Ocean Observatories Initiative Facility Board (OOIFB)

Town Hall

Monday, December 12, 2022

AGU FALL MEETING

SCIENCE LEADS THE FUTURE

OCEAN OBSERVATORIES INITIATIVE FACILITY BOARD

OOIFB

OOIFB Town Hall Agenda

1830 Welcome, Introductions, Activity Update – Kendra Daly (USF), OOIFB Chair

1835 Updates from the National Science Foundation – George Voulgaris (NSF)

1840 Updates from the OOI Operator – Jim Edson (WHOI)

1850 Pioneer Array Relocation Update - Al Plueddemann (WHOI)

1900 Lightning Talk Presentations

1930 End of Town Hall

For those joining virtually:

- Please mute yourself (unless you are the presenter).
- We hope to have time at the end of the Town Hall for discussion. Questions and comments can be typed into the chat box throughout this session and will be addressed during the Q&A period.

About OOIFB

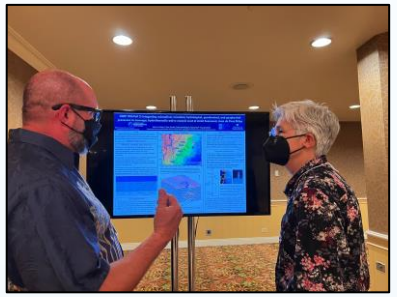
"The National Science Foundation's Ocean Observatories Initiative Facility Board (OOIFB) provides independent input and guidance regarding the management and operation of the Ocean Observatories Initiative (OOI)."
Oversight, Conduit, Collaborate, Equality, Evolution

- NSF formed the OOIFB in 2017
- OOIFB Membership:
  - Kendra Daly (Chair), University of South Florida
  - Dax Soule (Chair Elect), Queens College
  - Tim Crone (DDCI Chair), Lamont-Doherty Earth Observatory
  - Paulinus Chigbu, University of Maryland Eastern Shore
  - Edward Dever, Oregon State University (OOI appointee)
  - Chris Edwards, University of California, Santa Cruz
  - Ruoying He, North Carolina State University
  - Deborah Kelley, University of Washington (OOI appointee)
  - John Wilkin, Rutgers, The State University of New Jersey
- One Standing Committee:
  - Data Systems Committee
- OOIFB Administrative Support Office located at URI:
  - Annette DeSilva, PI
  - Karen Besson, Administrative Assistant
  - Danielle Bailey, Project Assistant

OOIFB Activities in 2022

www.ooifb.org

Dec 2021/Jan 2022	The DSC conducts community survey on the OOI Data Explorer and other Delivery Systems
February 25, 2022	OOIFB holds a Town Hall during the virtual 2022 Ocean Sciences Meeting. More than 50 participants join.
May 26, 2022	The OOIFB Spring Meeting is held (virtual).
June 7-9, 2022	OOIFB hosts the Northeast Pacific OOI Community Workshop at the OSU Portland Campus Center, Portland, OR. 105 participants (66 in person and 39 virtual).
June 13, 2022	OOIFB provides feedback to NSF regarding the OOI 2.0 Annual Work Plan for Program Year 5.
August 1-5, 2022	Elizabeth Ferguson presents at the Society for Marine Mammalogy conference as first recipient of the Larry P. Atkinson Travel Fellowship,
August 22, 2022	Dax Soule is appointed to the Chair Elect position of the OOIFB.
October 26-28, 2022	OOIFB & DSC hold their fall meetings in Alexandria, VA (hybrid).



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Hold the Date - July 17-21, 2023

Tentative: Pilot Program:
OOIFB 2023 Summer School on Sensor Data

- Focus area: Sensor used for measurements of optical attenuation and absorption.
- OOI Sensor - Seabird AC-S (OOI-OPTAA)
- Location and Date: Oregon State University, Corvallis, OR – July 17-21, 2023
- Participants - 25 advanced graduate students, post-doctoral fellows, and early career scientists.
- Stay tuned for announcements in early 2023.

WET Labs's ac-s in-situ spectrophotometer provides simultaneous beam attenuation and absorption coefficients at four nanometer resolution across the visible spectrum. (Photo Courtesy of WET Labs)

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Lightning Talk Presenters

Cesar Sauvage - Woods Hole Oceanographic Institution *(virtual)*

Artash Nath - MonitorMyOcean.com *(virtual)*

Karen Bemis - Rutgers, The State University of New Jersey

Ettore Biondi - California Institute of Technology

Amy Bower - Woods Hole Oceanographic Institution

Marine Denolle - University of Washington

Jiaqi Fang - California Institute of Technology

Aleck Wang - Woods Hole Oceanographic Institution

THANK YOU

For more information about OOIFB, visit
www.ooifb.org

Thank you for attending

AGU FALL MEETING

SCIENCE LEADS THE FUTURE

NSF's Ocean Observatories Initiative

Dr. George Voulgaris
Program Director
Directorate for Geosciences
Division of Ocean Sciences
Email: gvoulgar@nsf.gov
Tel: 703.292.7399

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Updates from the OOI Operator

James Edson

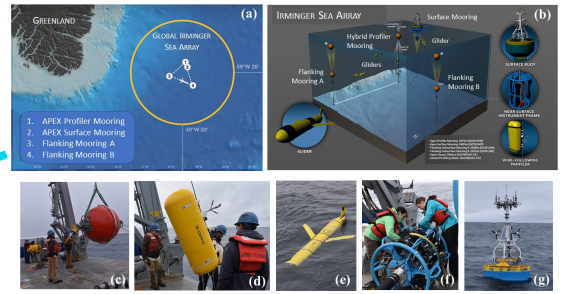
OOIFB Town Hall at Fall AGU

December 12, 2022

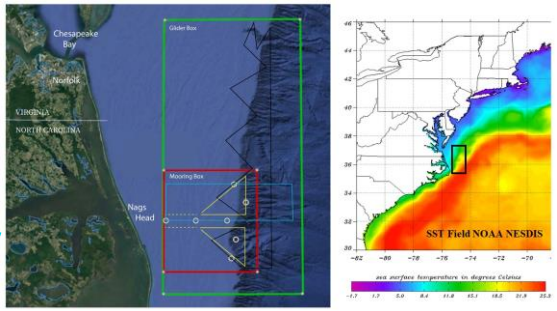
OOI Summary

- OOI operates & maintains sophisticated instrumentation in demanding locations.
- Real-time data from more than 800 instruments on 80 platforms at 5 arrays.
- The arrays are designed to conduct science at global, coastal & regional scales.
- Six interdisciplinary science themes articulated in the Science Plan:
  - Ocean-Atmosphere Exchange
  - Climate Variability, Ocean Circulation, Ecosystems
  - Turbulent Mixing and Biophysical Interactions
  - Coastal Ocean Dynamics and Ecosystems
  - Fluid-Rock Interactions & Sub-Seafloor Biosphere
  - Plate-Scale Geodynamics.

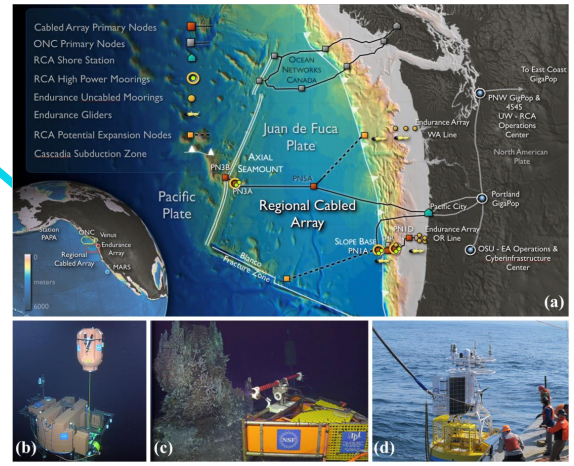
Global Irminger Sea



Coastal Pioneer Relocation



Regional Cabled Array & Coastal Endurance Array



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UNIVERSITY of WASHINGTON
Oregon State University

