



Ocean Observatories Initiative

Ocean Observing Teleconference

December 6, 2010

Jean McGovern

OOI Program Director, NSF





Agenda

1. Introductions
2. Project Description and Status
 - History
 - High level Description
 - Funding Status
3. Overview of OOI
 - Design Elements of each Observatory Scale
4. OOSC – next steps



OOI – Over a Decade of Planning





What is OOI?

- OOI is a multi-scale ocean observatory in Year 2 of Construction
 - \$386.42M (NSF is the sole funding agency)
 - 66 months of construction (Sept 2009 start)
 - \$769.5M for construction and initial operations (end 2016)
 - 25 years of planned operations
- OOI is being constructed because insights into ocean processes have been constrained by the lack of temporal resolution across spatial scales. A framework for providing sustained, high-resolution measurements is a recognized need.
- OOI is a system of systems that will document, for 25-30 years, air-sea, water column and seafloor processes, across full ocean depths using the best available technologies



OOI Project Team



Organization

Project Role

Consortium for Ocean Leadership

NSF Awardee &
Systems Integrator

Woods Hole Oceanographic Institution

Coastal and Global

- Oregon State University
- Scripps Institution of Oceanography
- Raytheon

University of Washington

Regional

UC San Diego

Cyberinfrastructure

Soon to Be Selected

Education &
Public Engagement





OOI Status of Awards

Cooperative Agreement Awarded to Consortium for Ocean Leadership
- September 1, 2009 – April 30, 2017 ***

1. CA Amount is \$769.5M for Construction and Initial Operations
2. Construction Period is 66 months - \$386.42M Total Project Cost
 - CSA for ARRA = \$105.93M (awarded September 15, 2009)
 - CSA for MREFC = \$280.47M (awarded December 2009)
3. CSA for O&M = \$383.1M (awarded February 2010)

Awardee Funding received to date

1. CSA for ARRA – fully funded \$105.93M
2. CSA for MREFC - \$20.2M
3. CSA for O&M - \$15.99M

*** All subject to the realities of the annual Federal Budget process

Design Elements

- Global Scale
- Regional Scale in the NE Pacific
- Coastal Scale: Mid-Atlantic Pioneer Array, PNW Endurance Array
- Fixed and mobile assets
- Cyberinfrastructure: data access, integration, adaptive sampling, analysis & visualization
- Interfaces for education users

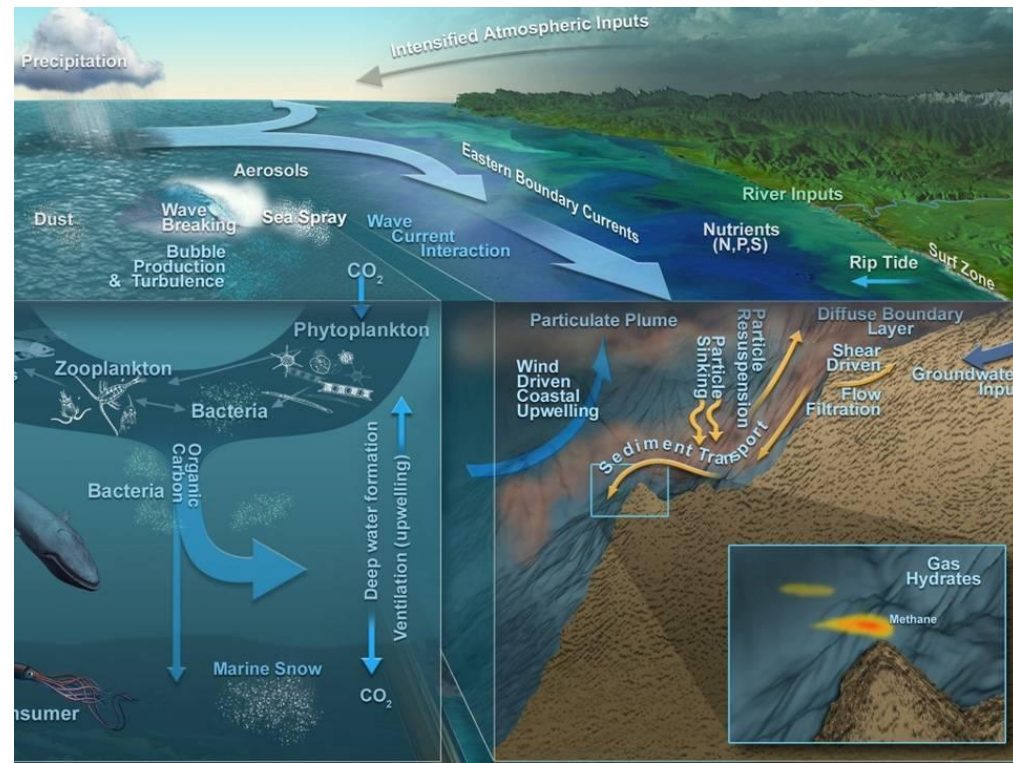


OOI Science Themes

- Ocean-Atmosphere Exchange
- Climate Variability, Ocean Circulation, and Ecosystems
- Turbulent Mixing and Biophysical Interactions
- Coastal Ocean Dynamics and Ecosystems
- Fluid-Rock Interactions and the Subseafloor Biosphere
- Plate-scale, Ocean Geodynamics

