



OOI Status Brief UNOLs Annual Meeting

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October 23, 2012

Additional information:

www.oceanobservatories.org



OOI – Quick Description

- OOI is a multi-scale ocean observatory - this is a detailed design/deploy/transition to operations award
 - \$386.42M (NSF is the sole funding agency) **
 - 66 months of construction (Sept 2009 start)
 - Currently in month 37
 - Incremental Transition to Operations – MAJOR CHALLENGE
 - R&RA funding budgeted for initial operations (end 2017) **
 - 25 years of planned operations
 - Pioneer Array is designed to be a redeployable array based on proposal review
- ** Subject to the realities of federal budgeting process

Ocean Observatories Initiative:

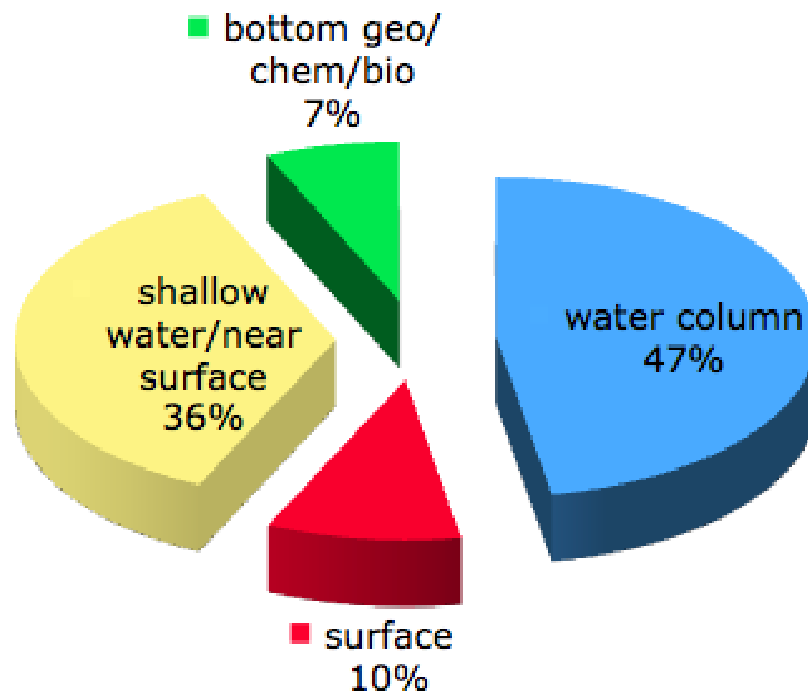
Real-Time Science Exploration in a
Changing Ocean from Anywhere on Earth

- ✦ Open data for all scientists, educators and the public
- ✦ High Latitude to Coastal Dynamics
- ✦ Microbial to basin scale observations
- ✦ Microseconds to years
- ✦ Integration of predictive models
- ✦ 25-year lifetime design
- ✦ System integrated and accessible by the Cyber-Infrastructure



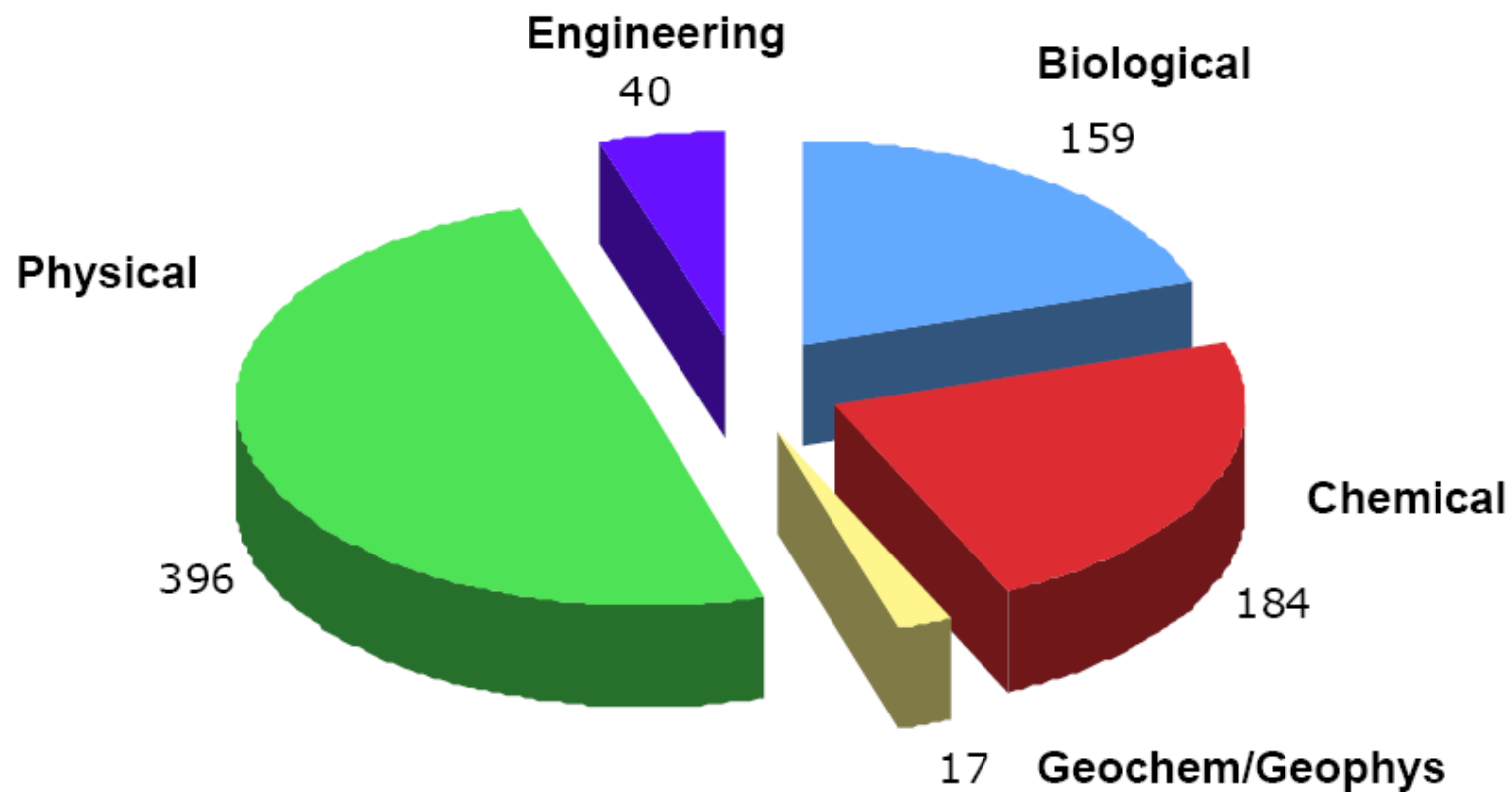
Water Column	Sensor Type	#
	Acoustic Doppler Current Profiler	39
	Conductivity/Temp.	210
	Hydrophone	10
	Inverted echo sounder	5
	pH	37
	Velocity, single point	53
Surface		
	Waves	10
	Meteorology	18
	pCO2	36
	Direct covariance flux	10
Shallow water		
	Fluorometer	81
	Nutrients	25
	Dissolved oxygen	82
	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

