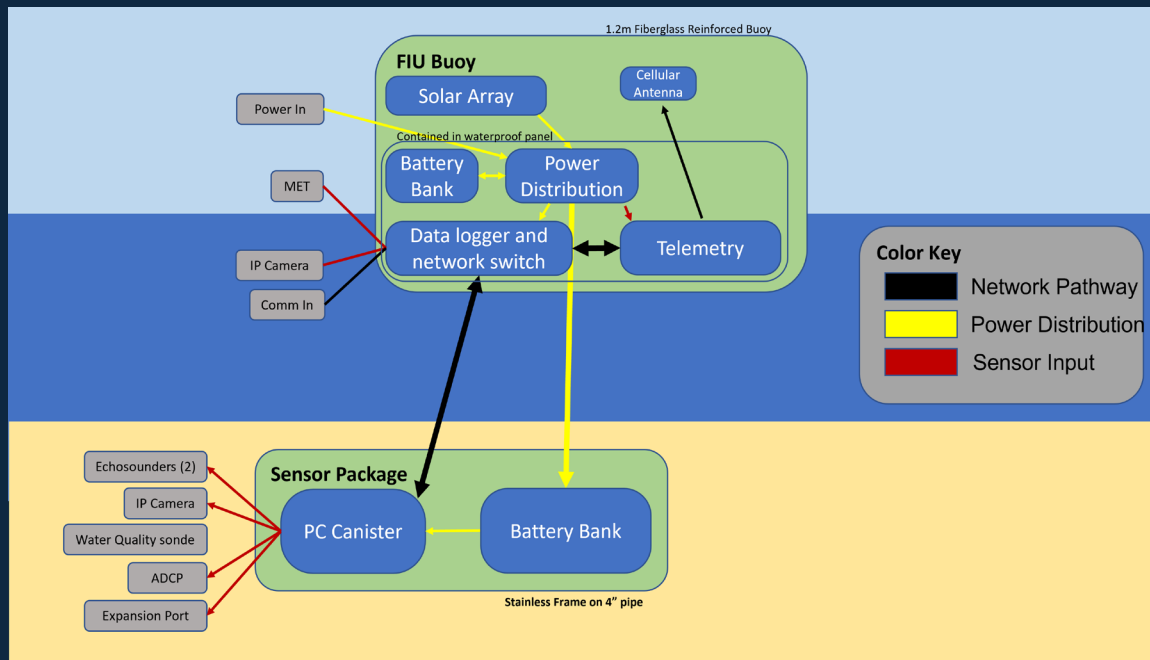
Built to be a testbed for development and a public resource to the stakeholder community.



The Aquarius Observatory

A flexible open source research platform focused on innovation.