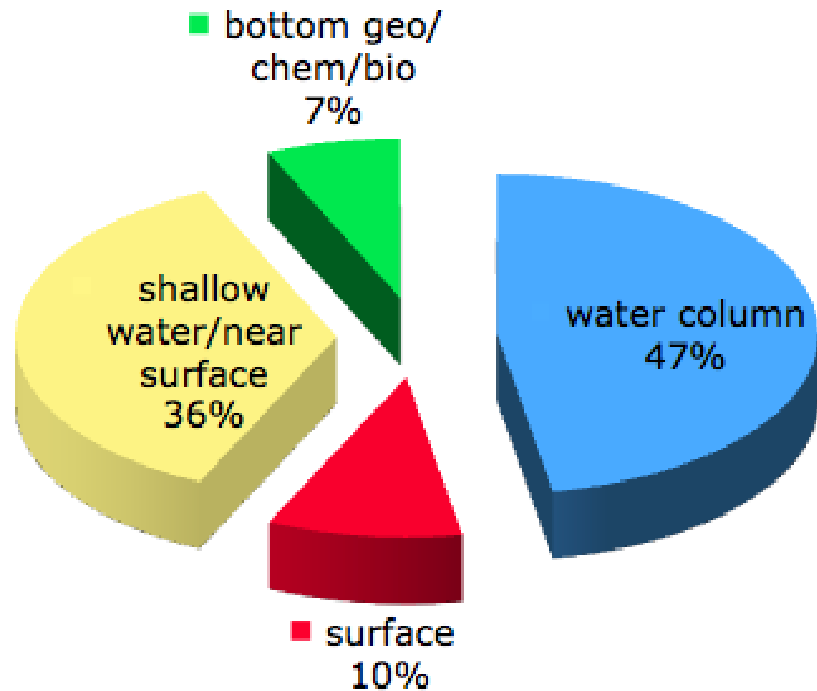
Additional Focus On

- Ecosystem Health
- Climate Change
- Carbon Cycling
- Ocean Acidification



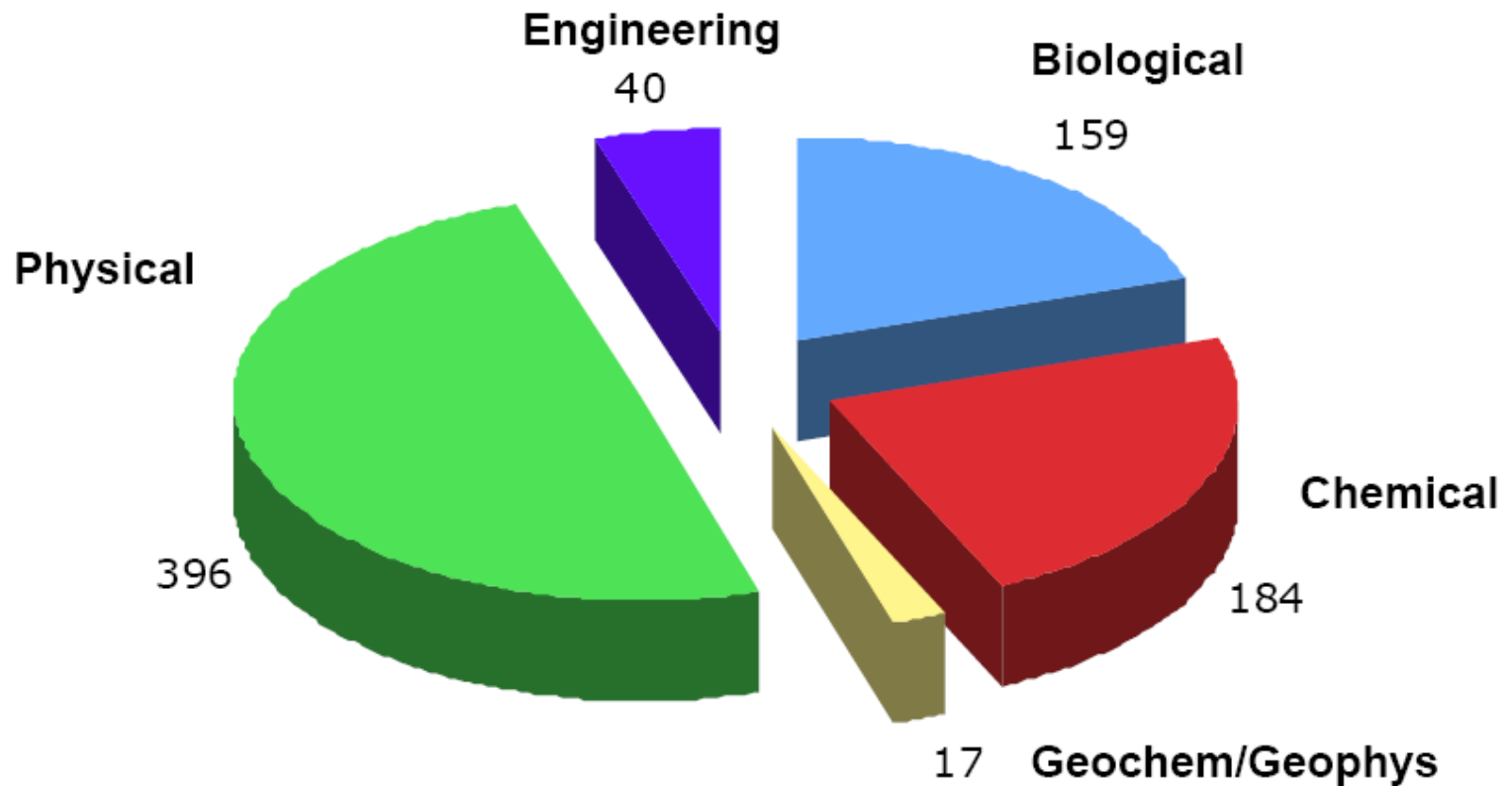
Water Column	Sensor Type	#
	Acoustic Doppler Current Profiler	39
	Conductivity/Temp.	210
	Hydrophone	10
	Inverted echosounder	5
	pH	37
	Velocity, single point	53
Surface		
	Waves	10
	Meteorology	18
	pCO2	36
	Direct covariance flux	10
Shallow water		
	Fluorometer	81
	Nutrients	25
	Dissolved oxygen	82
	Spectral irradiance	22
	Photosynthetically available radiation	20
	Optical absorption	31
	Zooplankton sensor	13
Bottom		
	Mass spectrometer	2
	Seafloor temperature	1
	Seismometer	13
	Camera	13
	Benthic flow	1
	Particulate DNA	1
	Vent chemistry	2
	Chemical sampling	3
	Seafloor pressure	15

Sensor Distribution



Core Sensors

Sensor Numbers by Primary Discipline



OOI Subsystems

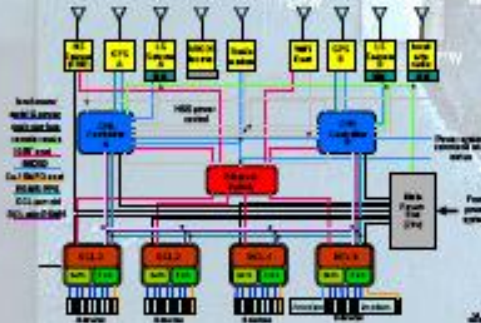
Buoys, Power, Telemetry



AUV/Dock



Platform Control, DCL



Sensors

Moorings

Benthic Nodes



Shore Station



Profilers

Gliders



OOI Data Policy

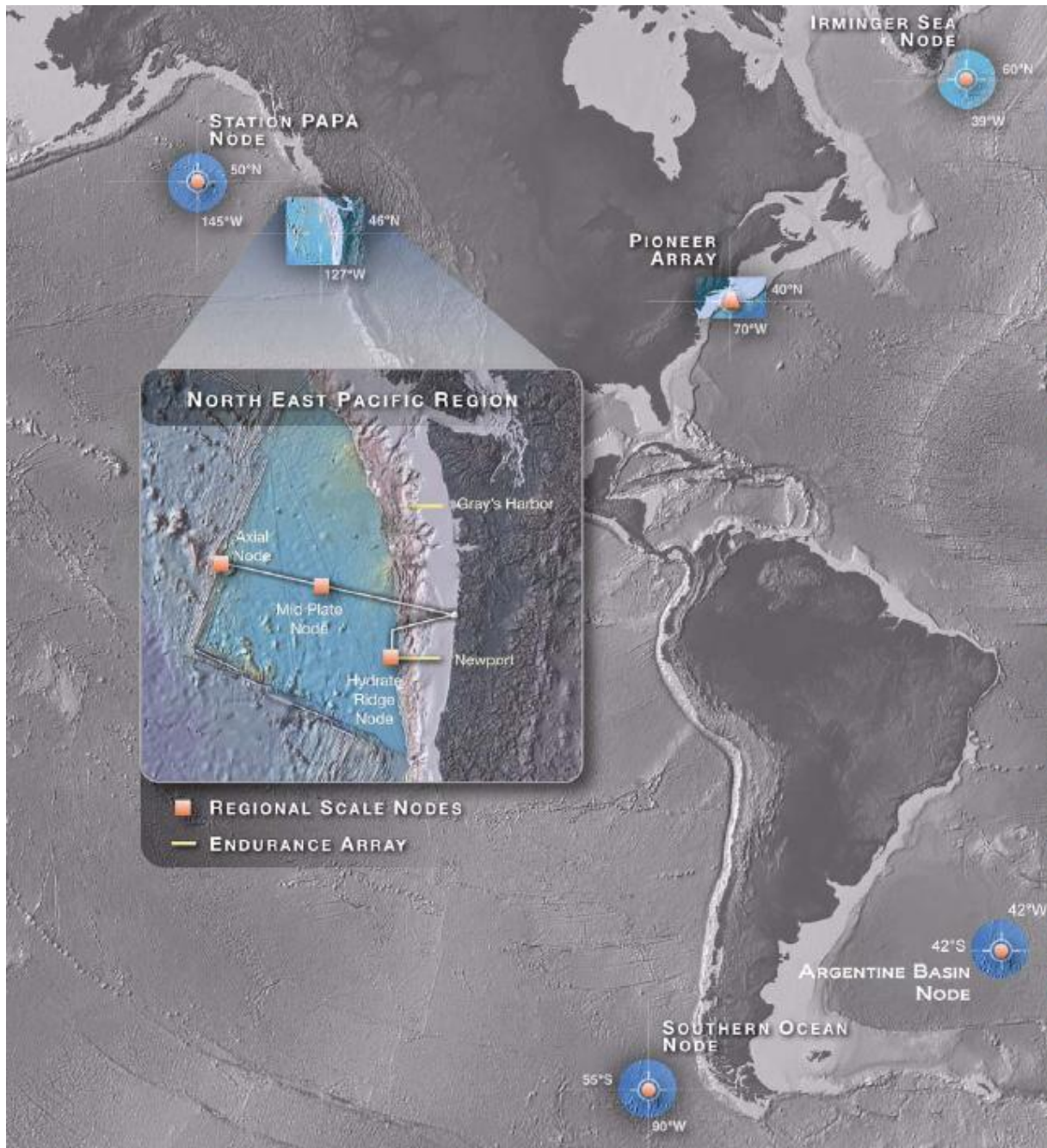


- Rapidly disseminated, open, and freely available
- Near-real-time with latencies as small as technically feasibility allows
- PI data shall be publicly available*
 - * PIs may request exclusive access (up to 1 year)
 - * Requests on a case by case basis
 - * All data public when exclusivity expires