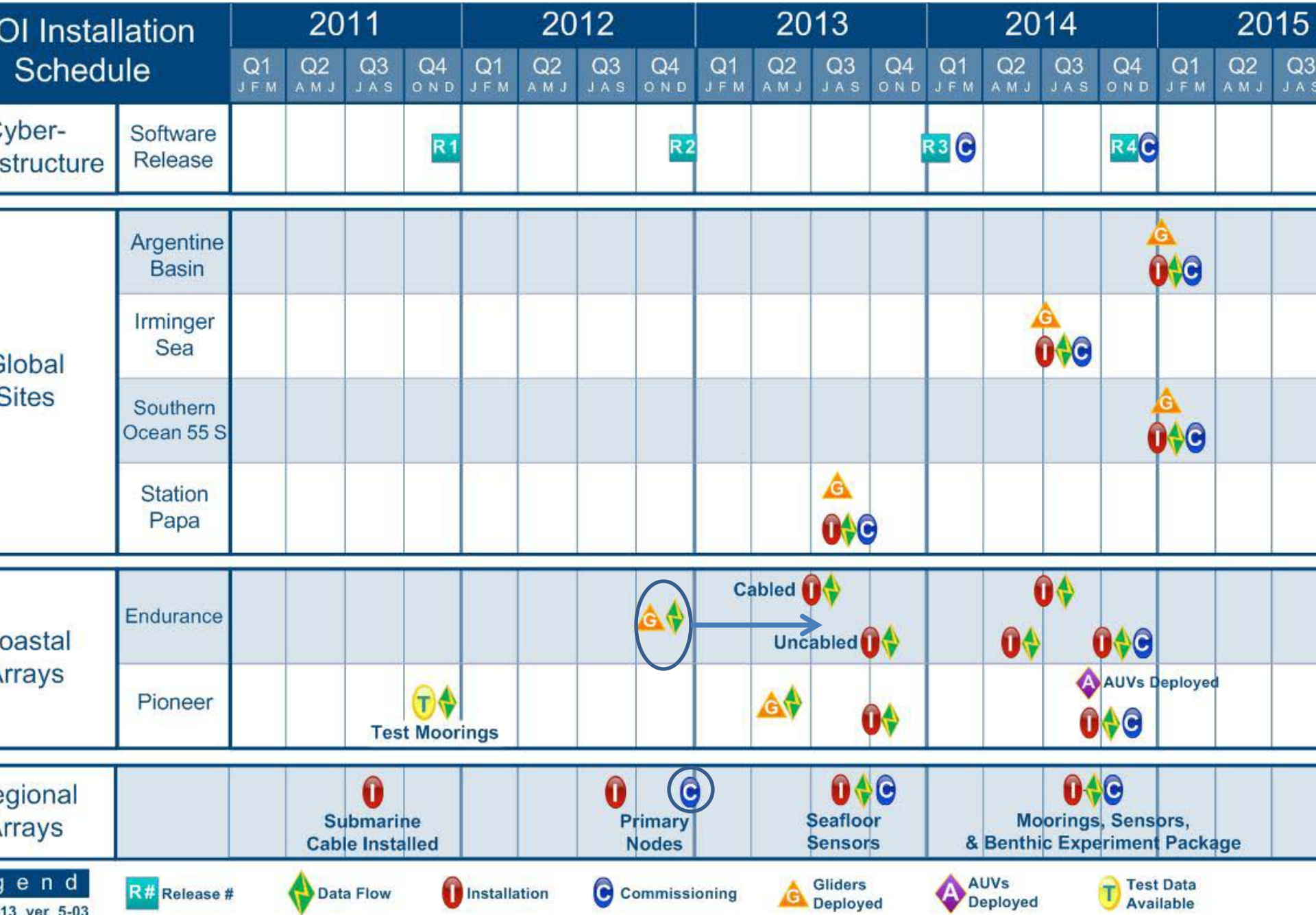
Sensor Distribution

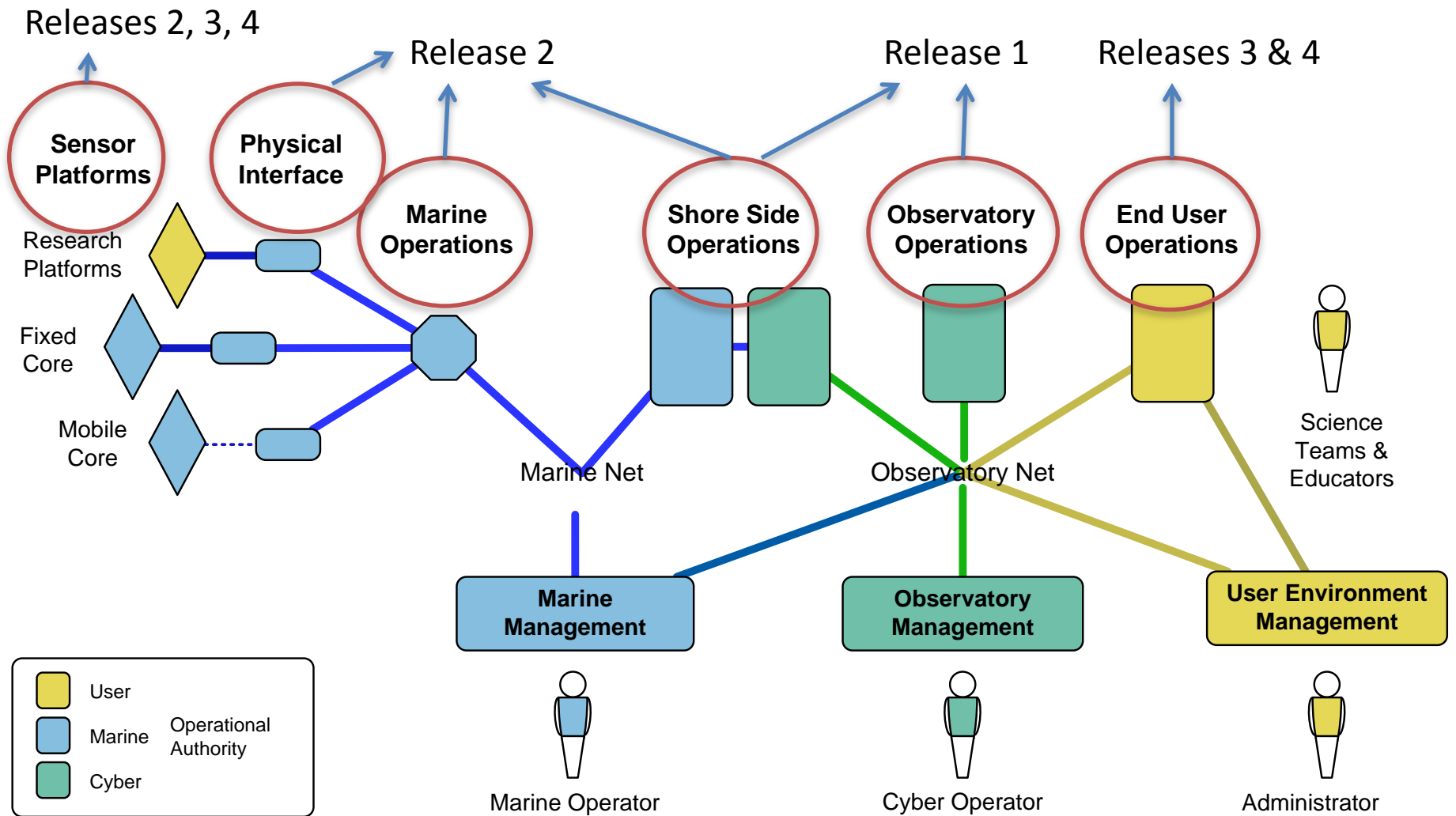


Core Sensors

Sensor Numbers by Primary Discipline





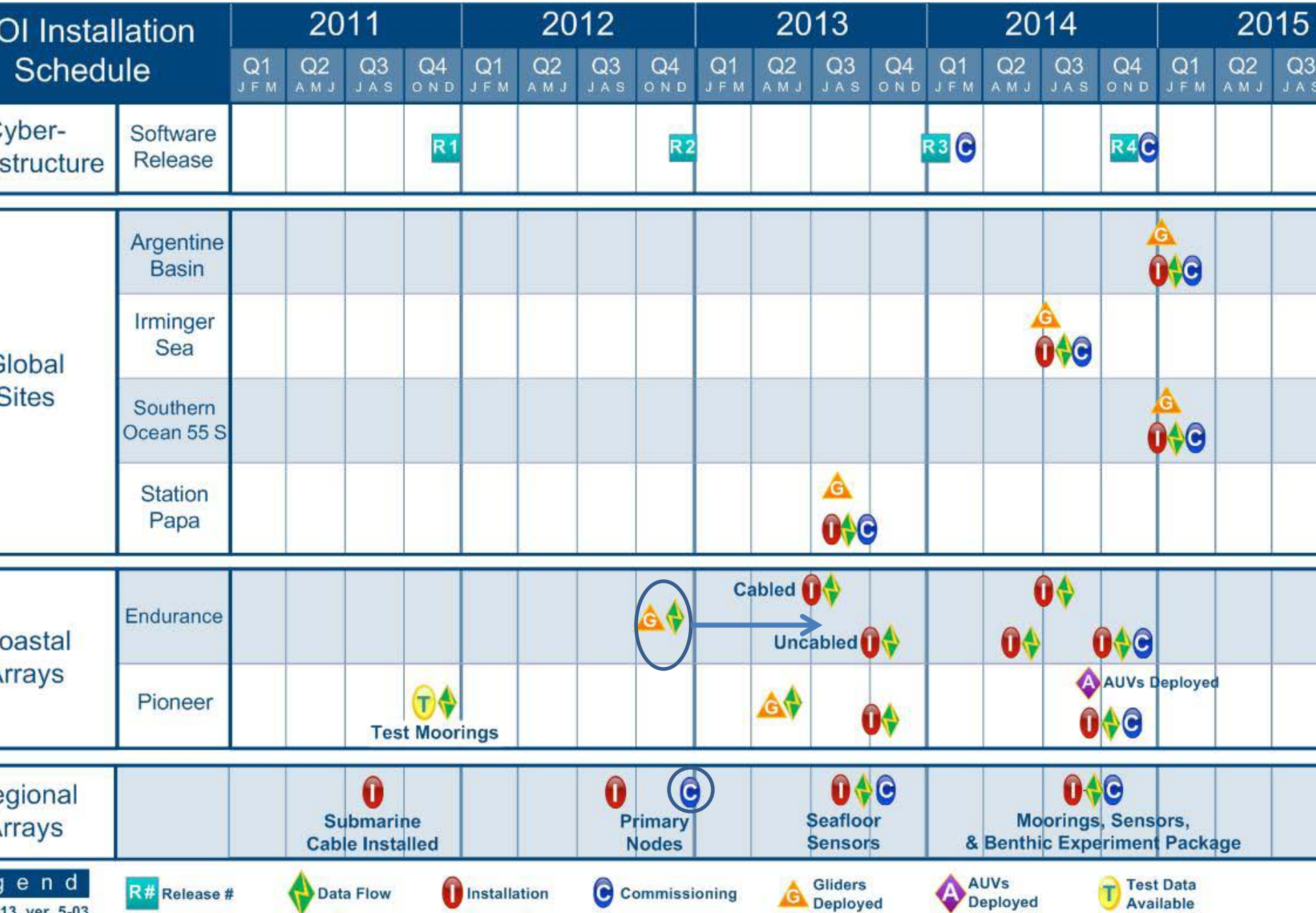


CYBERINFRASTRUCTURE – UCSD design/build/operate
Release 1 complete, accepted, Release 2 in progress



OOI Coastal/Global Status

- At Sea Test 2 (east coast) & In Shore Mooring Tests (west)
 - COMPLETE SUCCESS
 - Designs tested in various configurations
 - Mooring Designs for Global & Coastal locked down, approved, reviewed
 - Exception – Coastal Surface Piercing Profiler
 - Additional round of Surface Mooring Prove out planned
- BUILD then DEPLOY, then COMMISSION
 - Over \$60M in procurements in next 4 months
 - Build Phase Commences
 - Coastal Gliders in production, AUVs, Ocean Gliders
 - Risk in Supply Chain Management and Execution
- Deployments – see schedule
 - Working with UNOLs & OOSC
 - Challenges Ahead