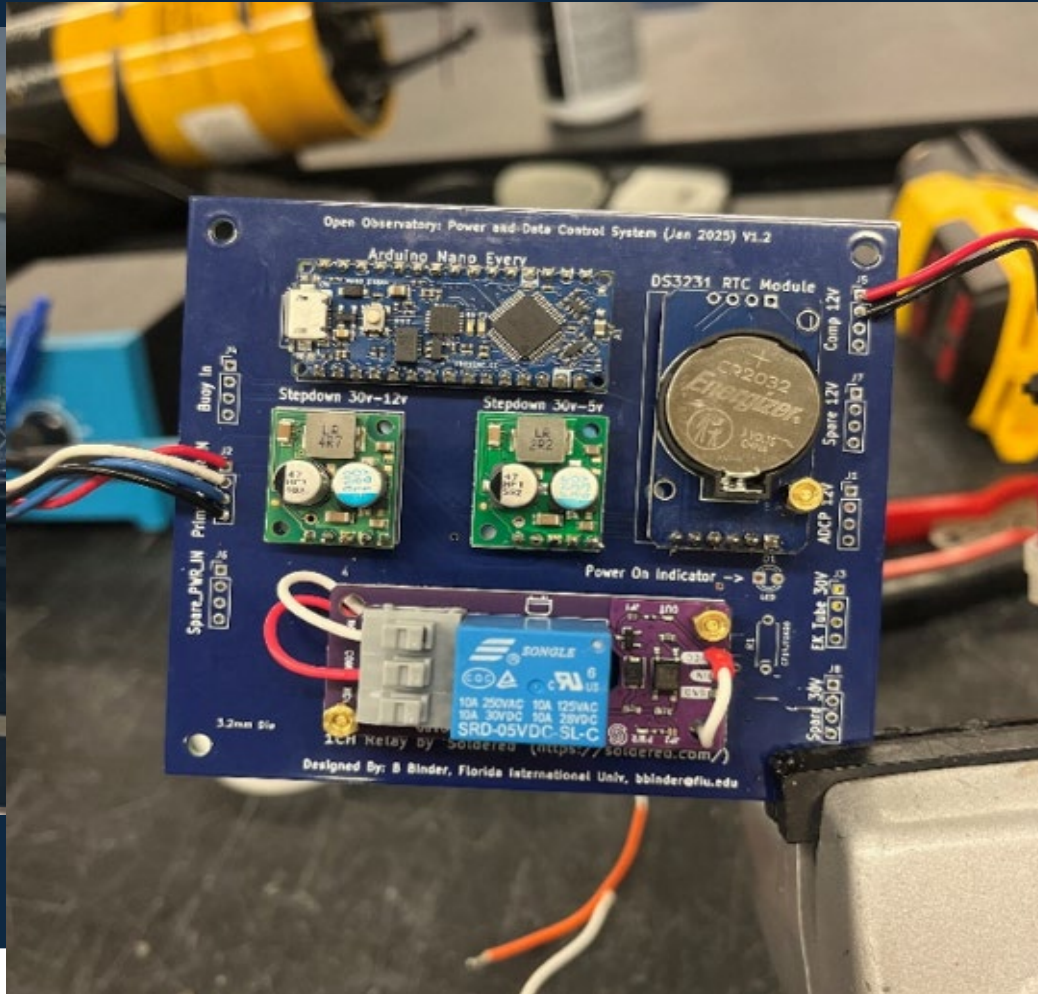
Designed to be fabricated with accessible materials to save on costs, supporting scalability and transferability.



The Aquarius Observatory

Started as flow charts and matured into real conceptual designs and products.

Consists of paired echosounders, water quality probes, ADCP's, hydrophone, acoustic receiver, custom computers and power controllers.

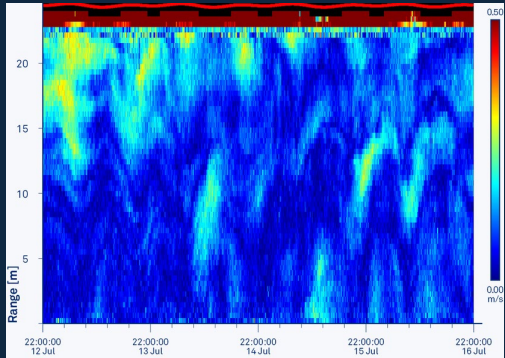


The Aquarius Observatory

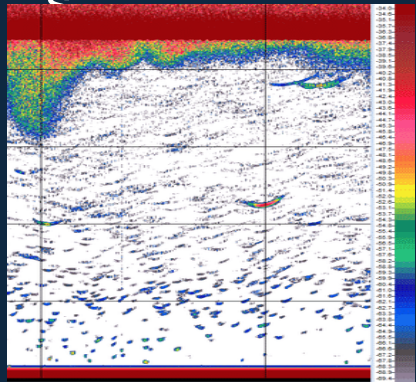
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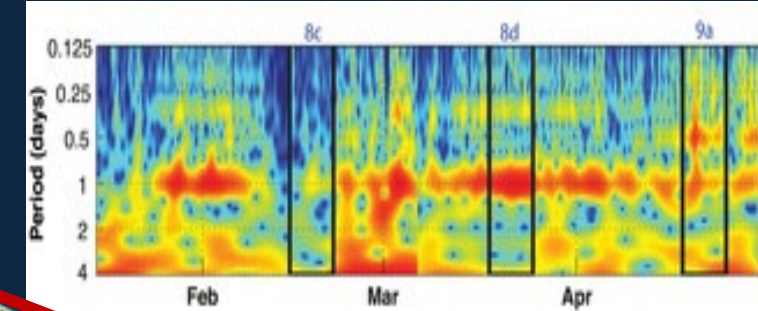
ADCP's