Design Elements

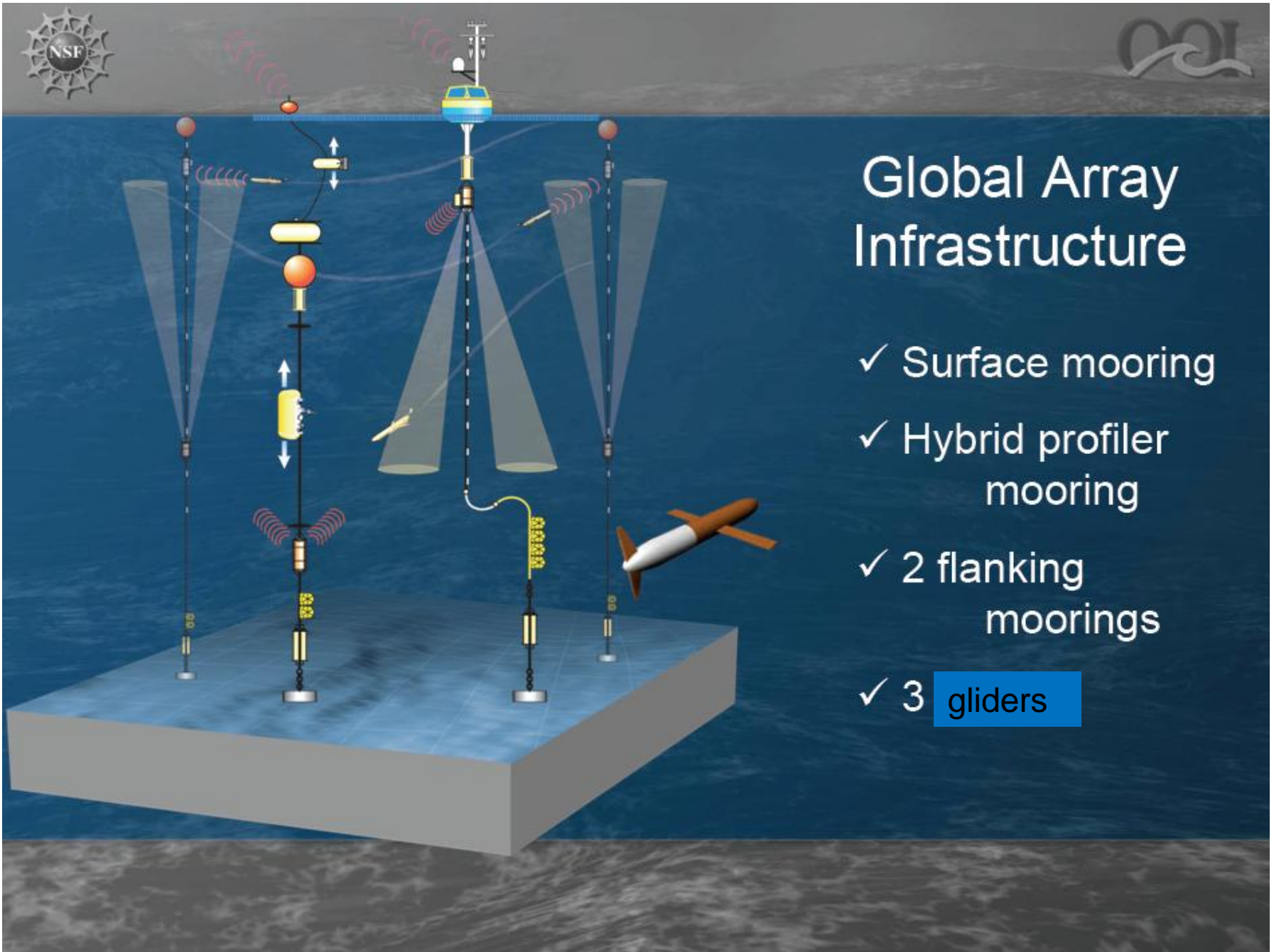
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Global Scale

- High latitude locations
- Air-sea and water column observing
- Moored and mobile assets
- Mesoscale footprint
- 4 sites:
 - ✓ Irminger Sea
 - ✓ Argentine Basin
 - ✓ Southern Ocean
 - ✓ Station PAPA* (NOAA collaboration)



Global Array Infrastructure

- ✓ Surface mooring
- ✓ Hybrid profiler mooring
- ✓ 2 flanking moorings
- ✓ 3 gliders



OOI – Global Site Collaborations



- **Station Papa** – OOI will join NOAA/PMEL at Station Papa.
- **Irminger Sea** – Global site in EEZ of Greenland, State Dept coordination required.
- **Southern Sites**– Collaboration and working relationships will need to be defined for operations and maintenance. NSF Office of Polar Program and South American collaborations will be explored.

Northeast Pacific

Regional Scale –

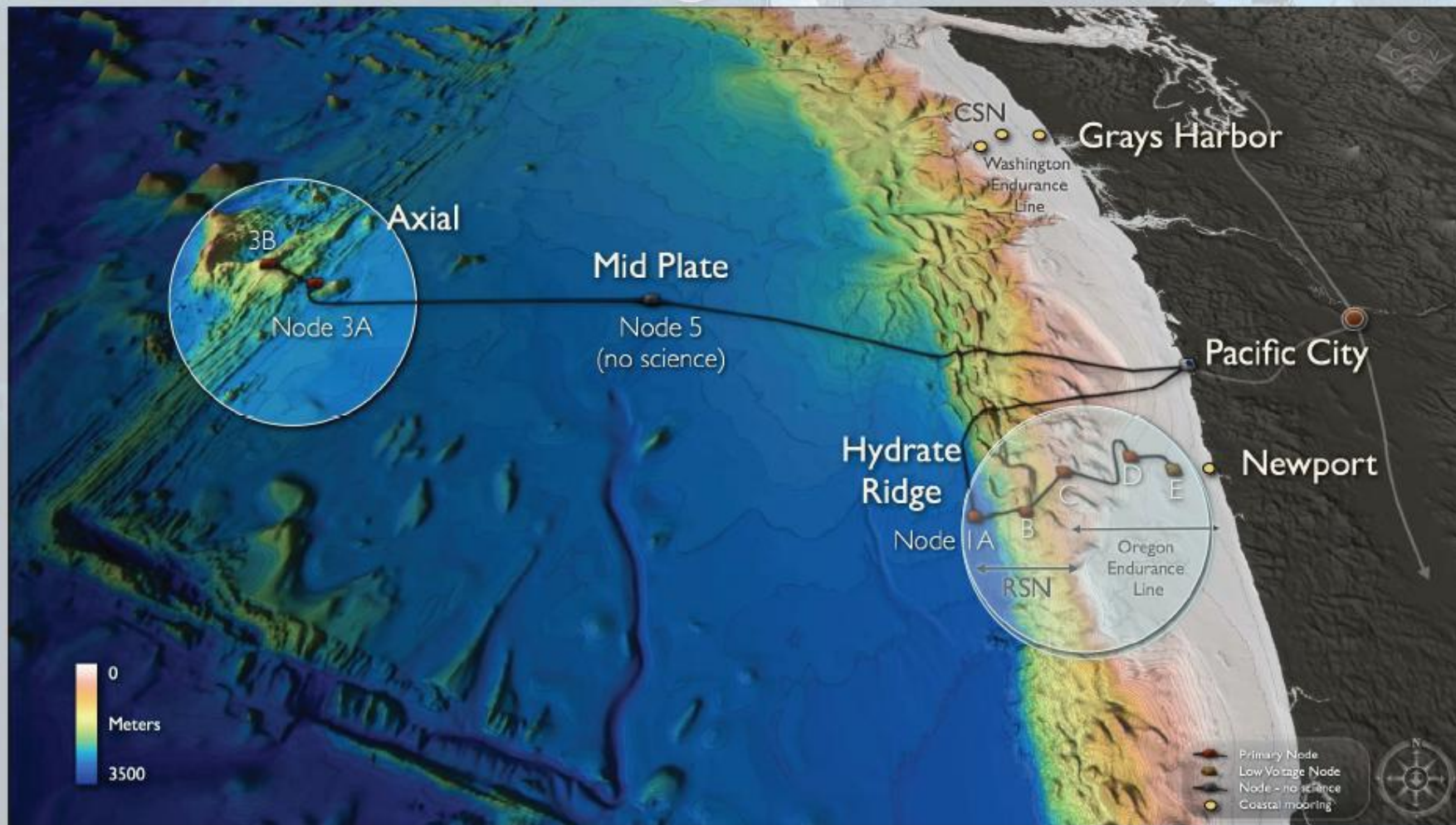
- ✓ 3 sites
- ✓ Seafloor and water column observing
- ✓ High power
- ✓ High bandwidth