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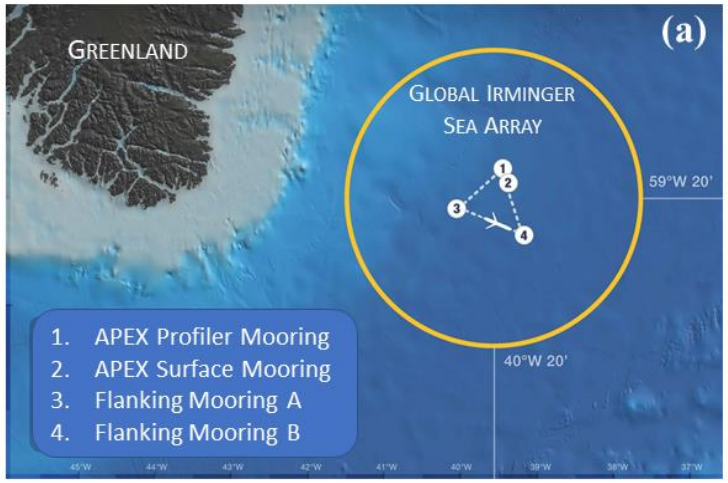

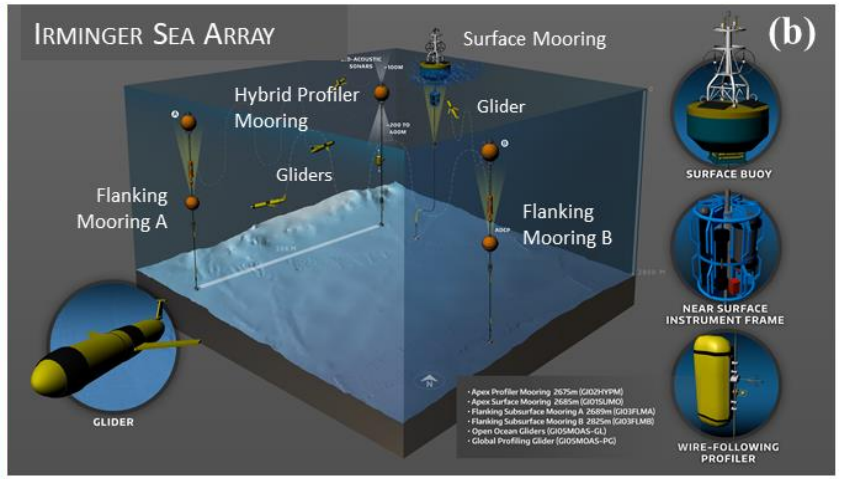

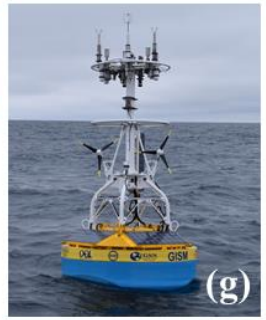

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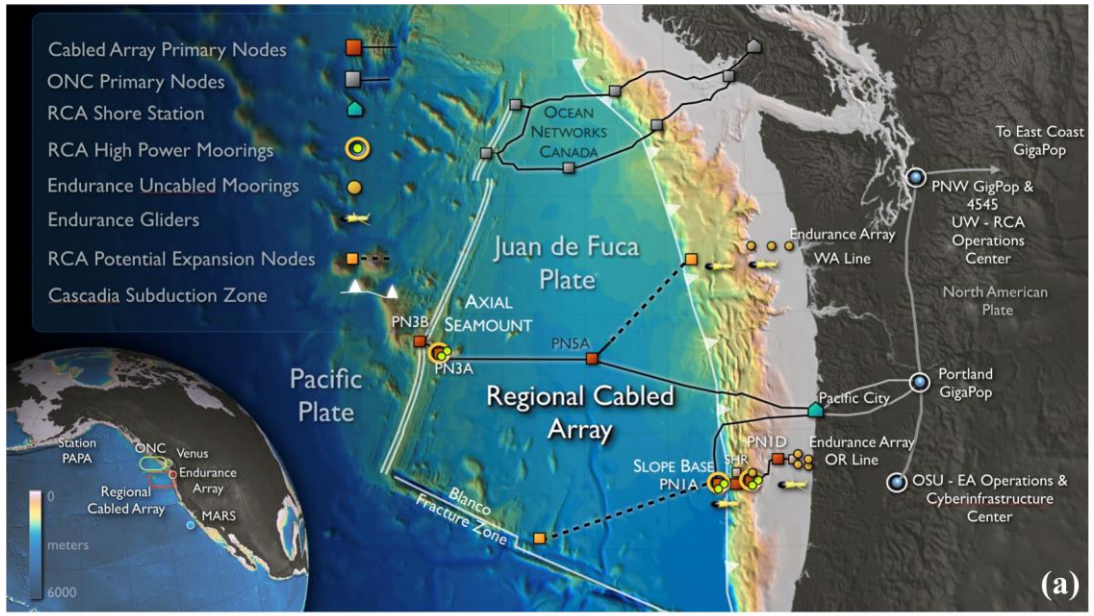
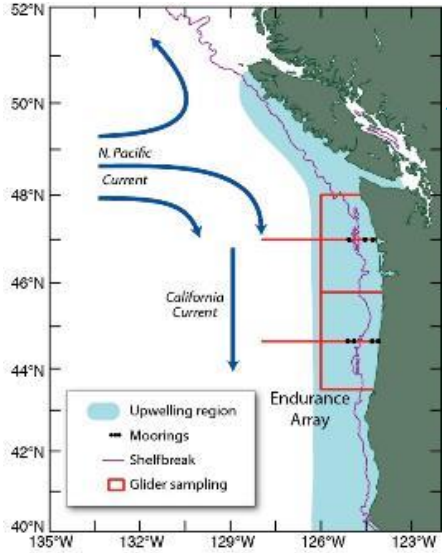
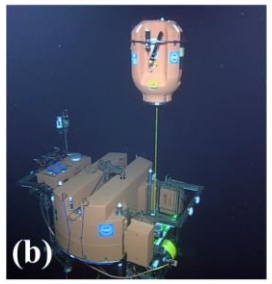
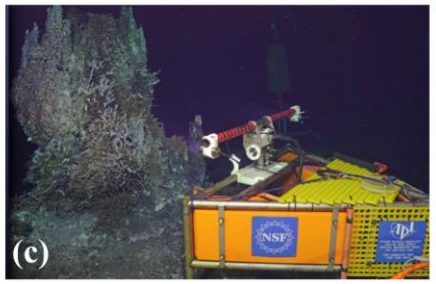
  - Coastal Ocean Dynamics and Ecosystems
  - Fluid-Rock Interactions & Sub-Seafloor Biosphere
  - Plate-Scale Geodynamics.
- Served by a united Cyberinfrastructure
- Data freely available online
- 30-year lifetime starting from 2016.

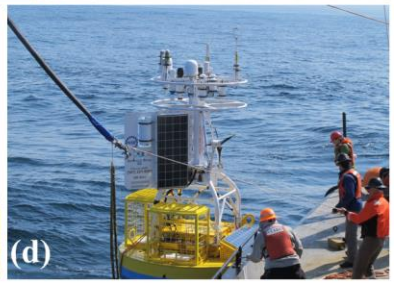
Regional Cabled Array & Coastal Endurance Array

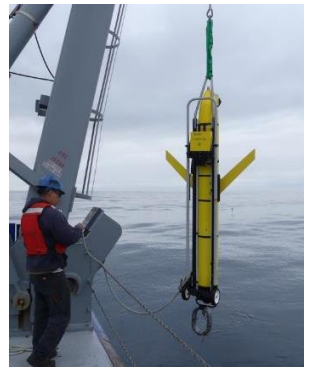












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Our Mission

The OOI does not conduct research, the OOI provide research quality data to the user community.

https://oceanobservatories.org/how-to-access-data/

ECV Collected

Surface Variables
- Pressure
- Radiative Fluxes
- Temperature
- Humidity
- Precipitation
- Moisture/Evaporation
- Vector Wind
- DC Stress & Buoyancy Flux

Oceanographic
- Surface Heat Flux
- Temperature Profiles
- Salinity Profiles
- Currents Profiles
- Sea Level

Biogeochemical Sensors (at multiple depths)
- pH
- pCO_2
- Oxygen
- Plankton & zooplankton
- Nitrate
- Chlorophyll *a*

and we monitor an active volcano!