Echosounder



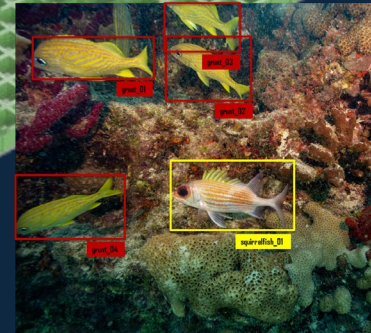
Hydrophones



WQ Sonde



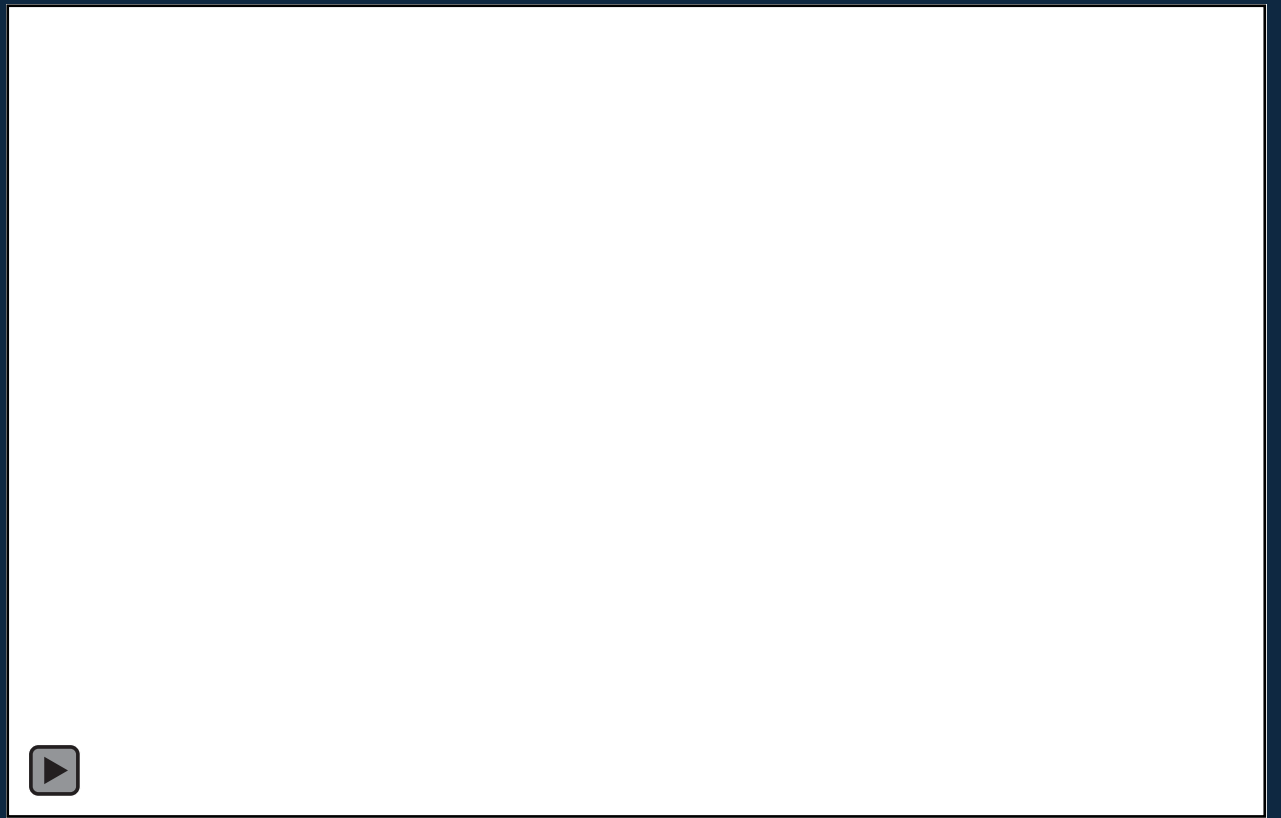
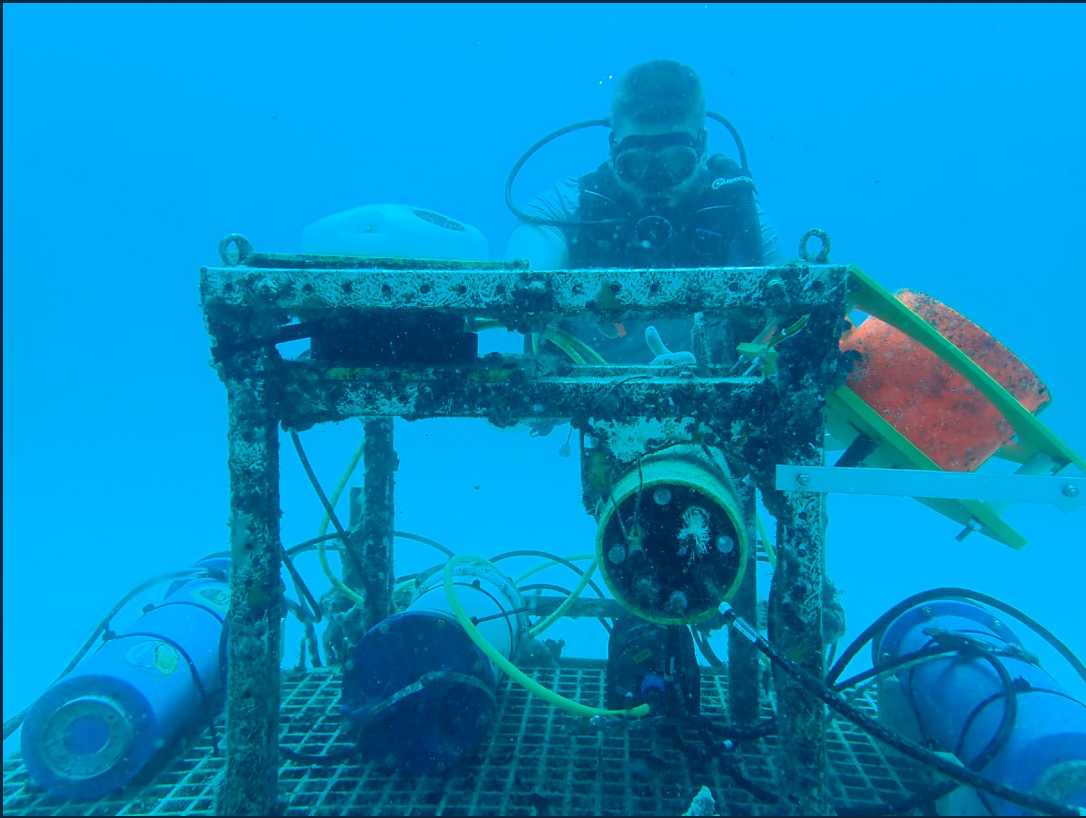
Cameras