Coastal Scale Endurance Array

- ✓ 2 lines of moorings
- ✓ Connect to RSN cable
- ✓ Air-sea, water column, benthic observing
- ✓ Mobile assets

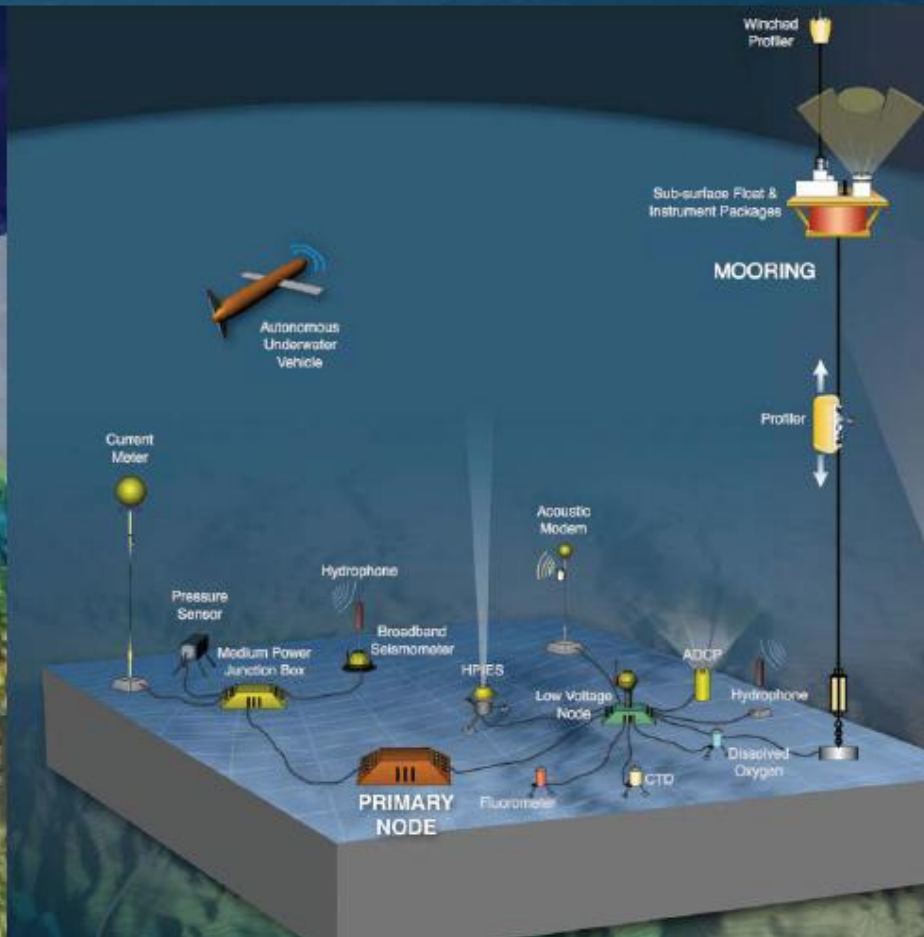
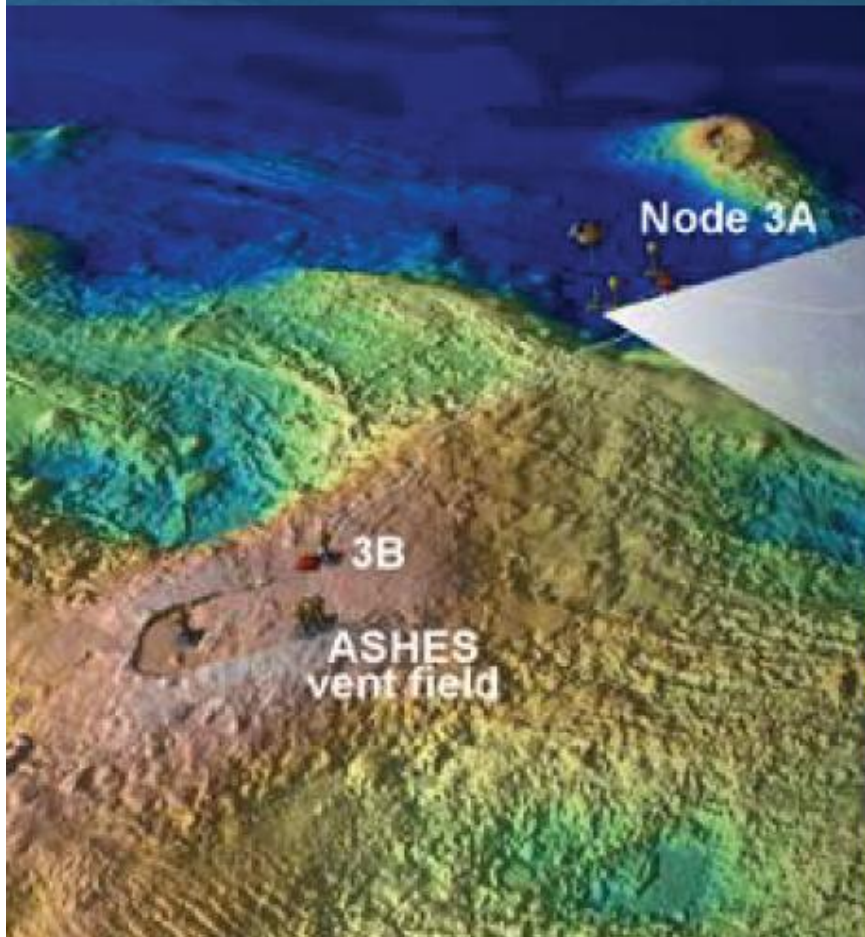