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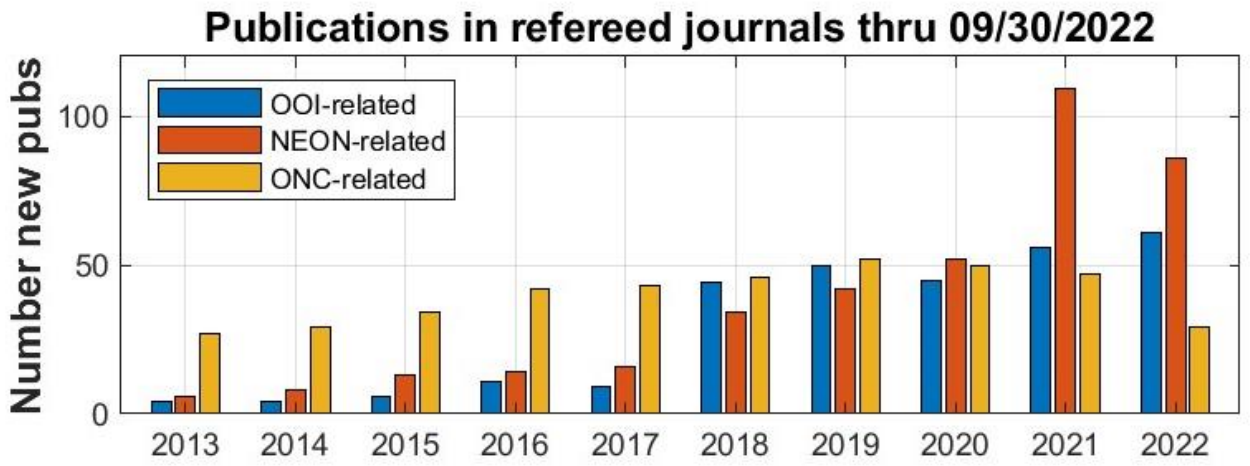
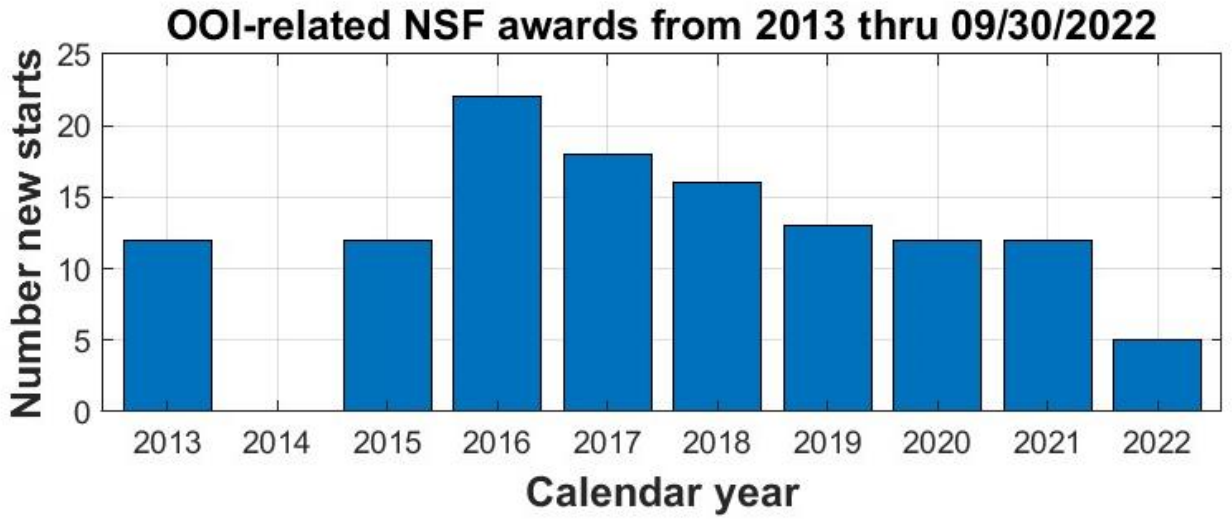
Science Impacts

- 294 OOI-related publications in refereed journals thru 30 Sept 2022
  - 249 lead authors
  - 132 lead institutions
  - 23 countries
- **33 publications from Q4 PYIV with 3 months to go.**
- 124 NSF awards using OOI data or infrastructure thru 31 Mar 2022
  - $65.2M total
  - 94 lead PIs
  - 46 lead institutions
- The data is freely available, i.e., you don't need a proposal to use it.
- The OOI will continue efforts to encourage on colleagues, especially young scientists, to write external proposals using OOI data and infrastructure.
- We will continue to promote the OOI to peer institutions, community colleges, other NSF divisions, federal agencies, MSI, etc.





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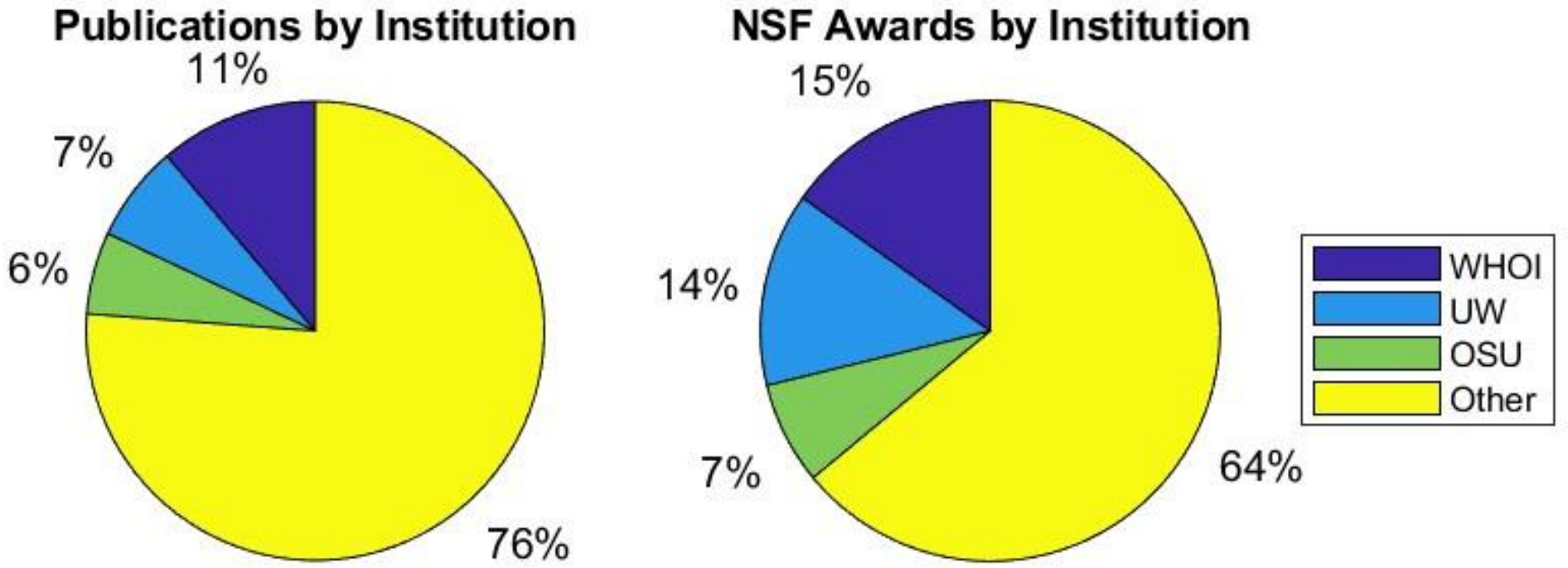
Publications & NSF Starts by Institution



- The OOI doesn't conduct research, is provides research quality data to an ever-expanding user base.
- NSF funding is going to a wide range of universities, collages, and research institution.
- The OOI infrastructure has supported research by numerous PIs using diverse funding sources.