The Aquarius Observatory

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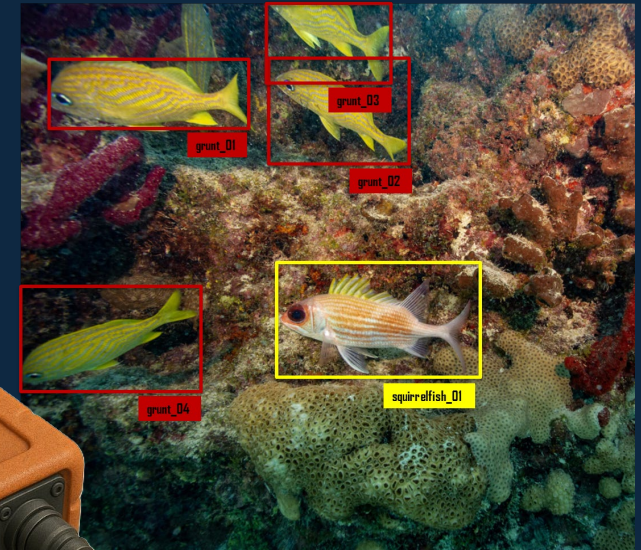
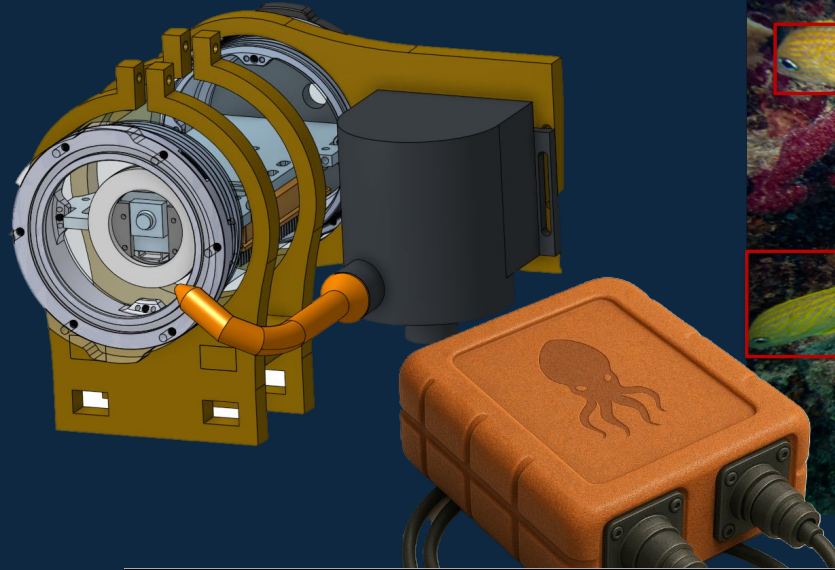
The Aquarius Observatory