Regional Scale Nodes

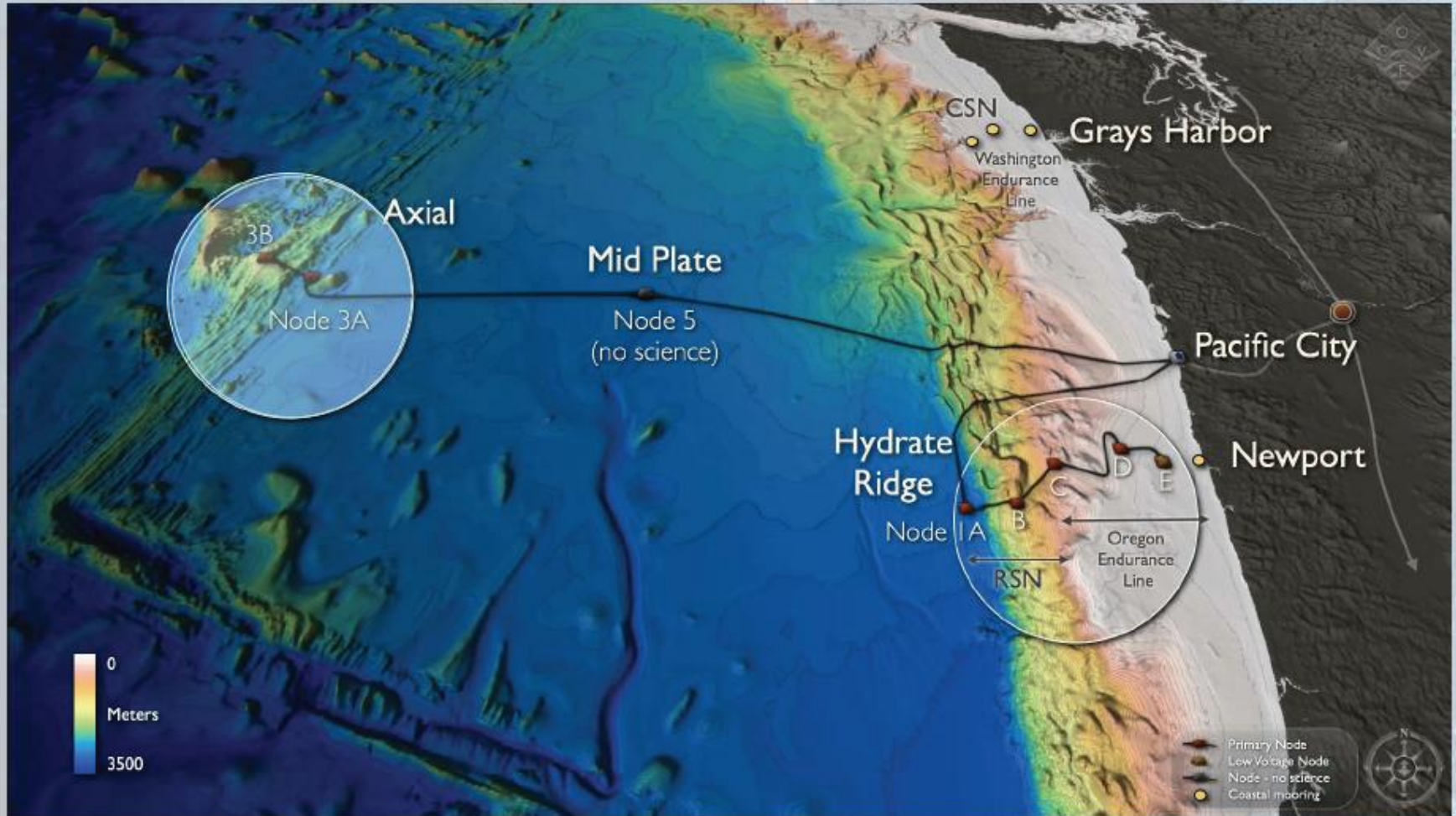


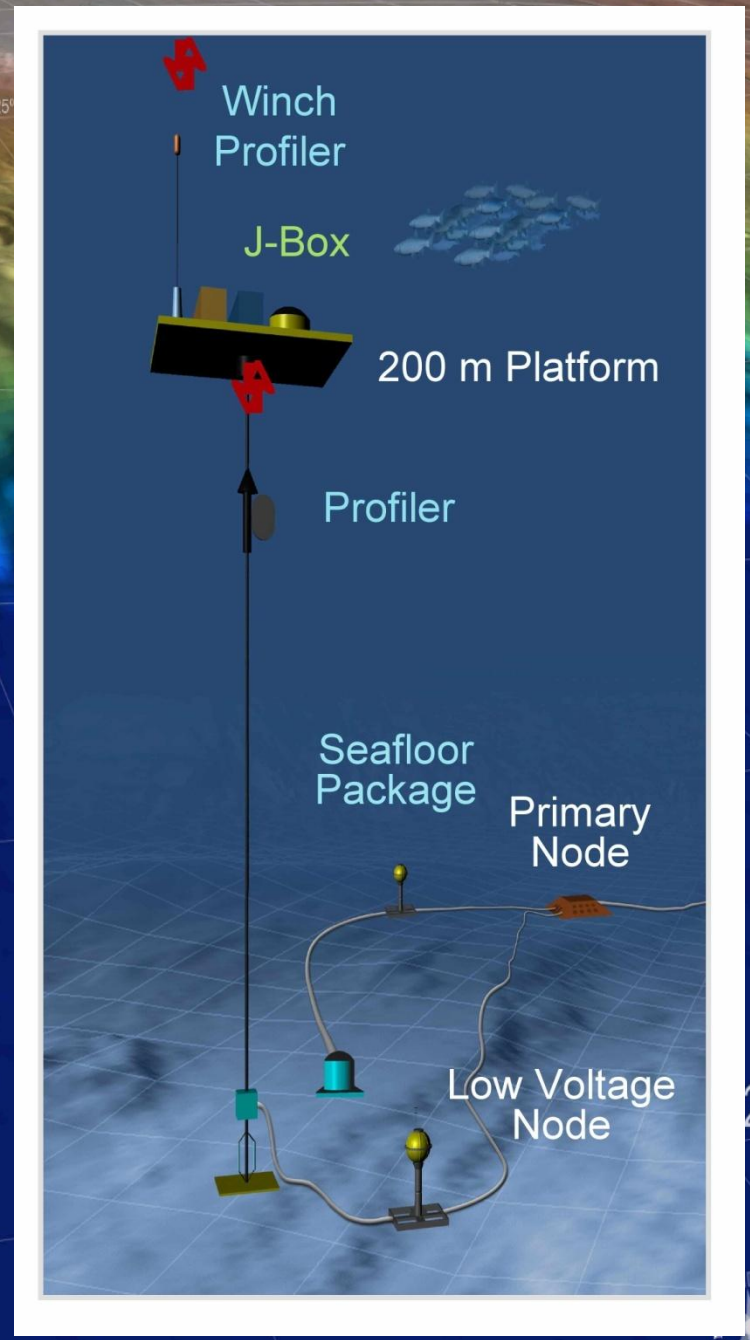
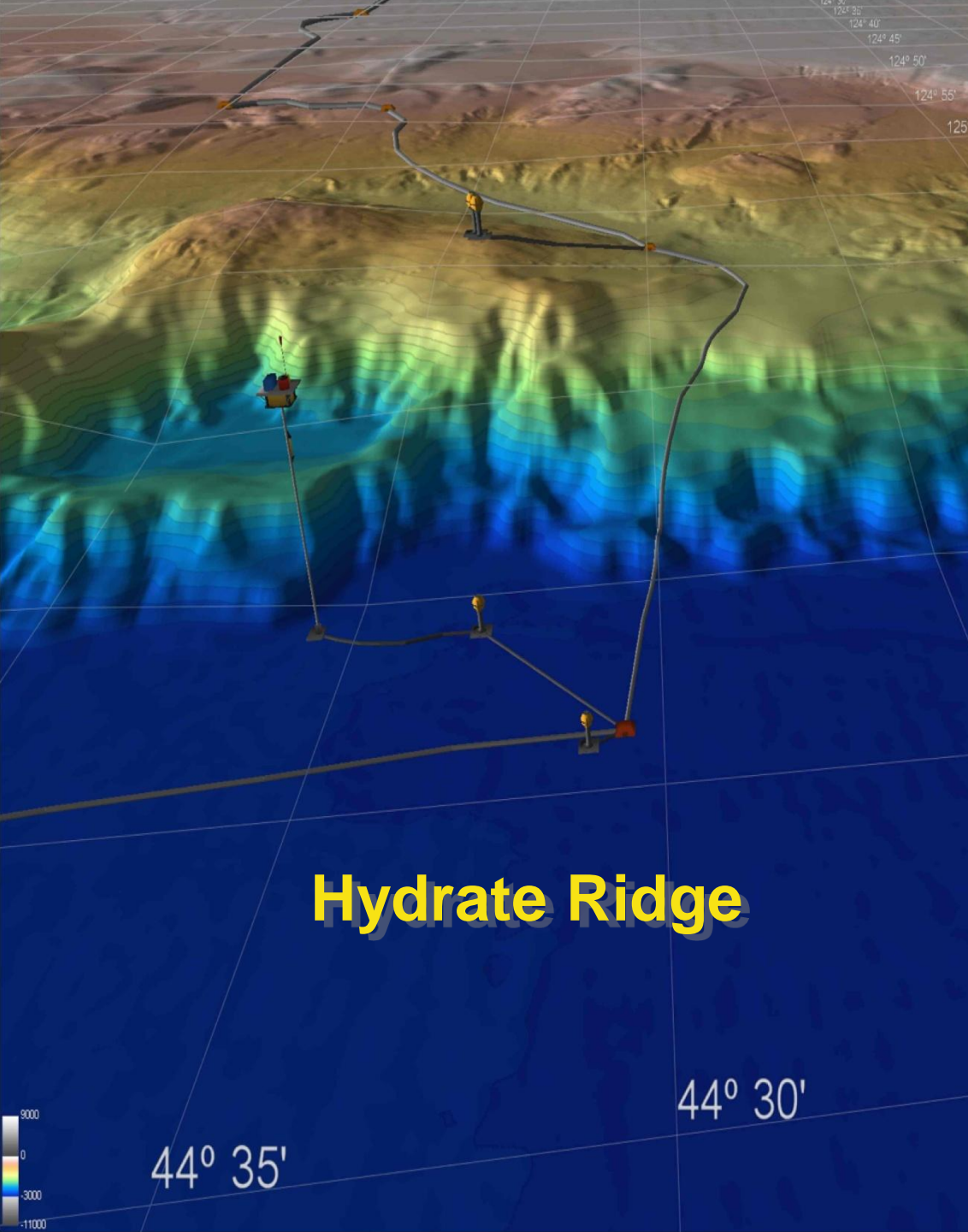