Participated in COP27 in Sharm El Sheikh, Egypt

Panel - Ocean observations for climate change: From local observations to a global system

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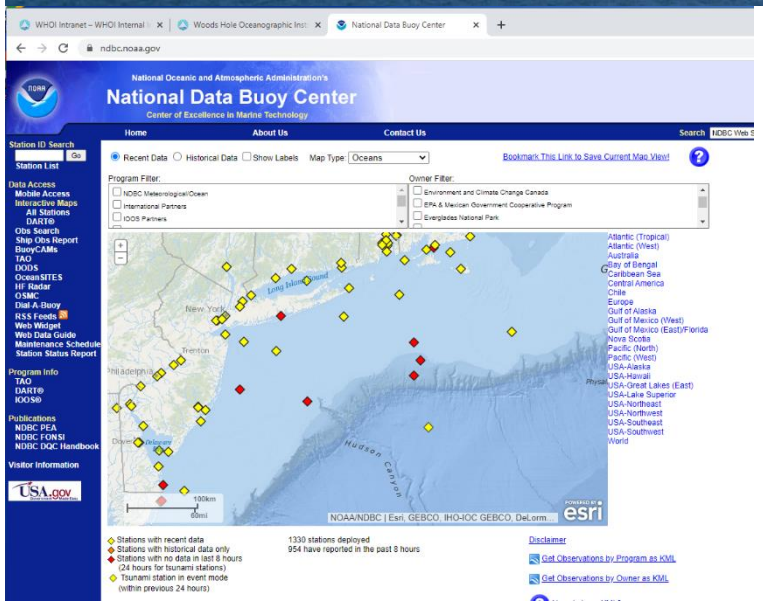
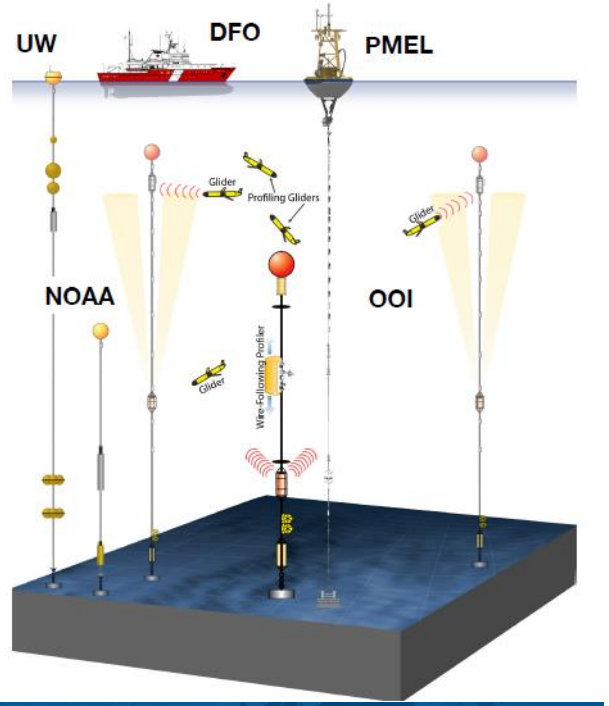
Continued and new partnerships opportunities

- **OOI is a UN Decade Action**
- **OASIS -** OOI is attached
- **GOOS & IOOS**
- **OBPS**
- **NDBC** - Additional Data Delivery
- **Ocean Sites**
- **ONC** – Cabled array & CDR
- **Offshore Wind**
- **US CLIVAR** – Gulf Stream
- **NOAA Labs** - PMEL Papa
- **SOOS**
- **IMOS/SOFS**
- **National Oceanography Centre**
- **Plymouth Marine Laboratory**
- **POGO**
- **Mercator Ocean International**
- **British Antarctic Survey**





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THANK YOU!

James Edson

Senior Scientist, WHOI; Lead Scientist, OOI

You can find me at: jedson@whoi.edu

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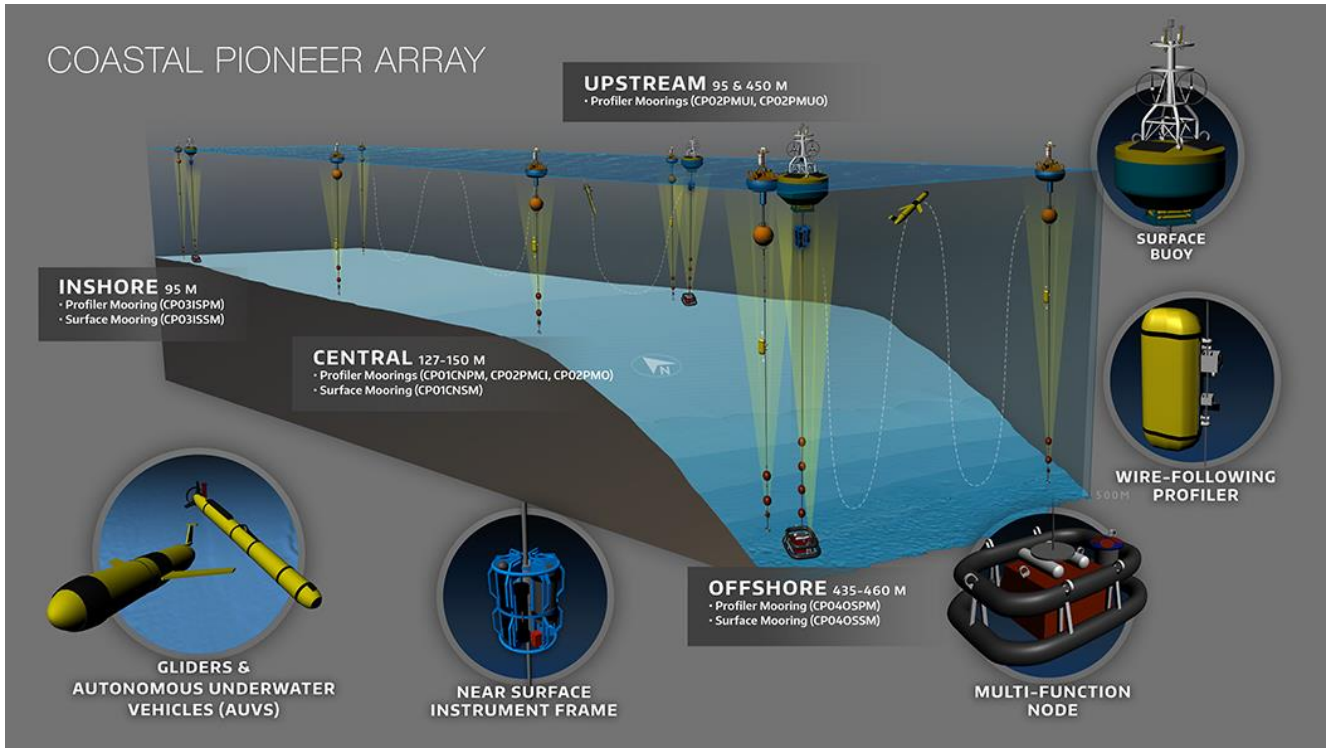
Pioneer Array Relocation Status

Al Plueddemann and Derek Buffitt

Fall AGU 12 Dec 2022

Overview

- The Pioneer Array was conceived within OOI as a re-locatable coastal array suitable for moderate wave and current regimes on the continental shelf and upper slope.
- The Array has been on New England Shelf since 2016, final recovery Nov 2022.
- Existing infrastructure will be utilized to create a new Array
- The new location is the shelf and slope offshore of North Carolina, starting in 2024



Background

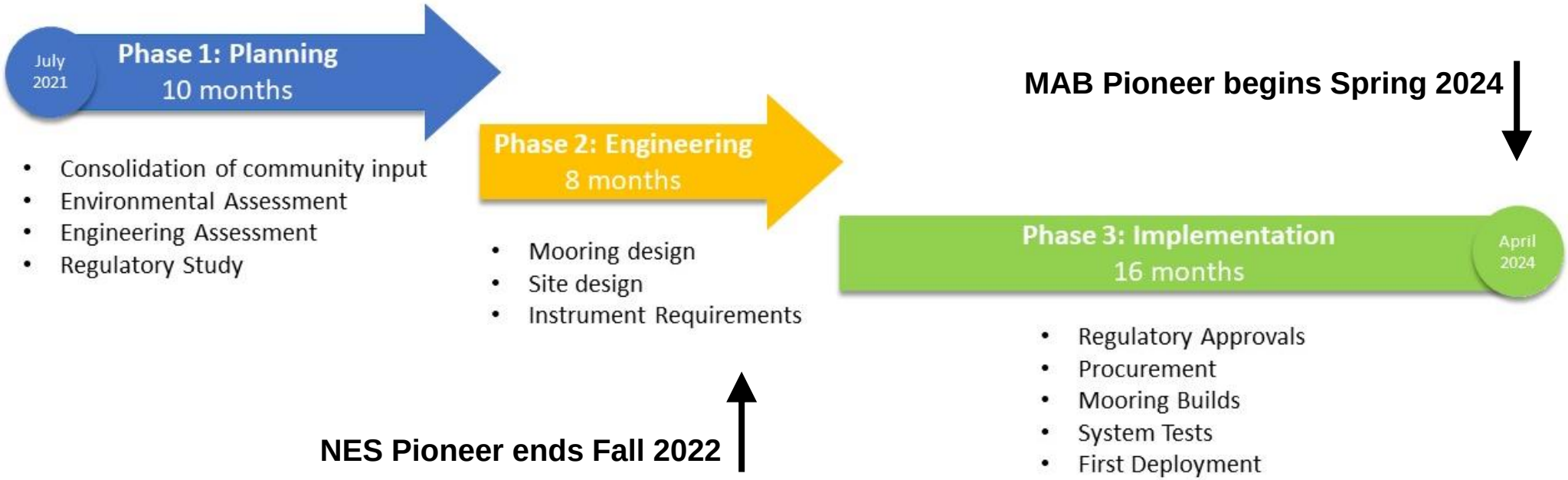
- NSF Announcement of intent to relocate (or retain)
  - Ocean Sciences Town Hall, Feb 2020
- Extensive community input from two Innovations Labs
  - 15-19 March and 21-15 June 2021
- Decision to relocate to southern MAB
  - Announced in Apr 2021
- Relocation process
  - Initiated Jul 2021