First prototype was deployed Fall 2024, and two iterations have followed.

Releasing the full suite of software packages, schematics, and design notes to Github by the end of the year.

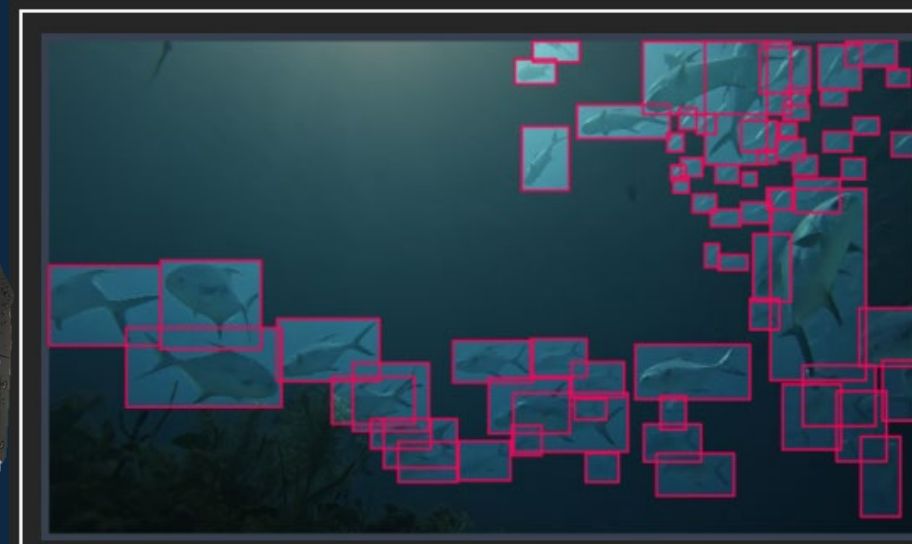
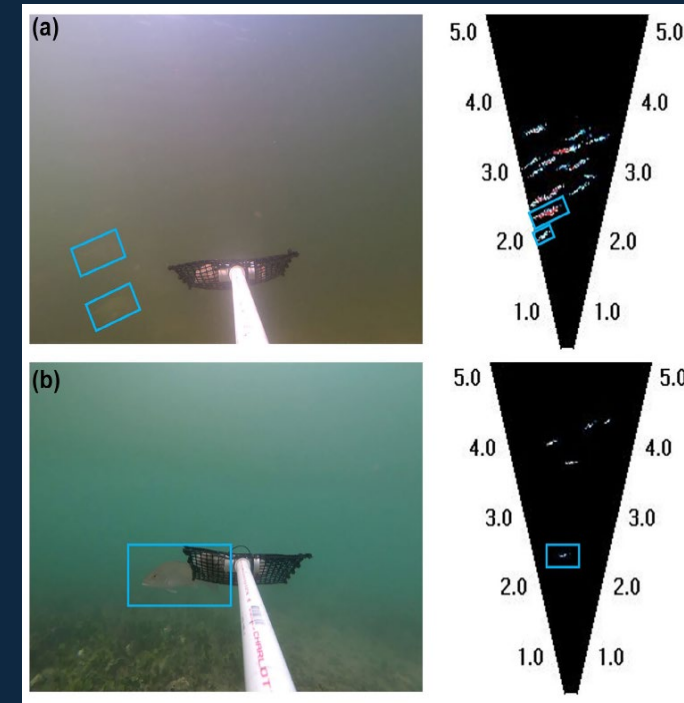
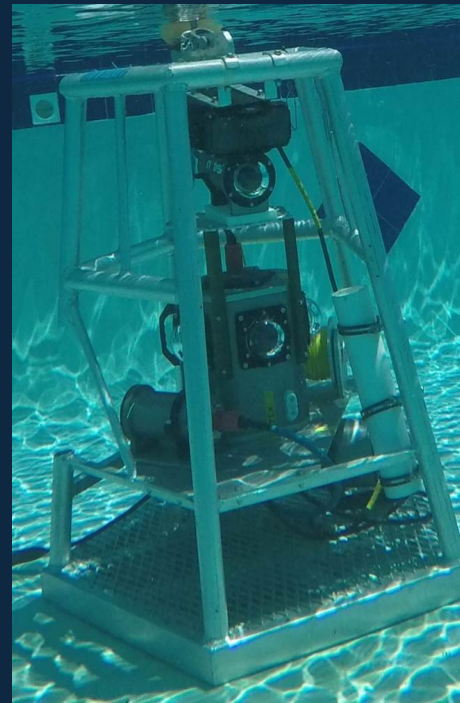
Targets on the Horizon