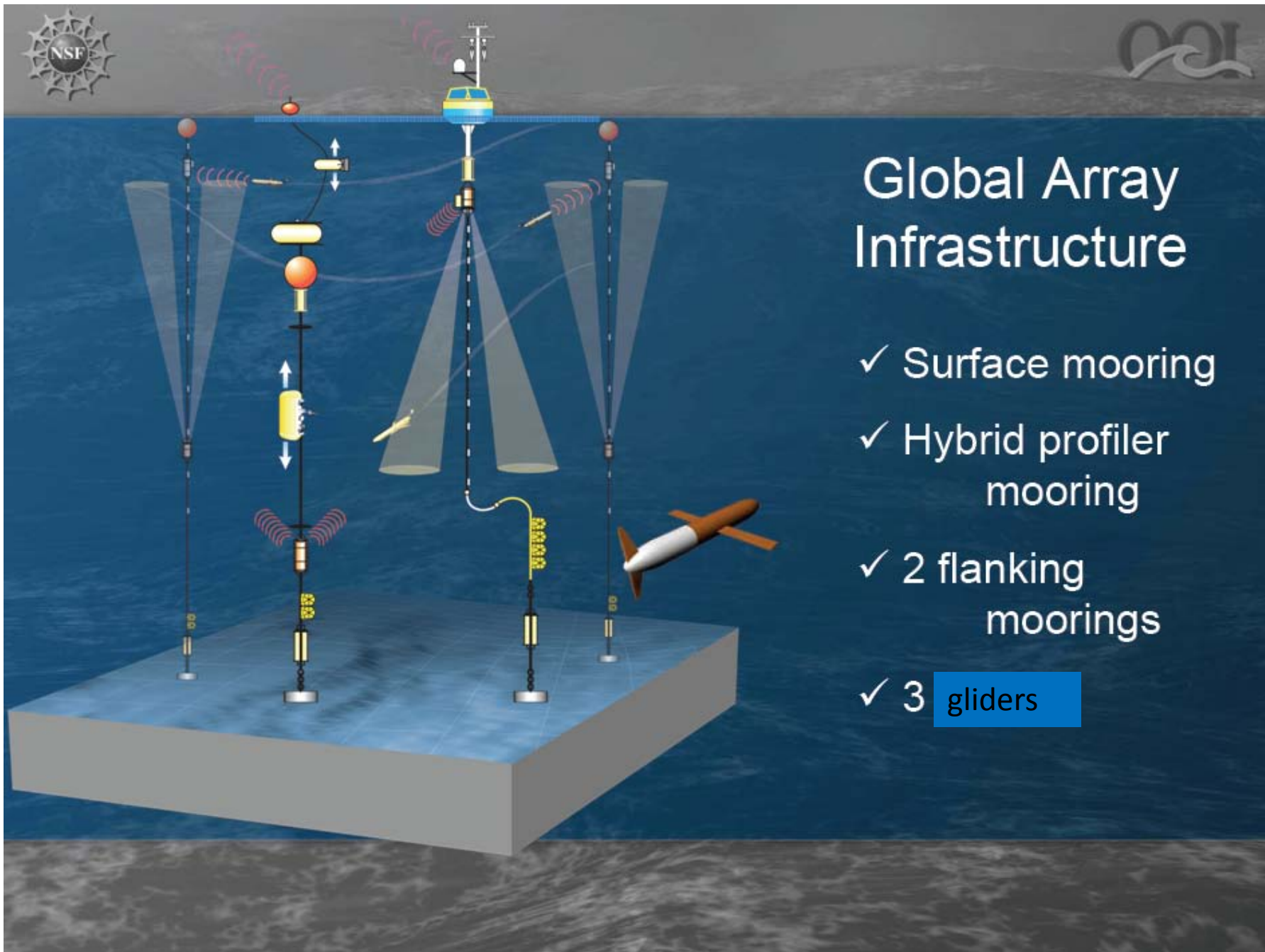


Test Mooring Development



Global Hybrid Profiler



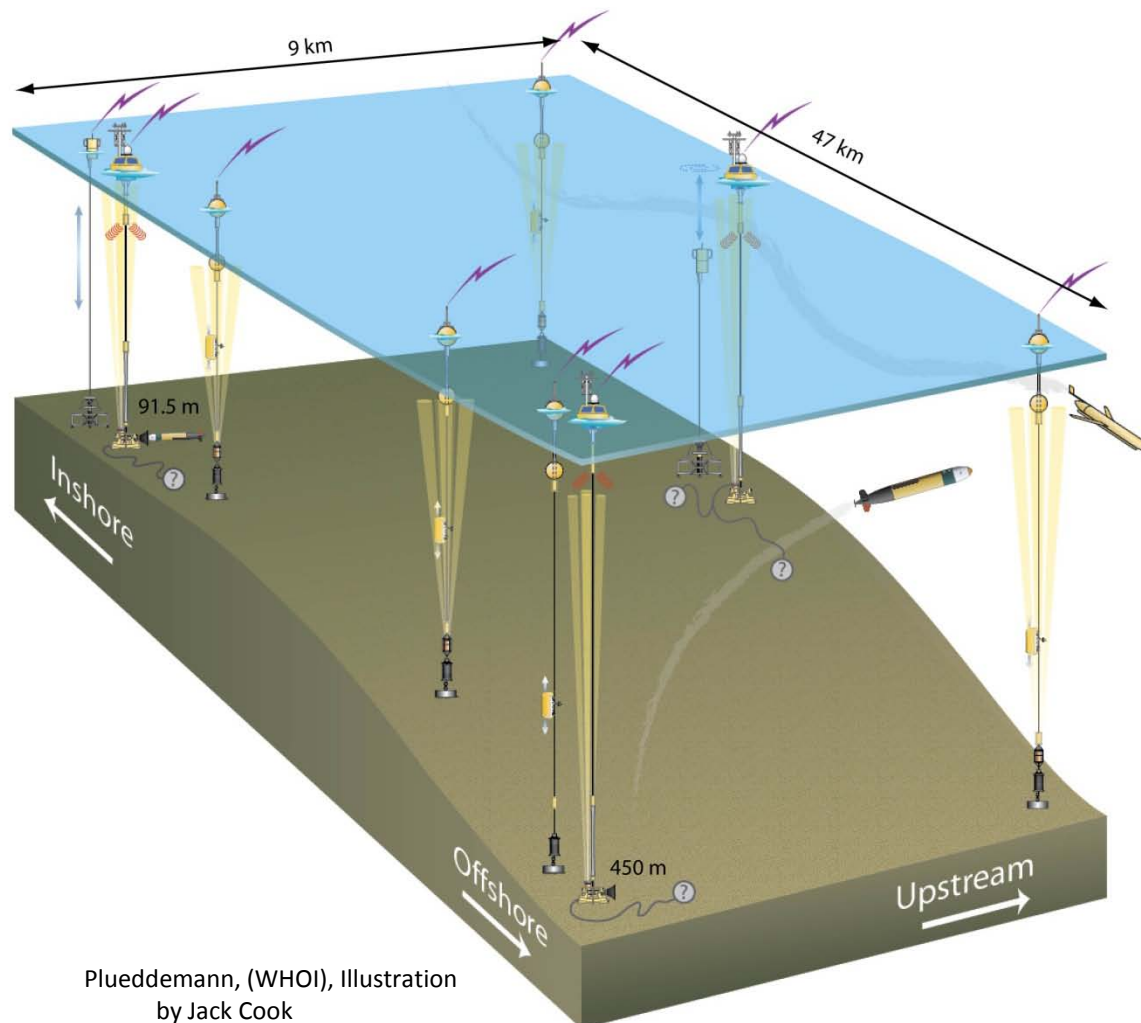


Global Array Infrastructure

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

Pioneer Array Infrastructure

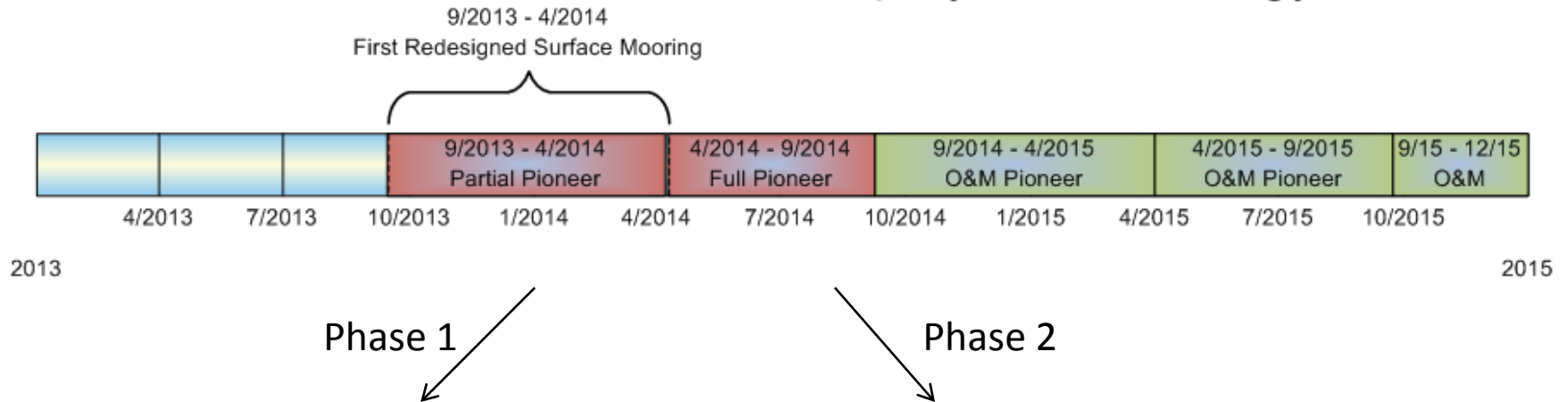