Relocation Process

- Approach
  - Guided by Innovations Lab science questions
  - Array design based on Innovations Lab consensus
  - Assessment and refinement by OOI Team
- Goals
  - Address science questions
  - Implement the consensus array design
  - Optimize use of existing inventory
  - Ensure feasible implementation
  - Operate within existing budget

Relocation Timeline

- Three main phases: Planning, Engineering, Implementation
- NE Shelf Pioneer ends Fall 2022; MAB Pioneer starts Spring 2024



Planning Phase Tasks

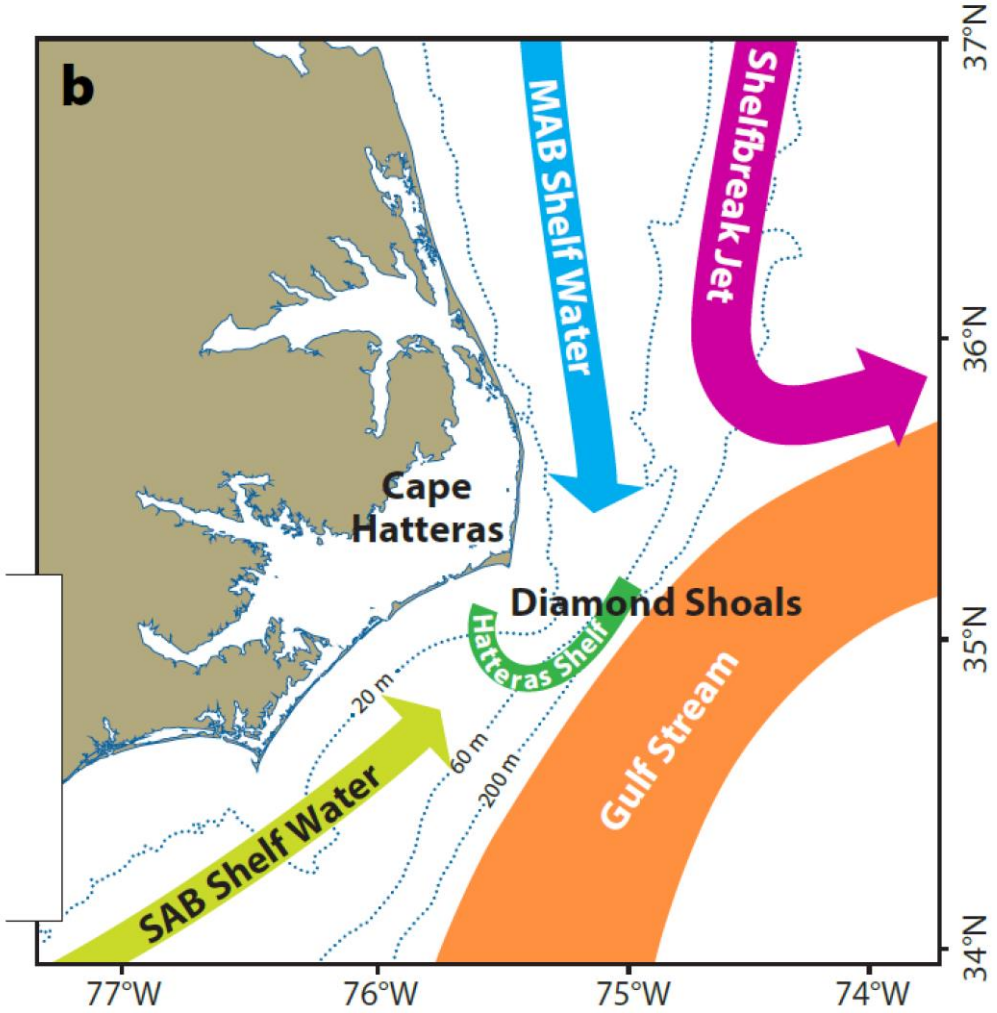
- Establish Focus Group
- Consolidate Innovation Labs input
  - Science themes, array design, instrumentation
- Site Characterization
- Waterspace management
- Regulatory study
- Mooring modeling
- Regional ocean modeling
- Instrumentation assessment
- Array design

Engineering Phase Tasks

- Complete Site Characterization
- Waterspace management
- Stakeholder engagement
- Regulatory/Permitting
- Final array design
- At-sea tests and site survey
- Final mooring design
- Instrument Procurement
- Configuration management
- CI assessment and planning

MAB Science Themes

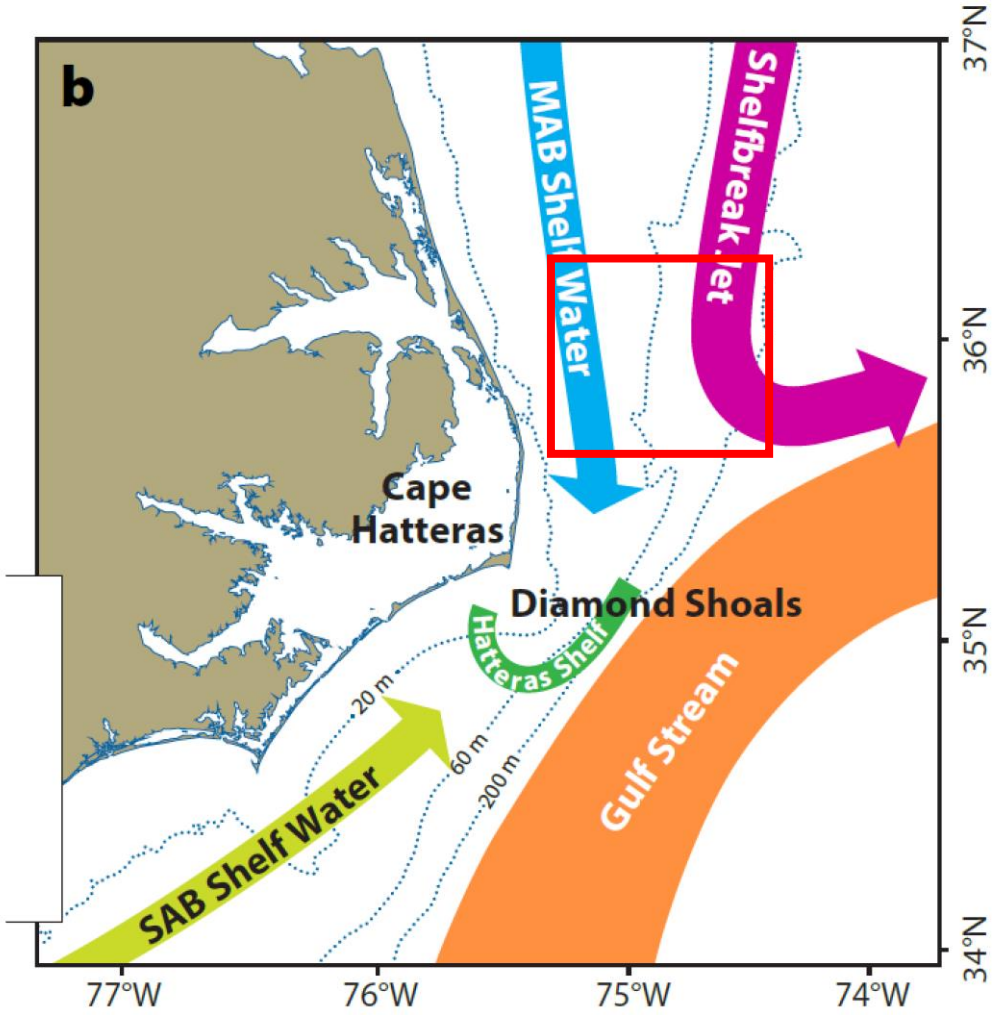
- Approach
  - Grouped into broad themes based on Innovations Lab input/ranking
- High level themes
  - Dynamics of shelf/slope exchange
    - Wind forcing, frontal instability, Gulf Stream influence
  - BGC cycling and transport
    - Carbon, nutrients, particulates
    - Ecosystem response
  - Extreme events
    - Hurricanes, freshwater outflows