Axial Seamount



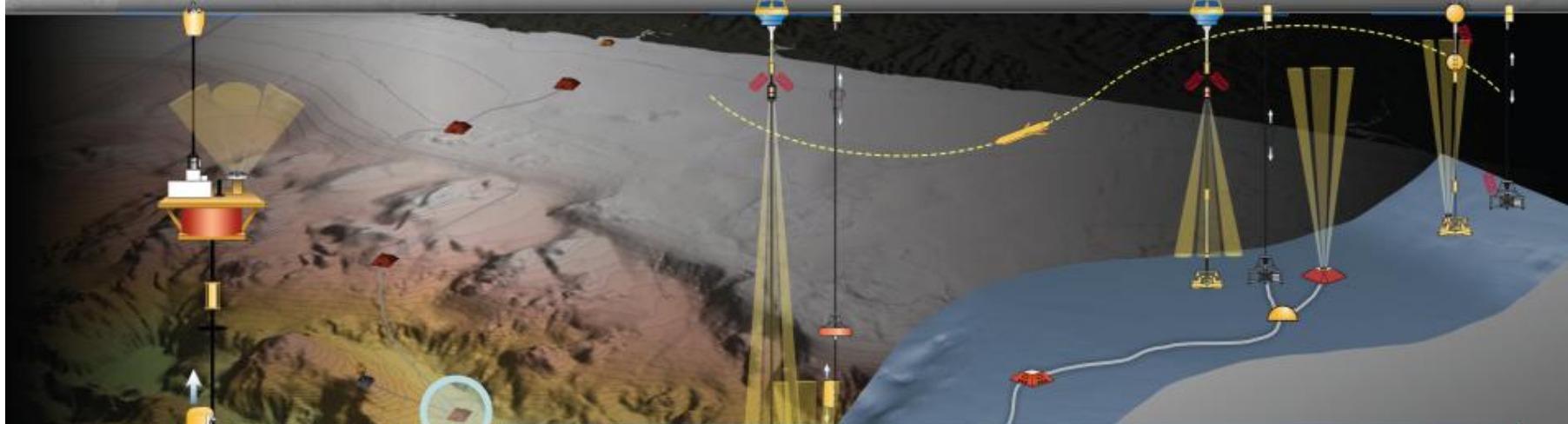
Regional Scale Nodes

















Hydrate Ridge

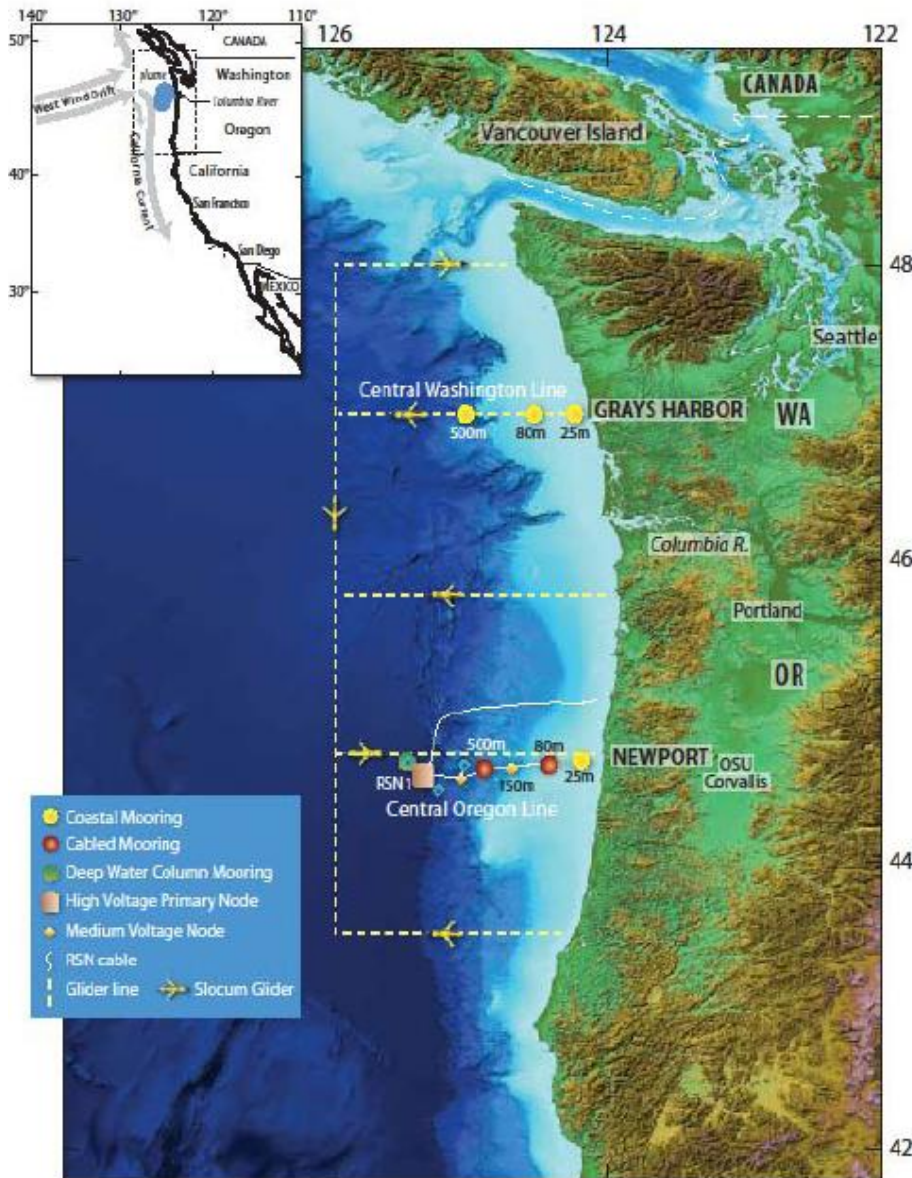


Instruments

-  Short Period Seismometer
-  Broadband Seismometer
-  ADCP
-  Current Meter - Temp
-  Pressure Sensor
-  Chemical Flow Sensor - Temp
-  Mass Spectrometer
-  Fluid Sampler - Temp
-  Ethernet Camera and Strobe