- Full water column
- 3D volume sampling
- Two-way satellite links
- Power-generating buoys
- Multi-function seafloor nodes



Plueddemann, (WHOI), Illustration
by Jack Cook

Pioneer Deployment Schedule

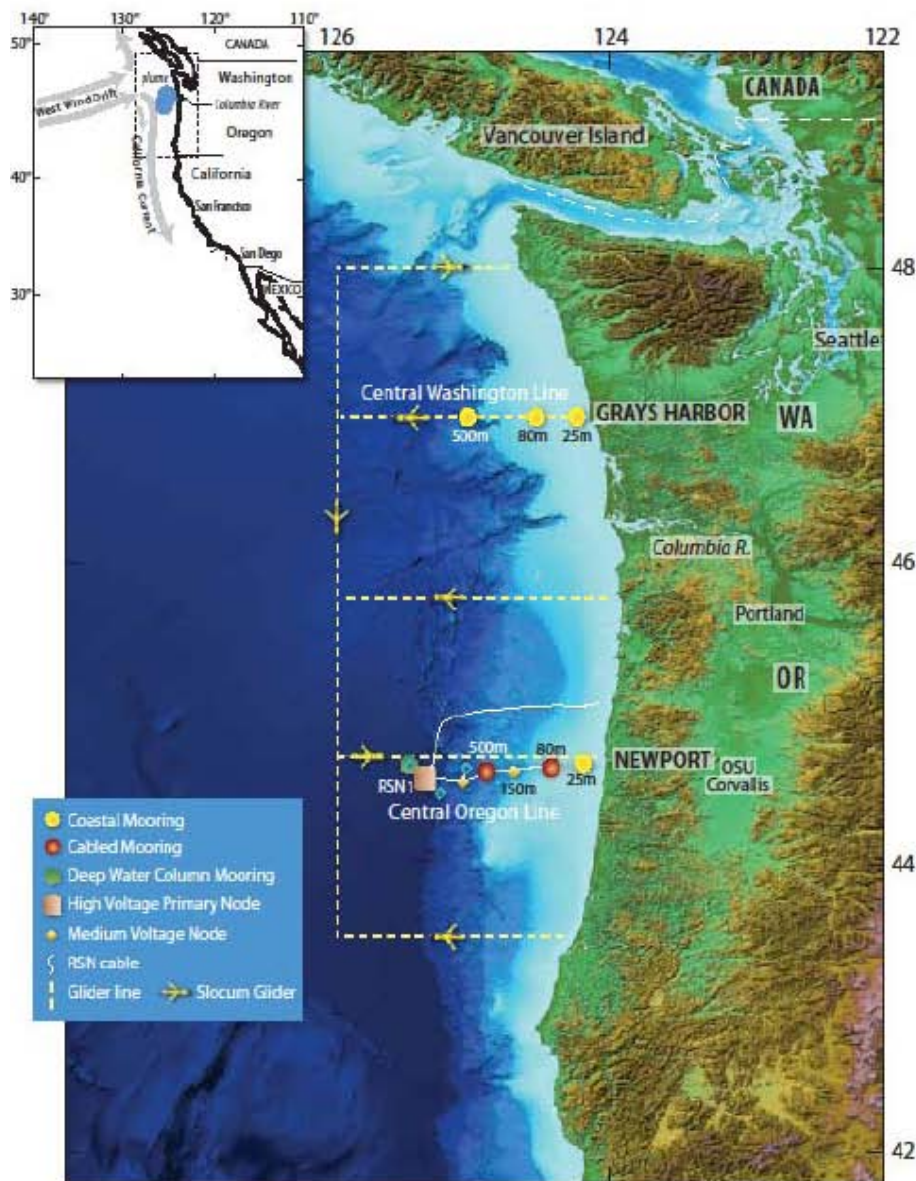
CGSN Construction Phase Deployment Strategy