Dana Savidge (Skidaway) and the PEACH Project

MAB Observing Region

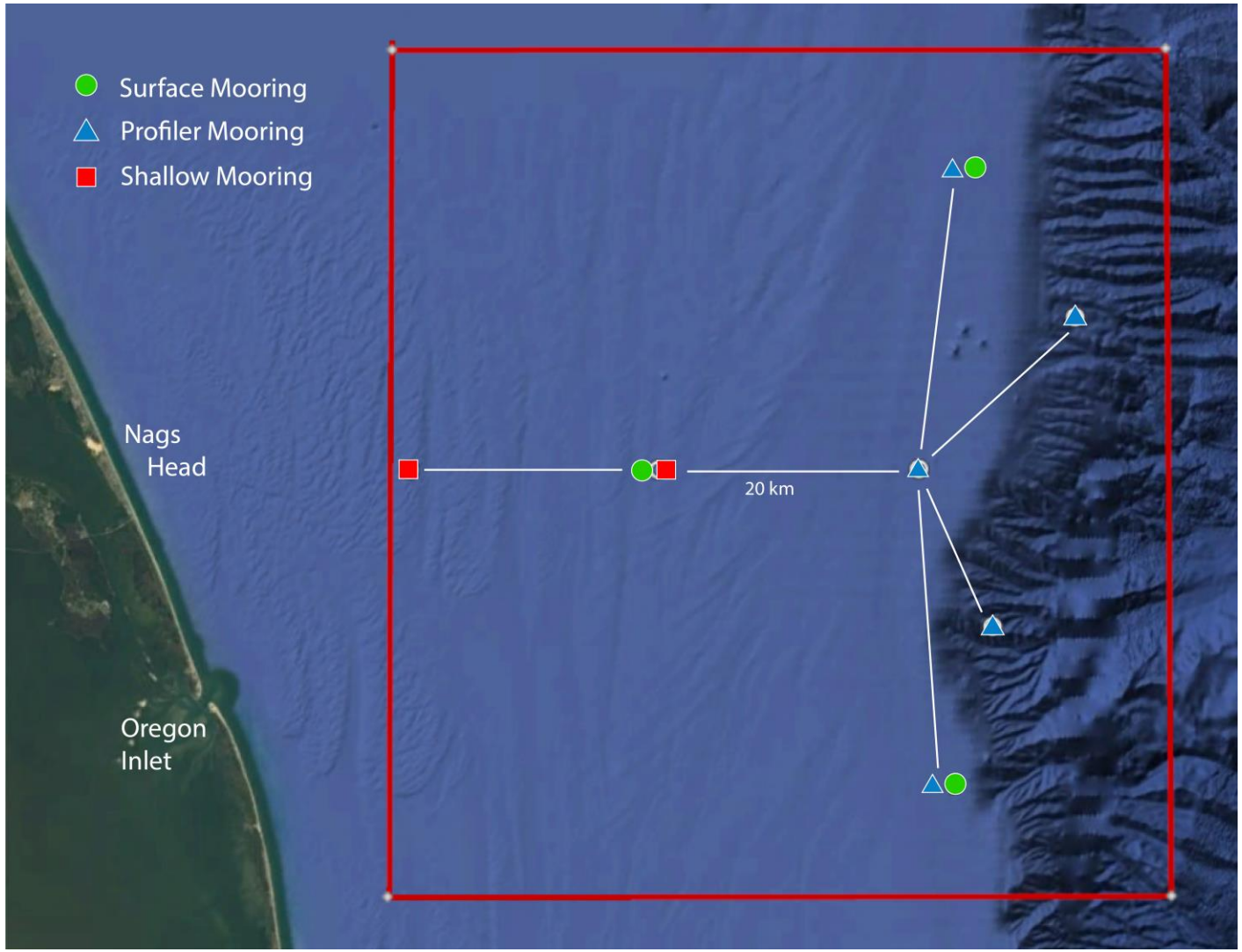
- Environmental constraints
  - Away from: Gulf Stream, shallow water, strong fronts, strong currents
- Limits of spatially coherent array
  - Moored array ~ 60 km x 60 km
- Decision to focus on:
  - Shelf-slope region
  - S of Chesapeake, N of Hatteras
- Desire to extend offshore &north:
  - Glider domain



Dana Savidge (Skidaway) and the PEACH Project

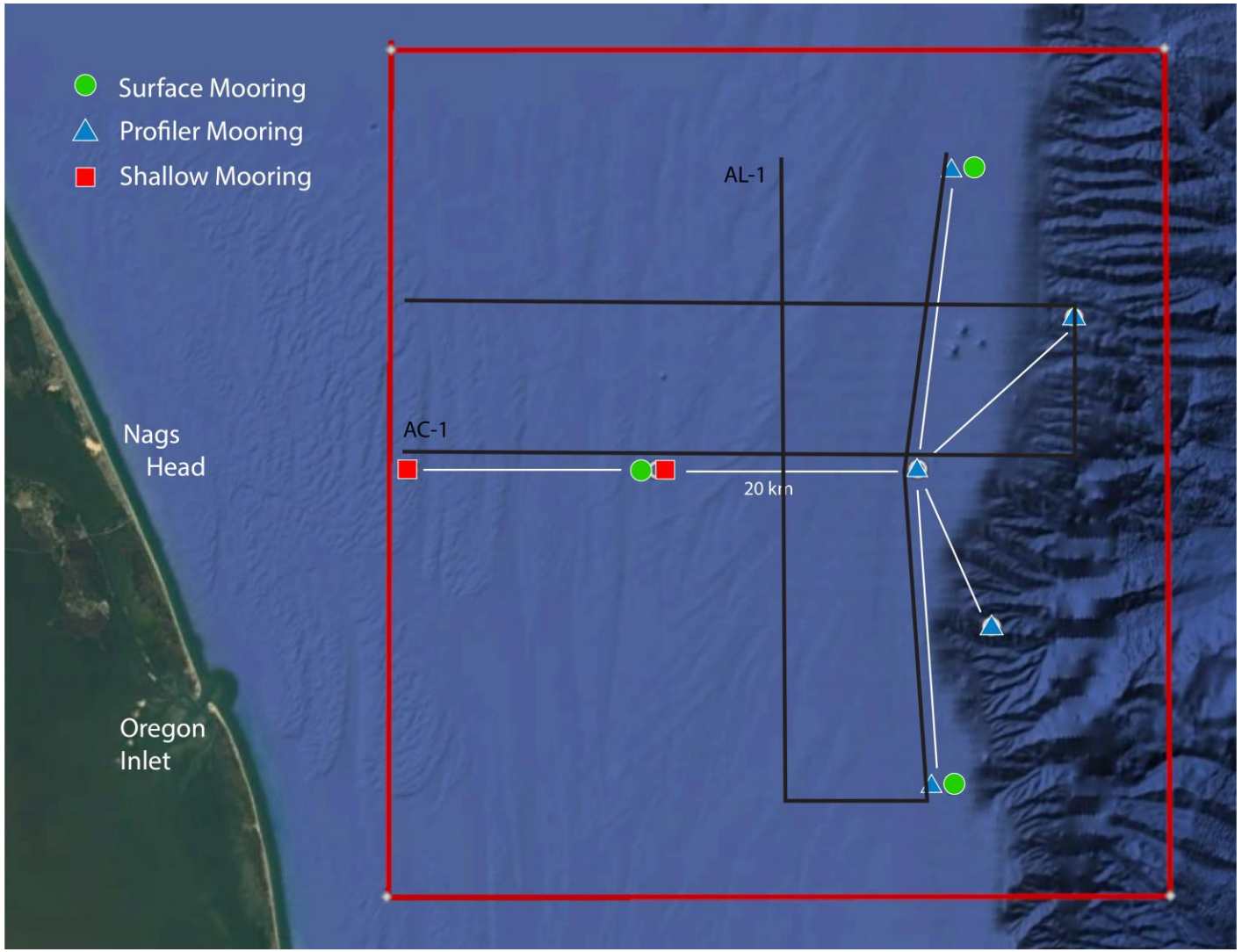
Moored Array

- Components
  - 3 Surface Moorings
  - 5 Profiler Moorings
  - 2 Shallow Water
- Challenges
  - Regulatory
  - Shallow water
  - Instruments
  - Logistics
  - Budget