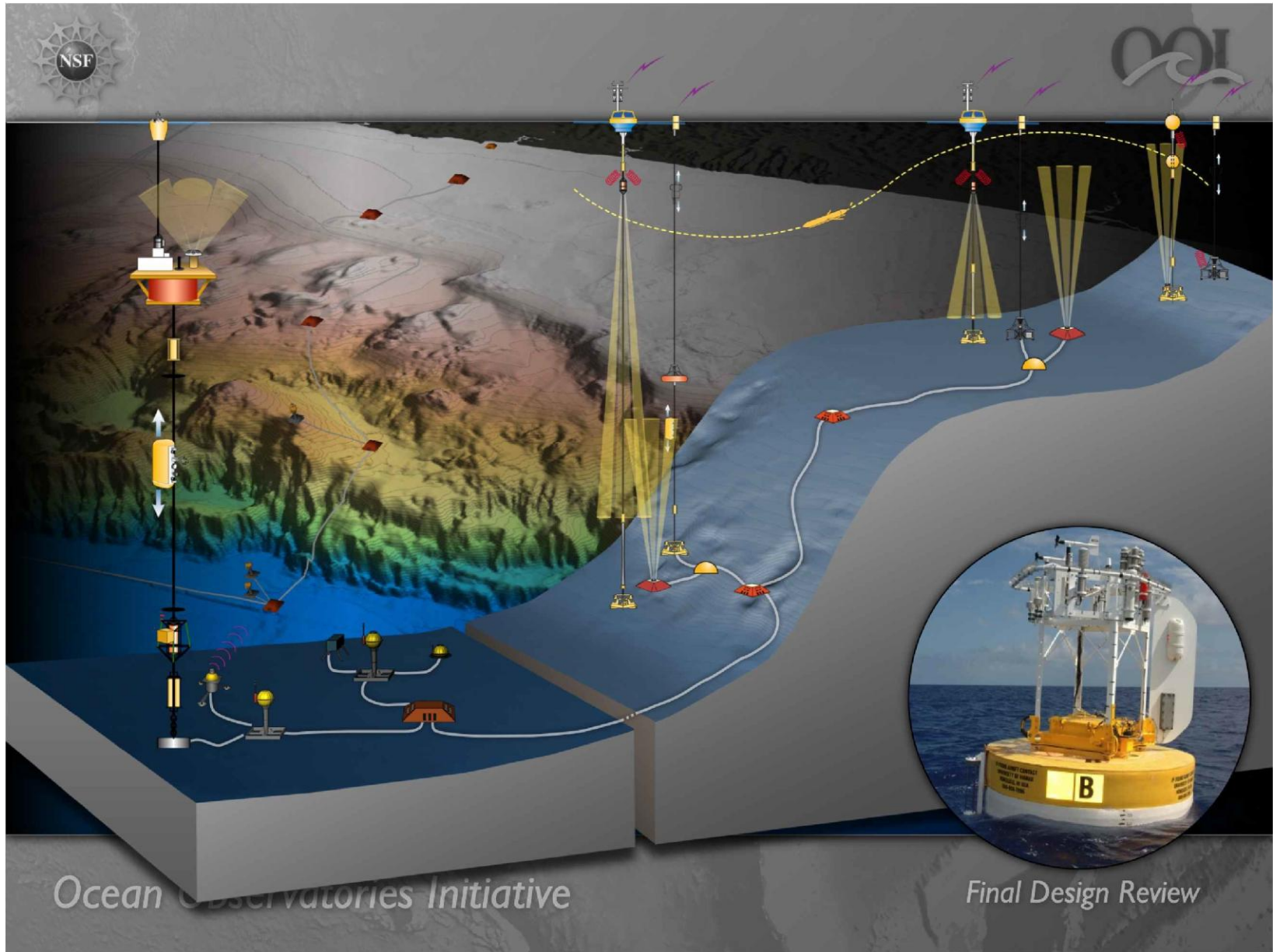


Endurance Array



- ✓ 2 cross-shelf lines
- ✓ Moorings on inner shelf, mid-shelf, and slope
- ✓ Air-sea, water column, and benthic observing
- ✓ 6 gliders
- ✓ Oregon Line connects to Regional cable; continuity with RSN mooring and PAPA
- ✓ Coastal to deep ocean observing

Endurance Array



North Atlantic

Irminger Sea

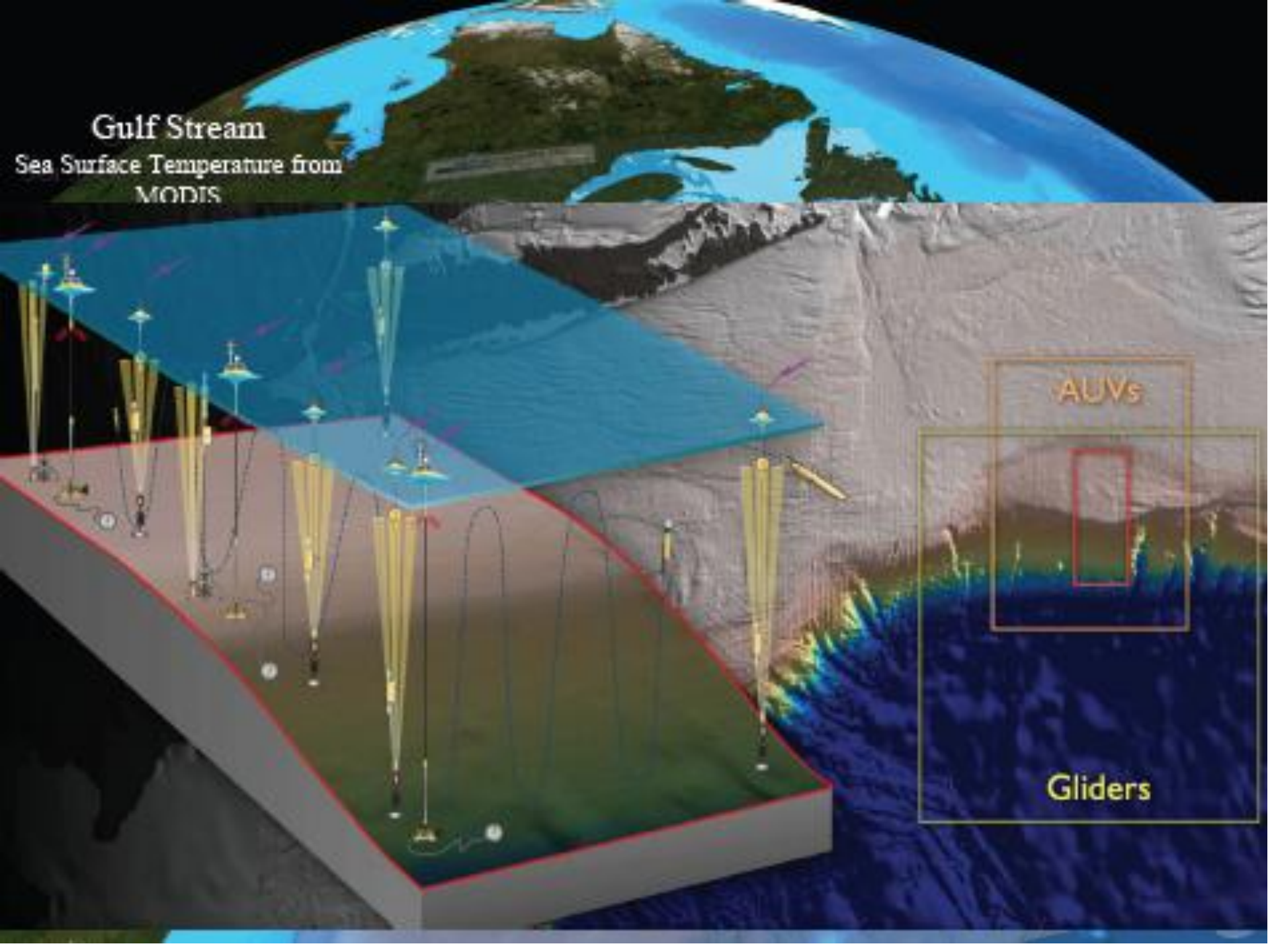
Pioneer Array

- ✓ High spatial resolution
- ✓ Shelf processes
- ✓ Air-sea, water column, benthic observing
- ✓ 6 Gliders; 3 AUVs
- ✓ 2 AUV docks
- ✓ Multi-function nodes
- ✓ Movable
- ✓ Reconfigurable