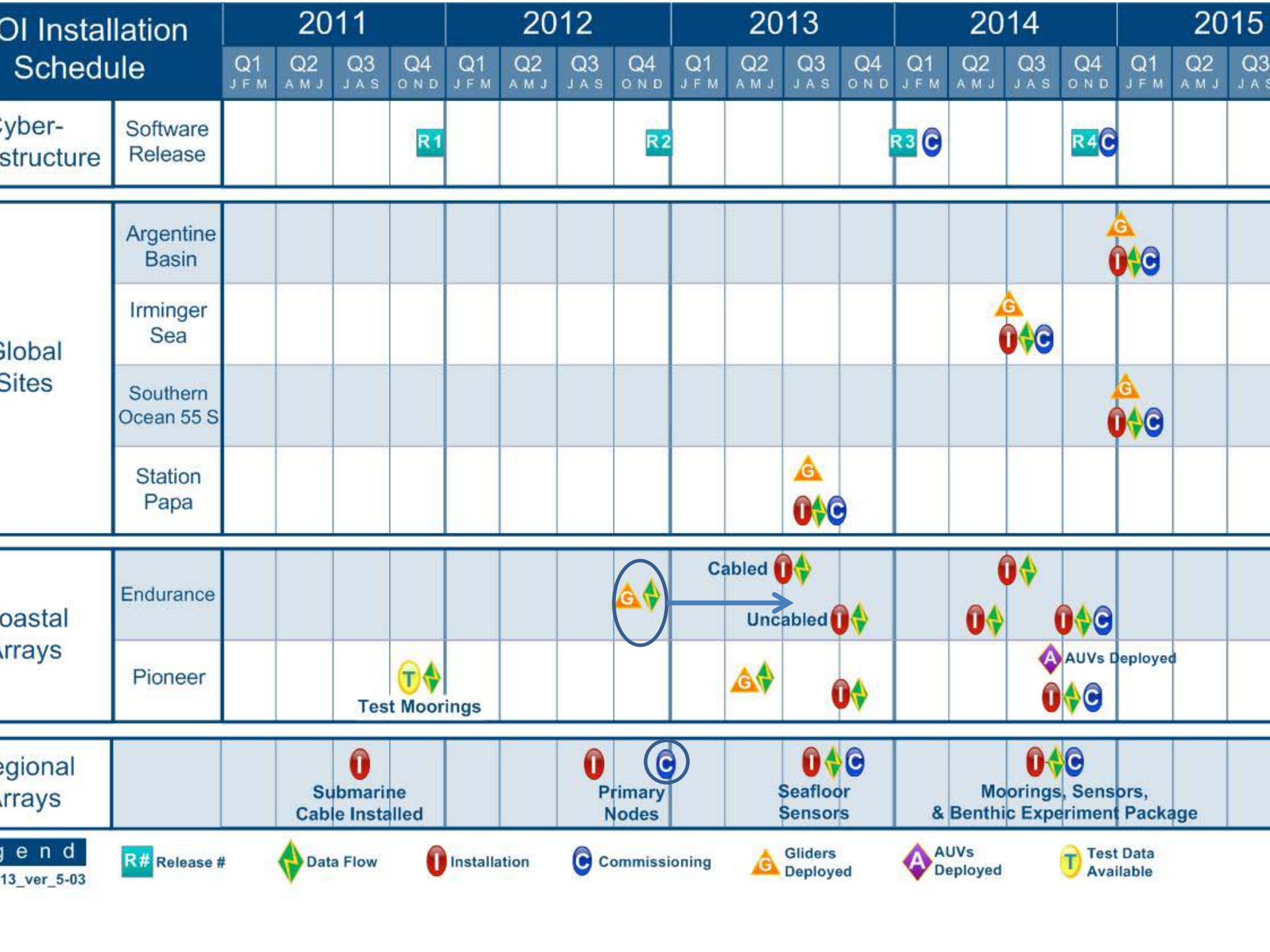
1 of 3 Surface Moorings
 5 of 5 Wire Following Profilers
 0 of 2 Surface Piercing Profilers
 6 of 6 Gliders
 0 of 2 AUVs with docks

3 of 3 Surface Moorings
 5 of 5 Wire Following Profilers
 2 of 2 Surface Piercing Profilers
 6 of 6 Gliders
 2 of 2 AUVs with docks

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





OOI Cabled Array Status

- Shore Station Leased along with “backhaul to Portland”
- Cable Deployed
- Primary Nodes in during summer 2012 – being accepted
- Secondary Infrastructure – summers 2013 and 2014

SHORE STATION

Shore Station subsystem encompasses the physical building, the battery backup and power connection to the grid, and space for the Primary Infrastructure SLTE and PFE