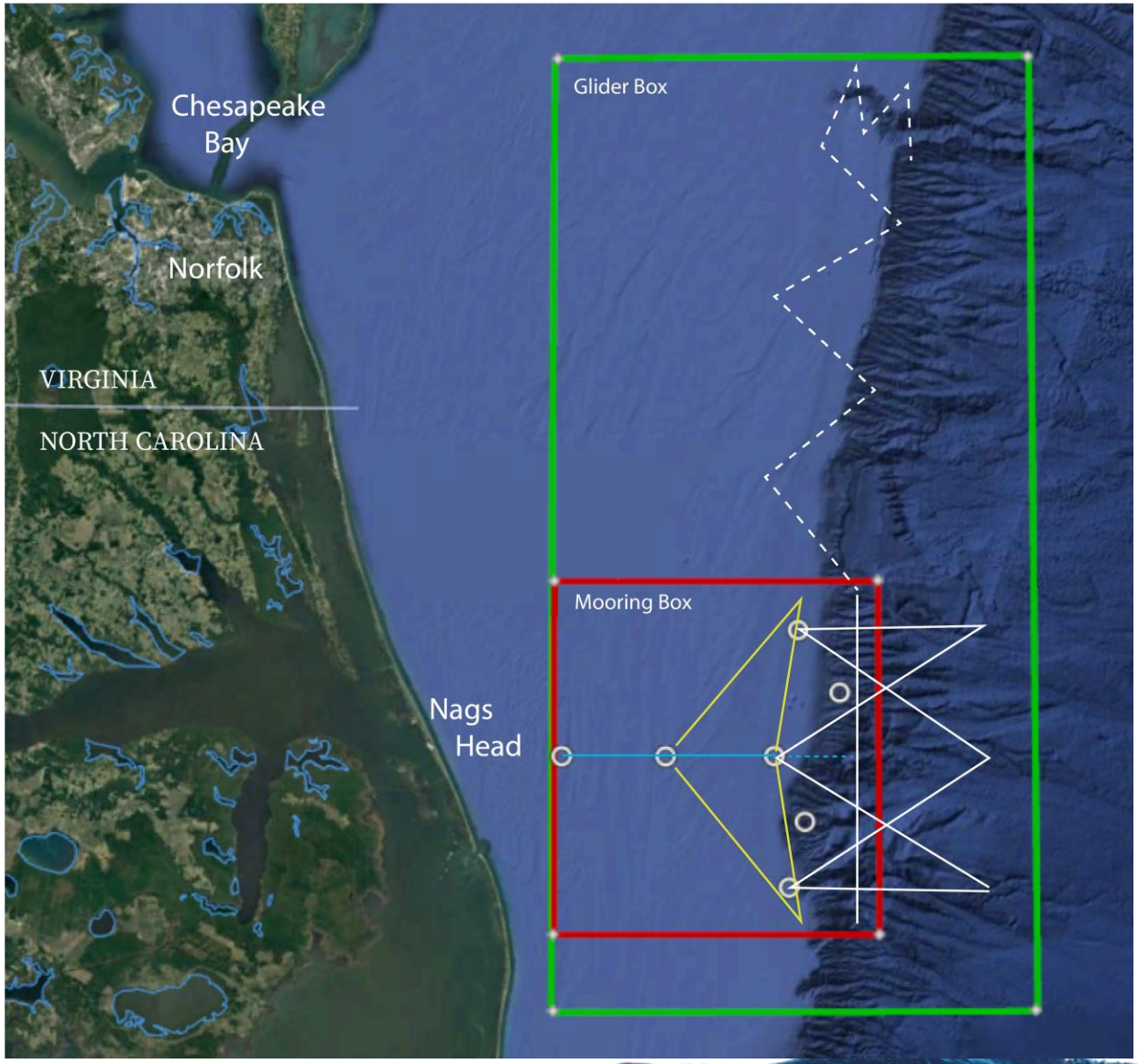
MAB AUV Plan

- Operations
  - Two REMUS-600 AUVs
  - “Campaign mode”
  - 4-6 missions/yr
- Two mission boxes
  - Cross-shelf box
  - Along-shelf box
- Objectives
  - Synoptic transects of moored array
  - Resolve shelfbreak front



MAB Glider Plan

- Operations
  - Occupy four track lines
  - ~90 day endurance
- Four main track lines
  - Moored array (yellow)
  - Cross-shelf (blue)
  - 2x Slope Sea (white; N-S line and X pattern)
- Supplemental line
  - Norfolk Canyon (dashed; 2x/yr)



Instrument Assessment

- Baseline: Current OOI core sensors
  - Oceanobservatories.org
- Innovations Lab Input
  - >40 instruments or measurement concepts suggested
  - Short list of 12 based on cross-group consensus
- Refined to “Tier 1” implementation list based on:
  - Science themes, technical readiness, operational feasibility, budget impacts
- Next steps
  - Requirements, specifications, RFIs, evaluation, procurement

Instrument Additions

- Tier 1 instruments and new procurements
  - Temperature and salinity, near surface
  - Velocity profile, near-surface
  - Turbidity*, water column and near bottom
  - Suspended particulates, near surface and near bottom
  - Phytoplankton imaging, near surface
  - Incident radiation, surface buoys
  - Nitrate, glider

* Preference for using existing FLORT instrument with manufacturer calibration for turbidity

Current Status and Look-Ahead

- Planning Phase - complete
- Engineering Phase – in progress
- Implementation Phase – early 2023
- Initial deployment – Spring 2024