- The “Sea Drive” and Water Knife Projects
- AI software for detection and classification of boats and fish sounds
- **Experiment with video logger's vs embedded AI systems to reduce collection : reporting lag**
- **Scaling instrument packages to address different programmatic objectives**



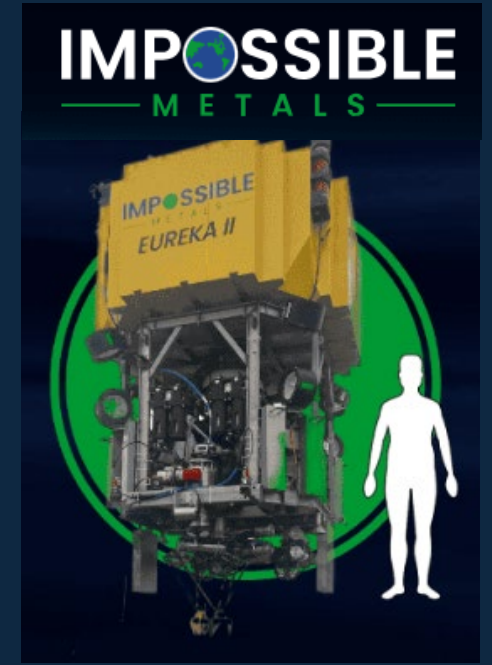
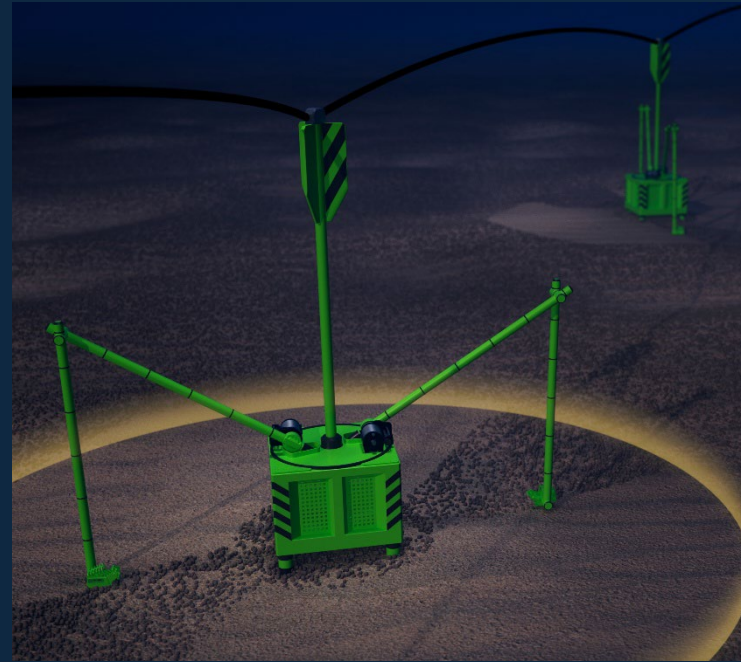
Targets on the Horizon

- Ongoing efforts to pairs cameras of various types with acoustic imaging sonar.
- Using computer vision and machine learning to classify species and extract data from different data types
- Goal is to reduce the lag between collection and reporting of data to aid fisheries managers.