Shallow Water Profiler

Shore station - Pacific City

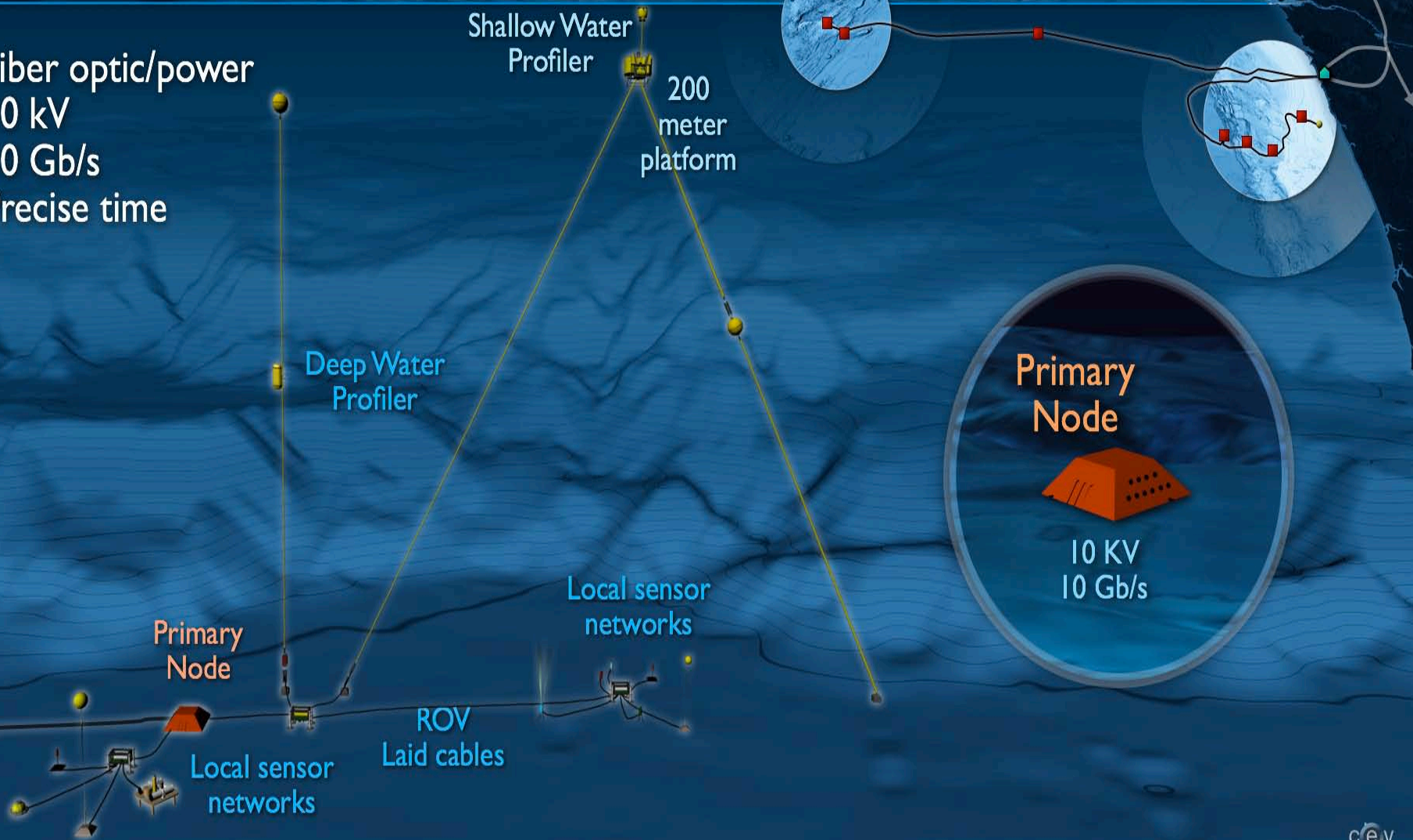
Primary Node

Local sensor networks



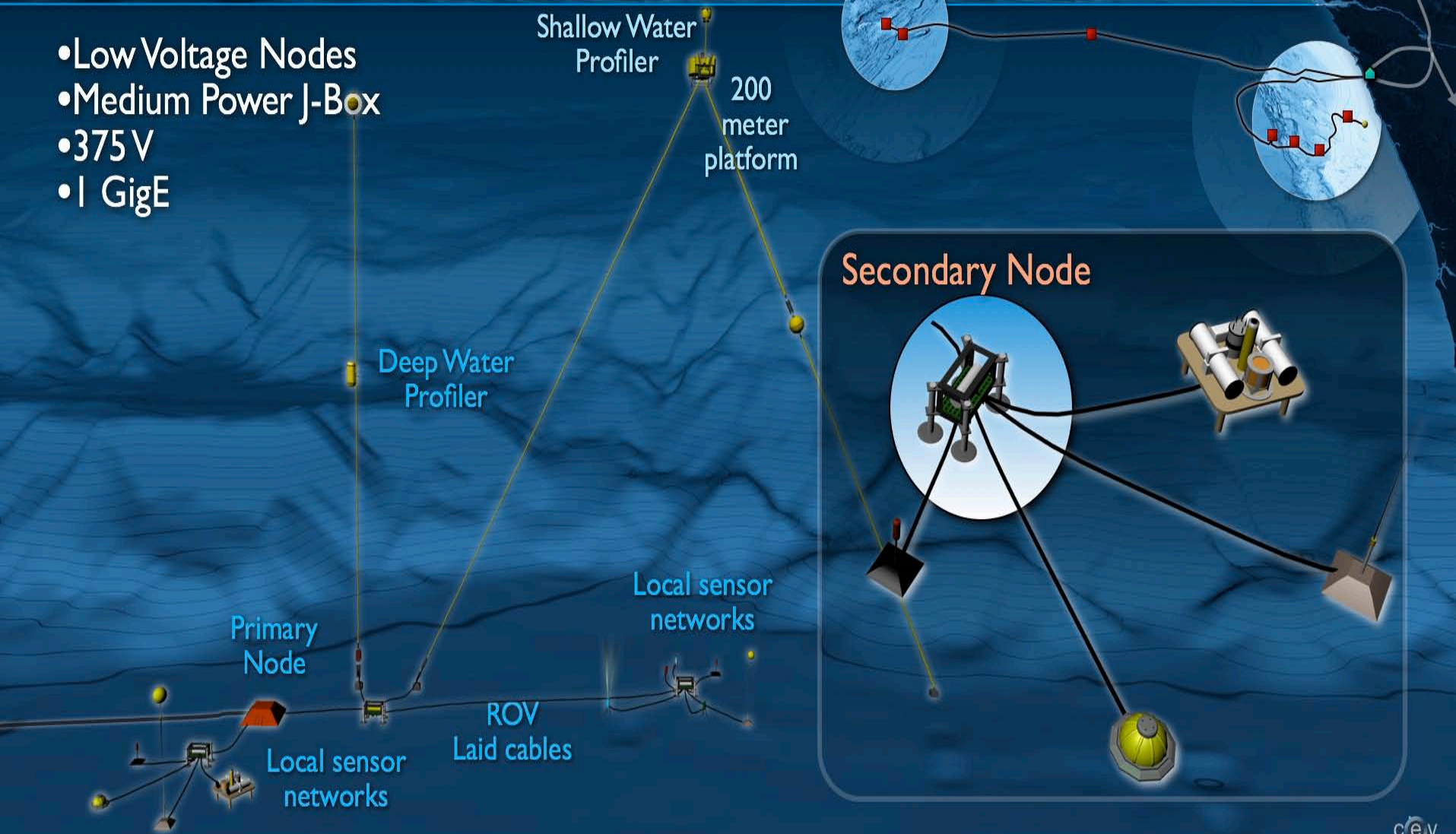
PRIMARY INFRASTRUCTURE

- Fiber optic/power
- 10 kV
- 10 Gb/s
- Precise time



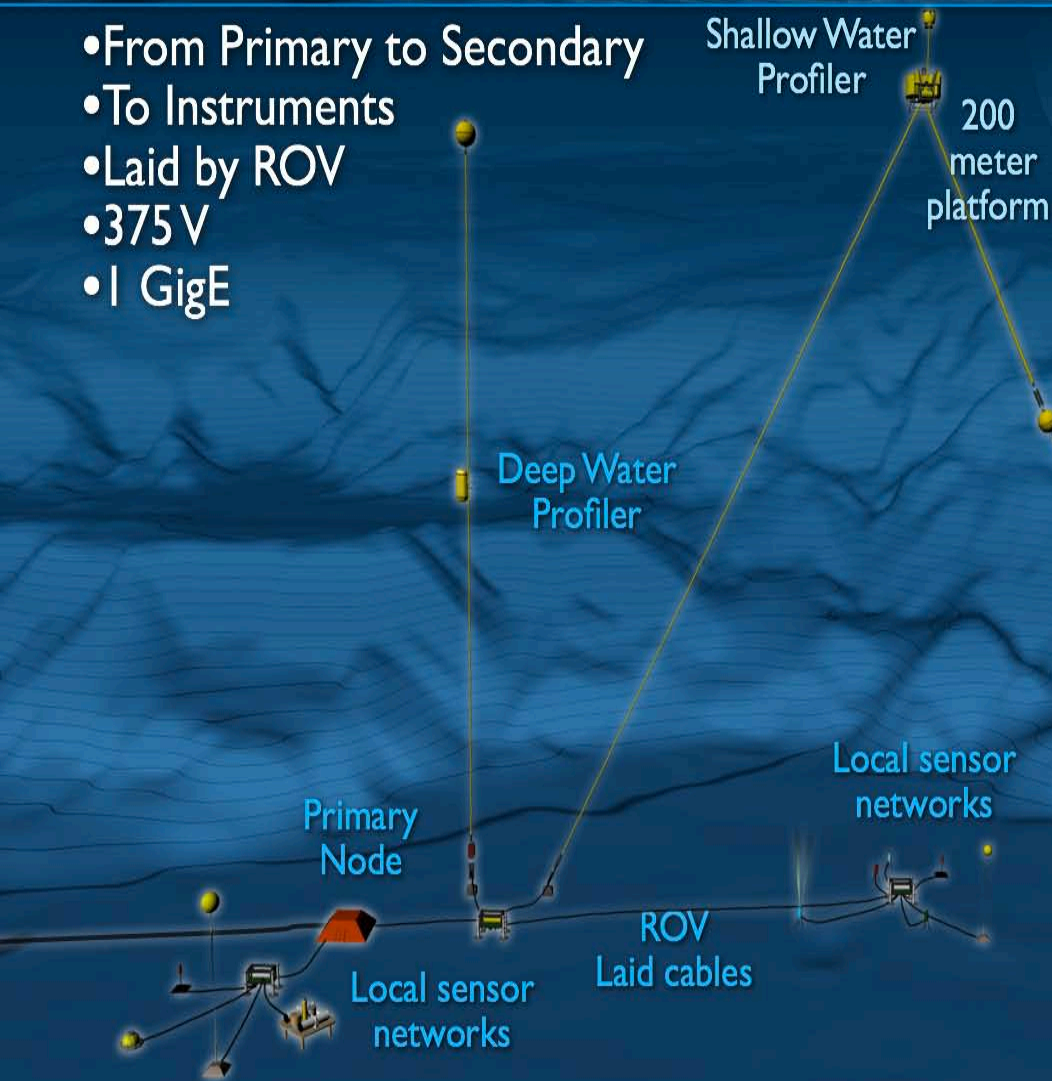
SECONDARY NODE

- Low Voltage Nodes
- Medium Power J-Box
- 375 V
- 1 GigE