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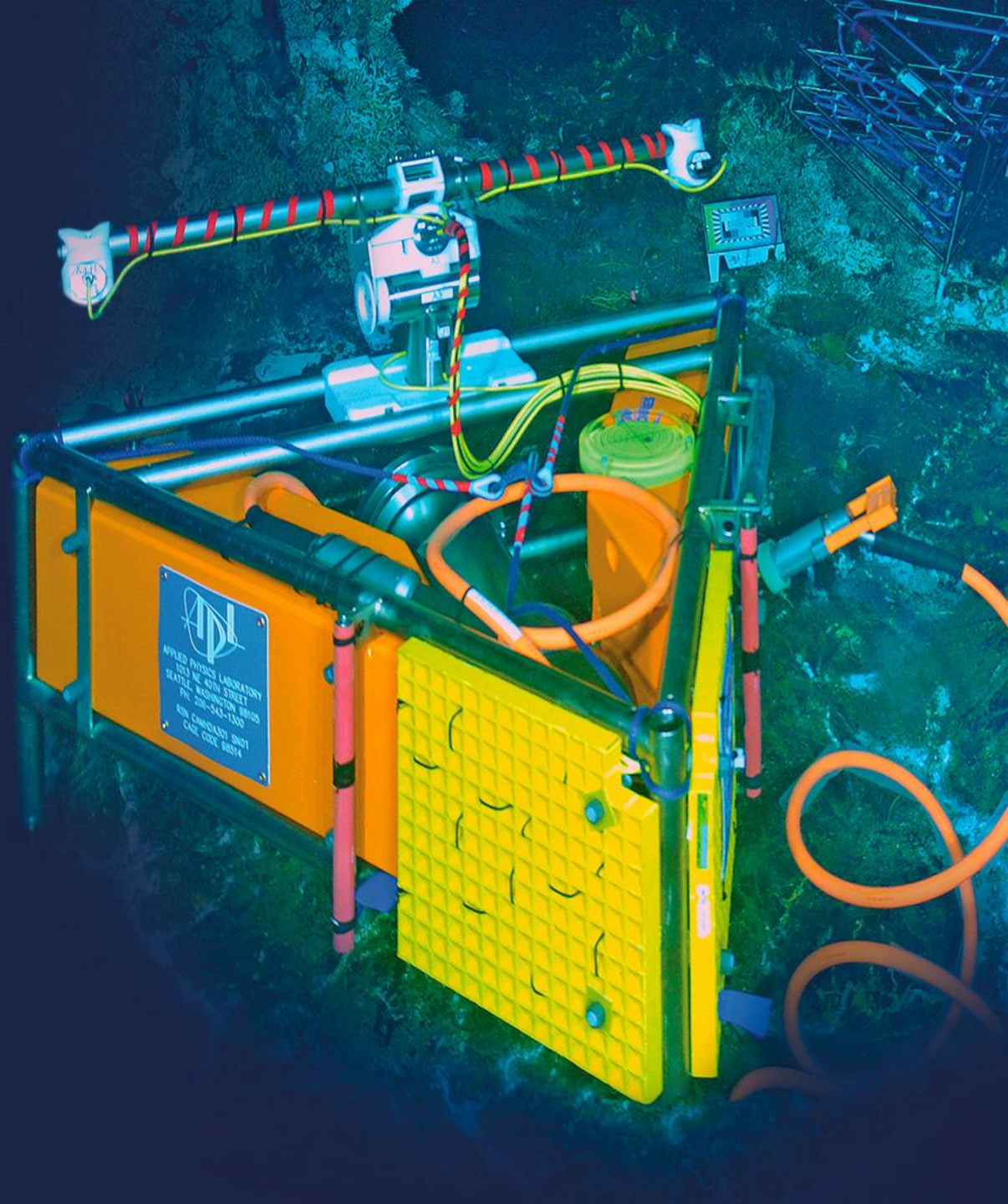
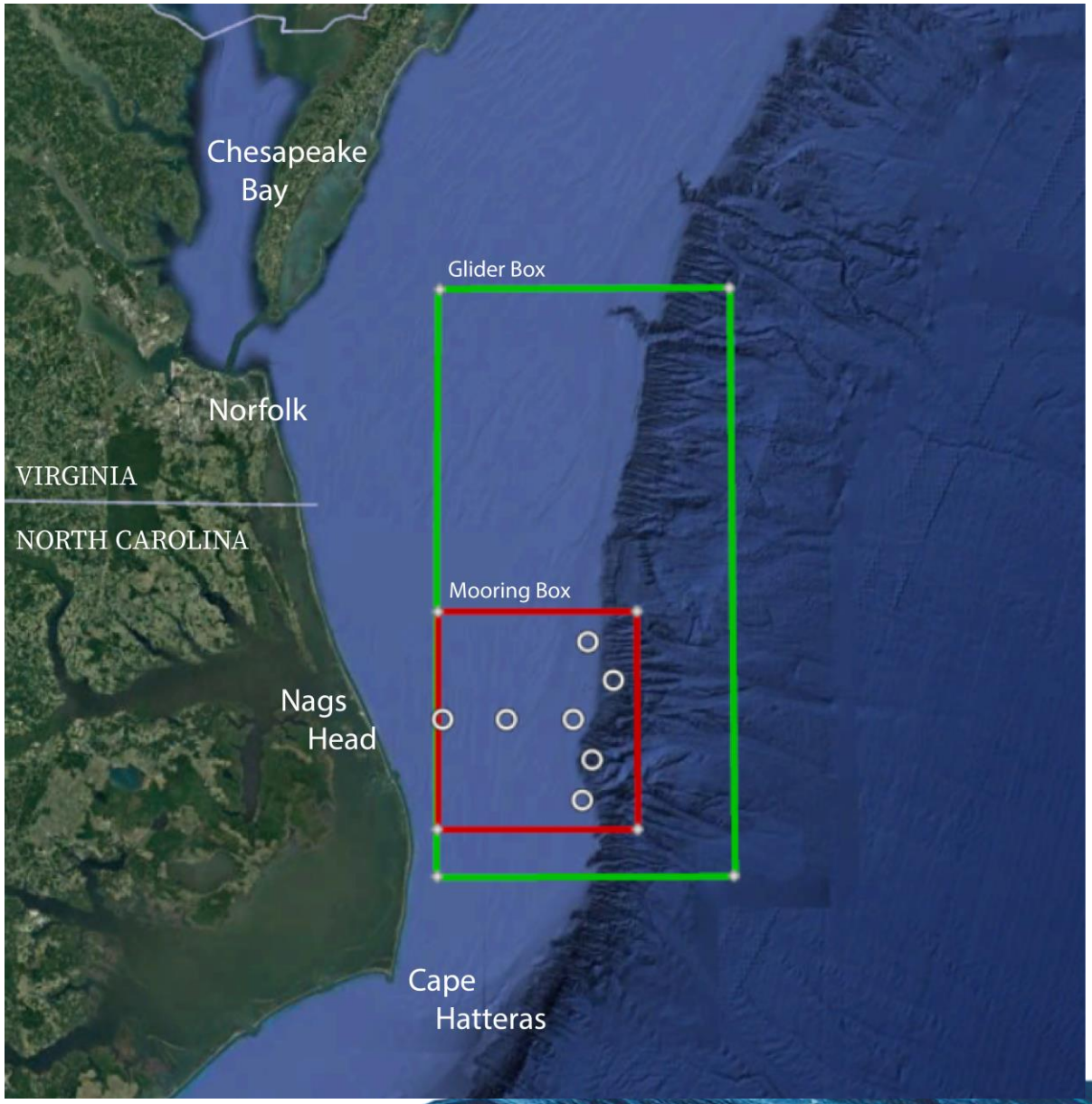
Questions?



Extras

MAB Array Design

- Region
  - Offshore of North Carolina, north of Cape Hatteras
- Moorings
  - Shelf and slope
  - East of Nags Head, NC
- Gliders/AUVs
  - Shelf and offshore
  - North to Norfolk Canyon



Instrument Additions

CPM

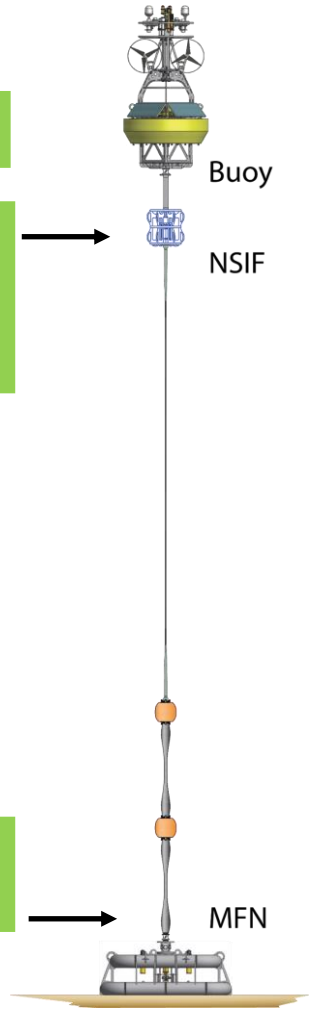
SURFACE
Buoy: PAR
Buoy: base CTD

SPHERE
Uplooking ADCP

CSM

SURFACE
Buoy: SPKIR

NSIF
Uplooking ADCP
Phyto imagery
Particulates
Turbidity



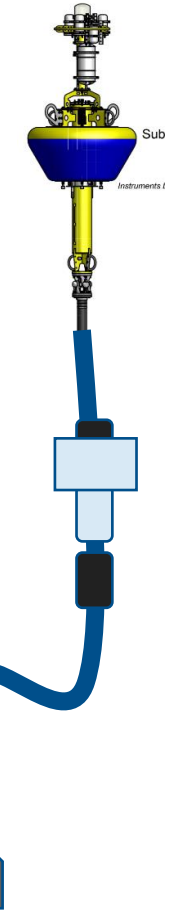
MFN
Particulates
Turbidity

SWM

SURFACE
Telemetry only

PROFILER
CTD
Oxygen
Fluorometer

BOTTOM FRAME
Uplooking ADCP
(surface waves)



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