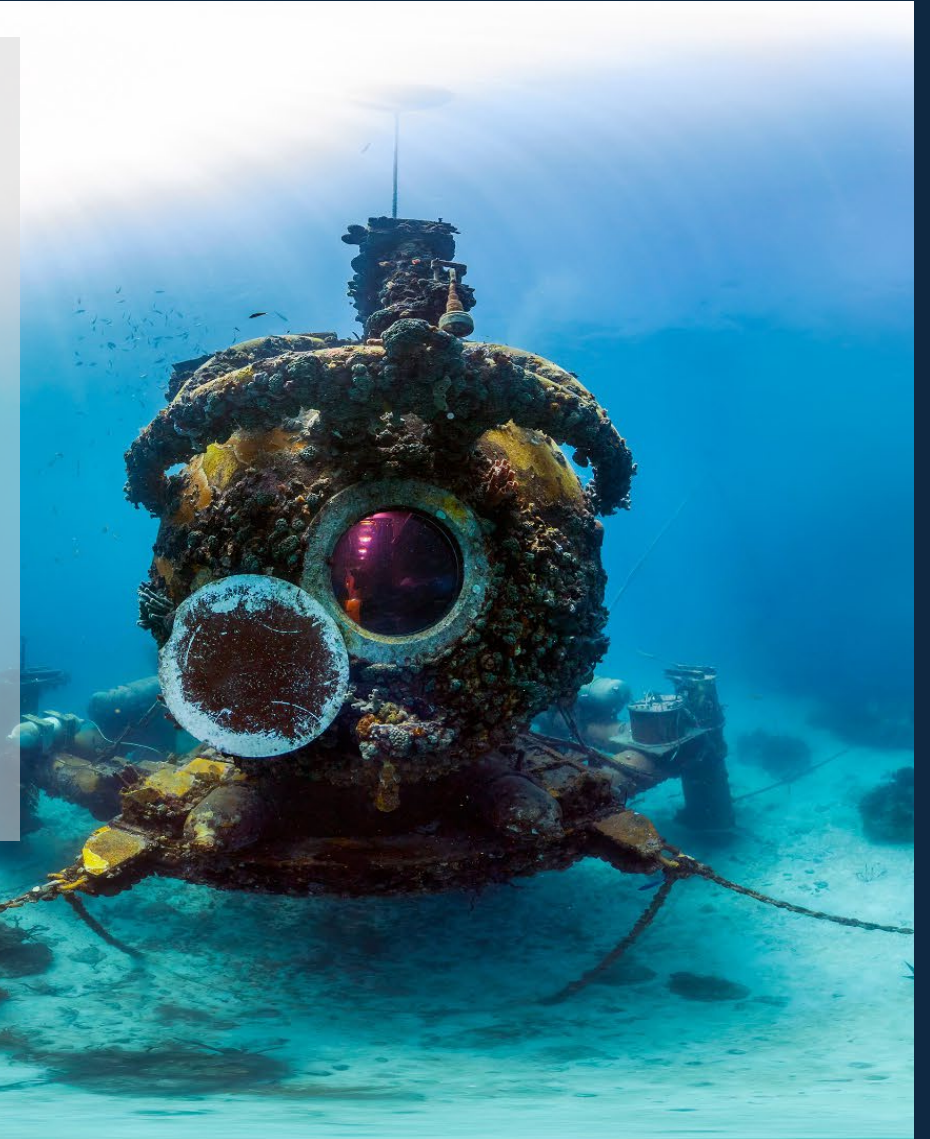
Industry Partnerships

- Developing sensor integrations on industry standard platforms and vehicles
- Reengineering tools of industry to support research focused on conservation
 - Deepsea Manganese nodule harvesters -> debris collectors
 - Scaled renewable energy platforms for low-cost autonomous remote sensing platforms



Wrapping Up

- Created an open source platform to support innovation and development of the next generation of scalable remote sensing packages.
- Currently includes a range instruments for comprehensive time-series data collection.
- Should be available online and viewable on FIU and other data sharing sites by the end of 2025.
- Lots of room to grow and always looking forward to building new collaborations!



Questions?



FLORIDA KEYS

MARINE SCIENCE CONFERENCE & WORKSHOP

FIU

Institute of
Environment





RASCCAR LAB

Robots and Autonomous Systems for Coastal
Conservation and Restoration

FIU