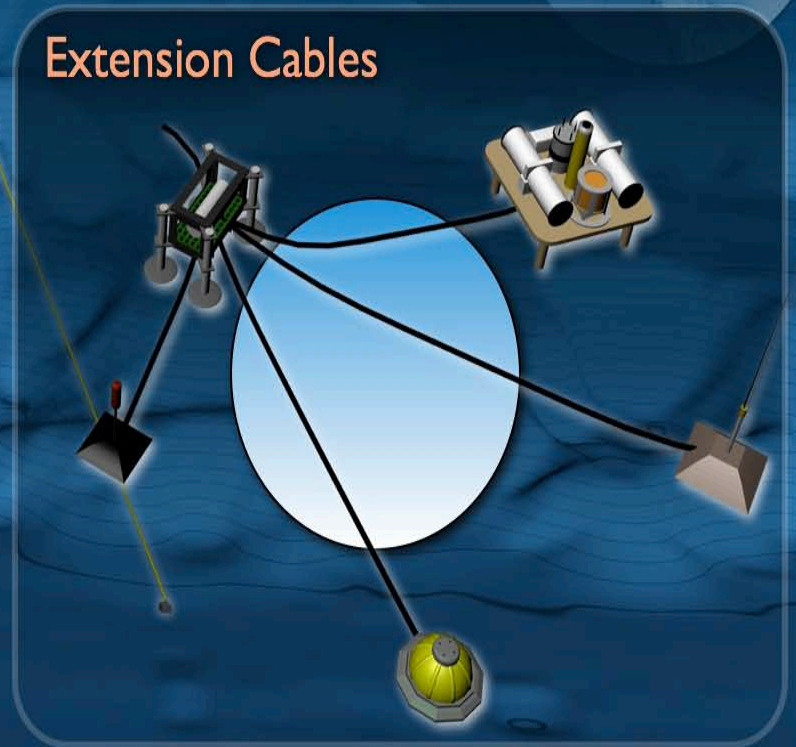


EXTENSION CABLES

- From Primary to Secondary
- To Instruments
- Laid by ROV
- 375V
- 1 GigE



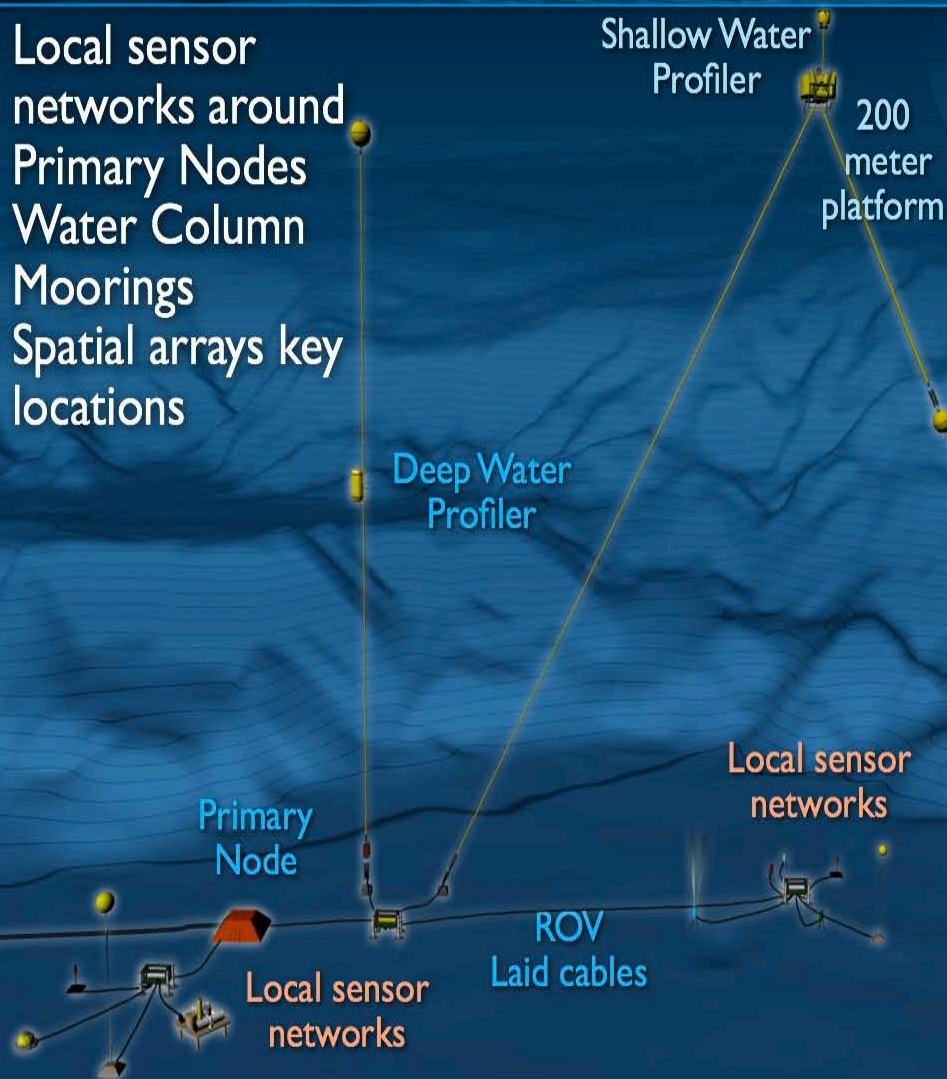
Extension Cables



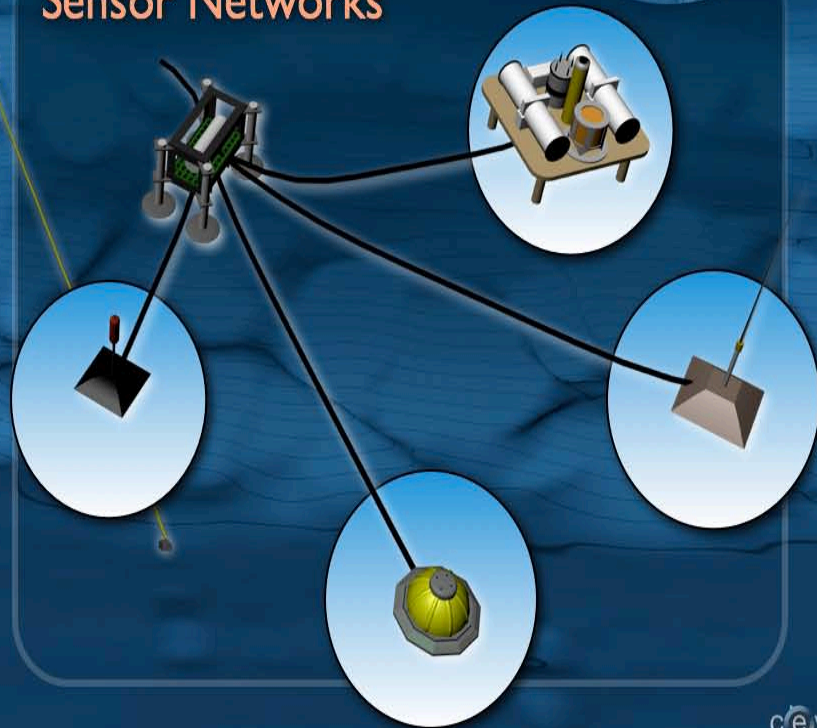
Seattle

SENSOR NETWORKS

- Local sensor networks around Primary Nodes
- Water Column Moorings
- Spatial arrays key locations