Gulf Stream

Sea Surface Temperature from MODIS



Pioneer Infrastructure

Moored Array

30 x 10 km

Site spacing

6-8 km cross

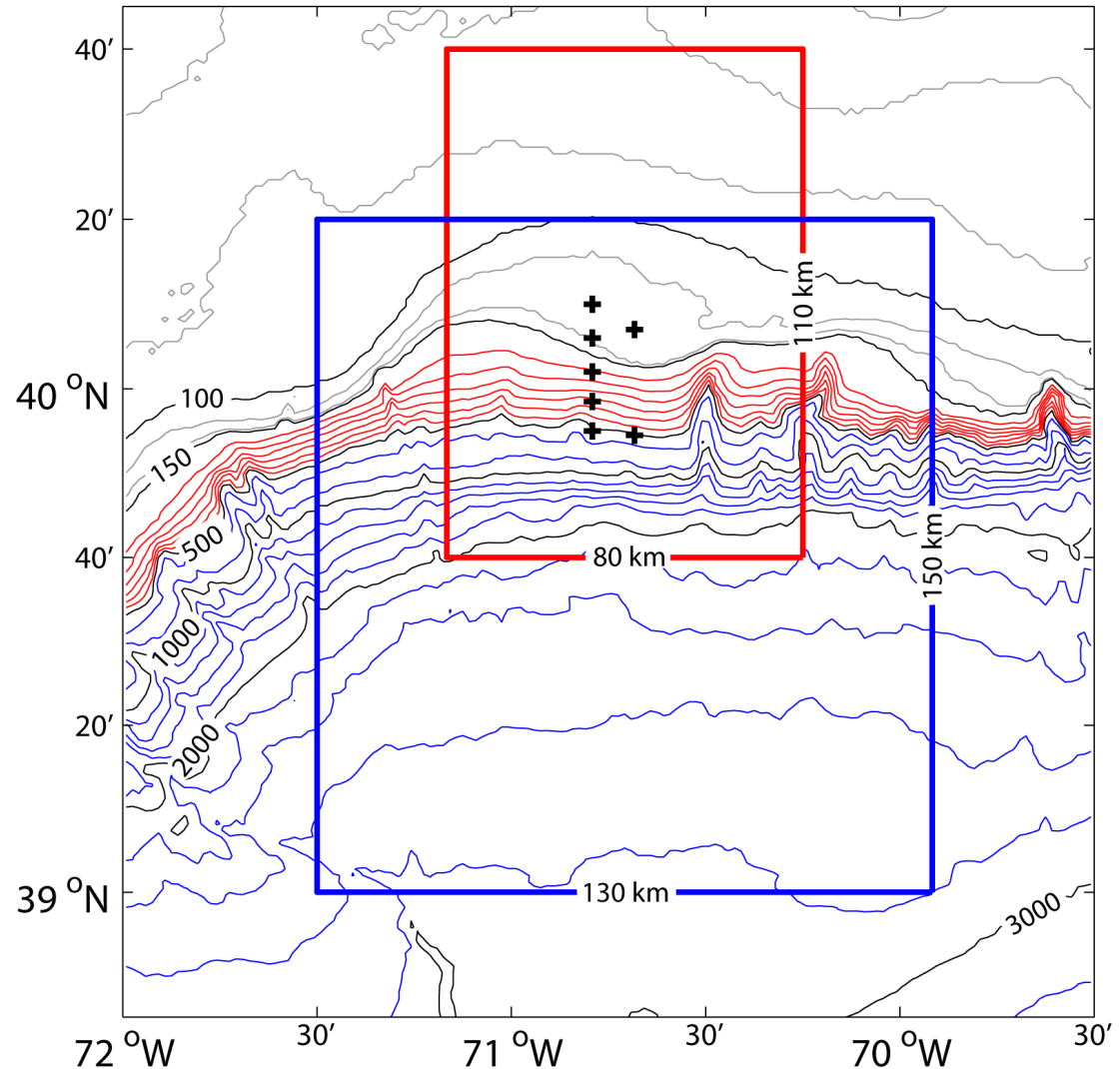
10 km along

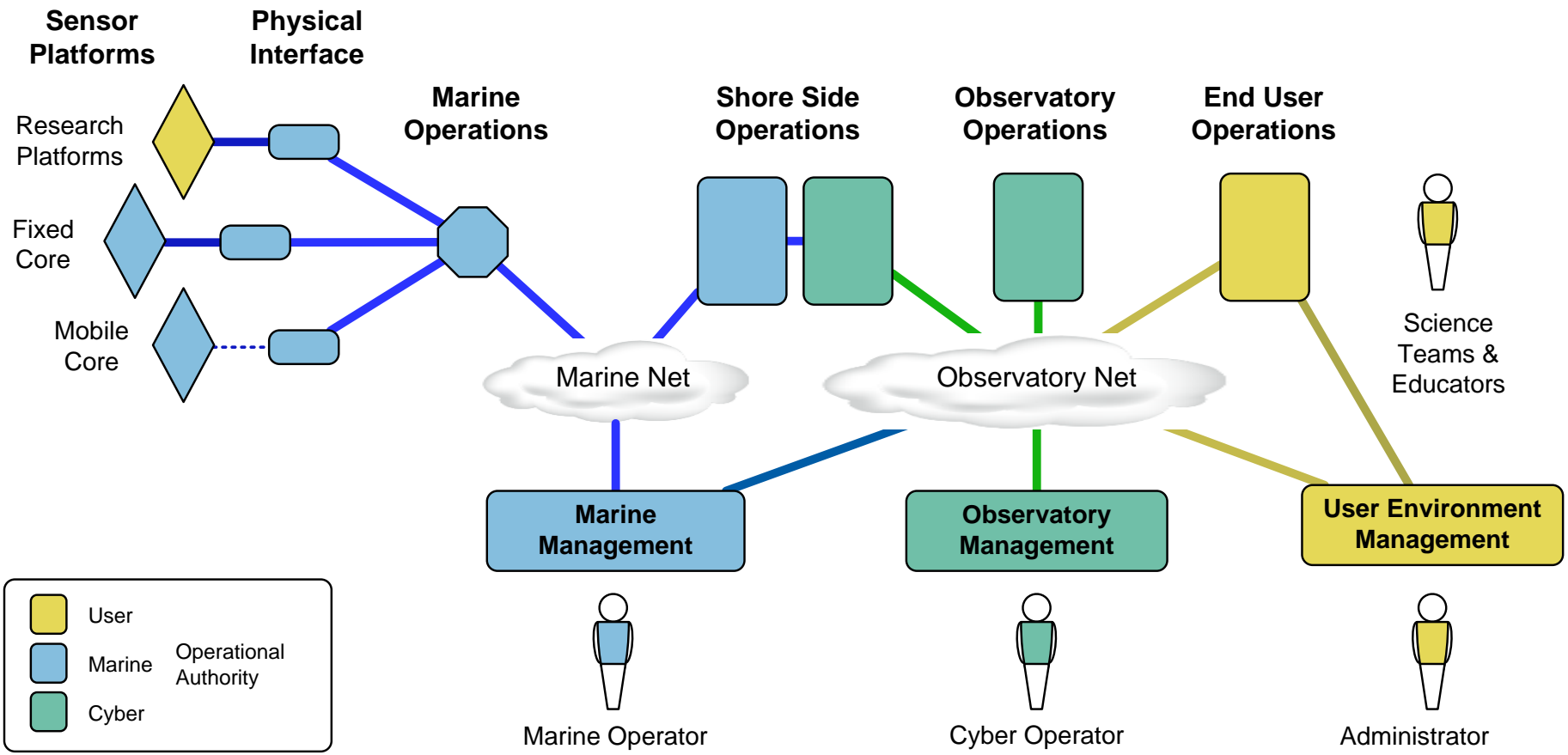
AUV Region

110 x 80 km






























Glider Region

150 x 130 km





Integrated Observatory Operational Domains

Proposed OOI Installation Schedule		2011				2012				2013				2014			
		Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D
Cyber- infrastructure	Software Release		  R1			  R2					   R3			  R4		   R5	
Global Sites	Argentine Basin									   							
	Irminger Sea									   							
	Southern Ocean 55 S												   				
	Station Papa										   						
Coastal Arrays	Endurance					 				 				  			
	Pioneer					 					   						
Regional Arrays	Primary Infra- structure			 Submarine Cable Installed			 Primary Nodes										
	Secondary Infra- structure									 Sensors				 Moorings	 		

Legend  Installation  Data Flow  Commissioning  Gliders Deployed  AUVs Deployed  R# Integrated Observatory Network Release #




















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Major Year 1 & 2 Activities



- Engineering Design & Prototypes
- Instrumentation Specification
- Procurements, Procurements, Procurements
- Environmental Compliance

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		Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D
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OOSC – next steps



- Membership
- Early Actions



OOI – web presence

www.oceanobservatories.org

Points of Contact:

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Ocean Leadership – Tim Cowles -tcowles@oceanleadership.org