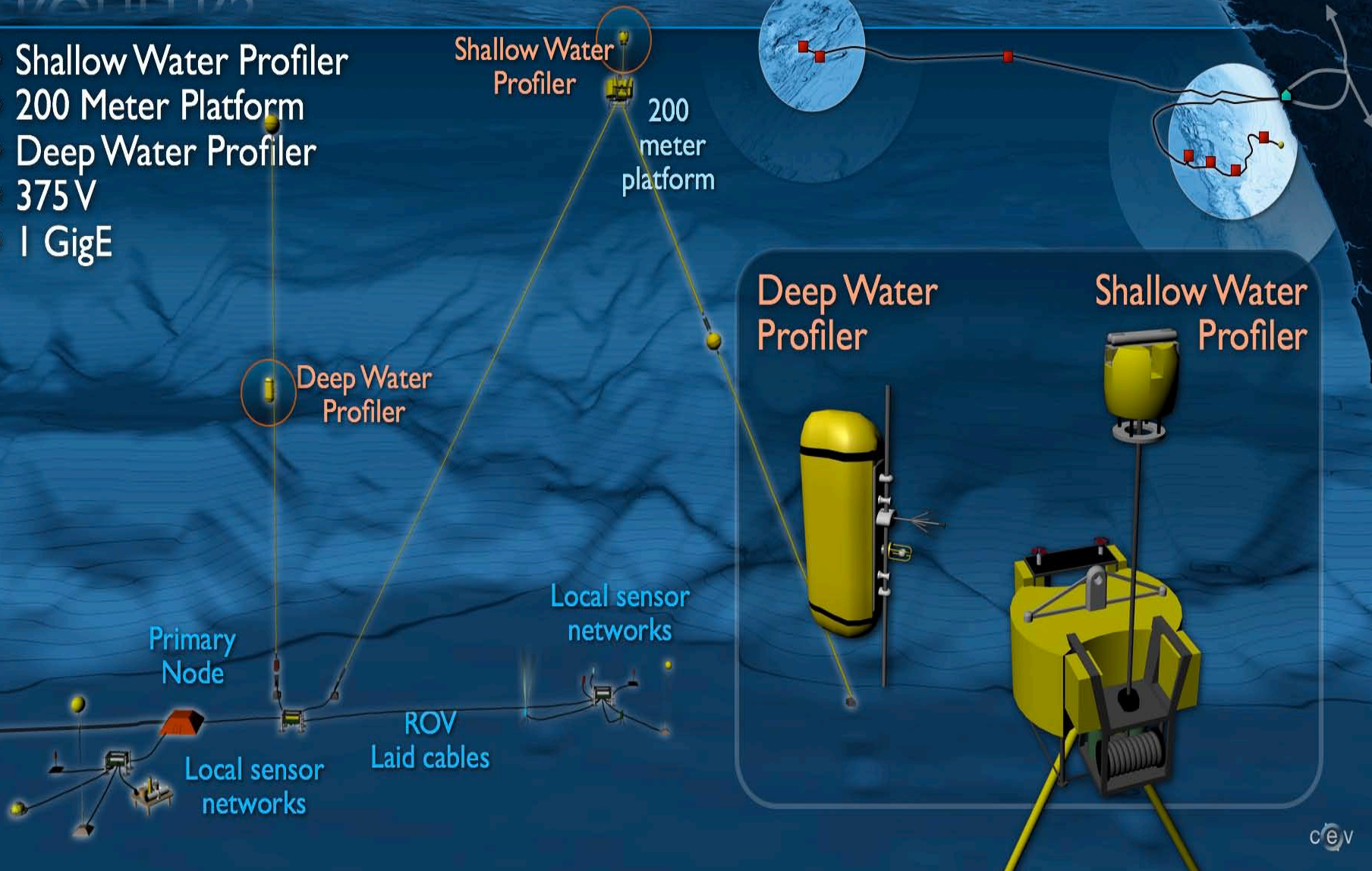
Sensor Networks



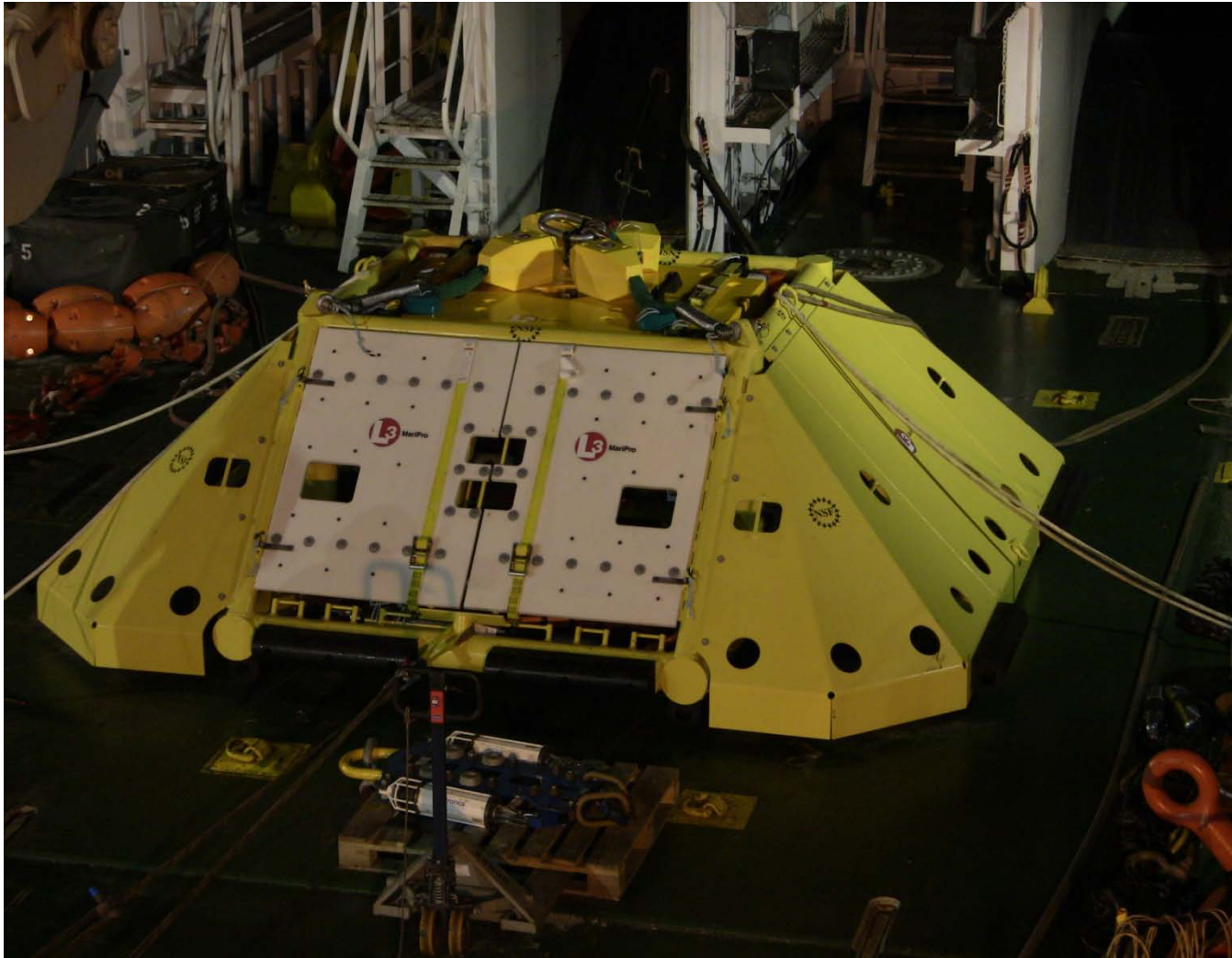
Seattle

PROFILERS

- Shallow Water Profiler
- 200 Meter Platform
- Deep Water Profiler
- 375 V
- 1 GigE

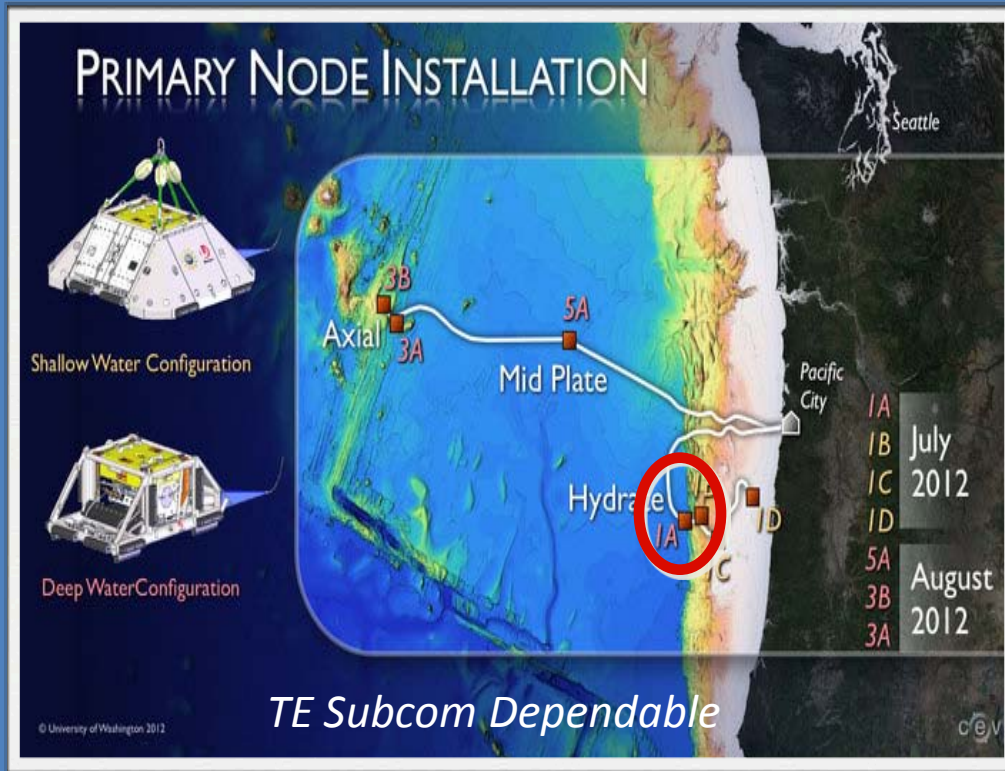


Shallow Water Node



Deep Water Nodes



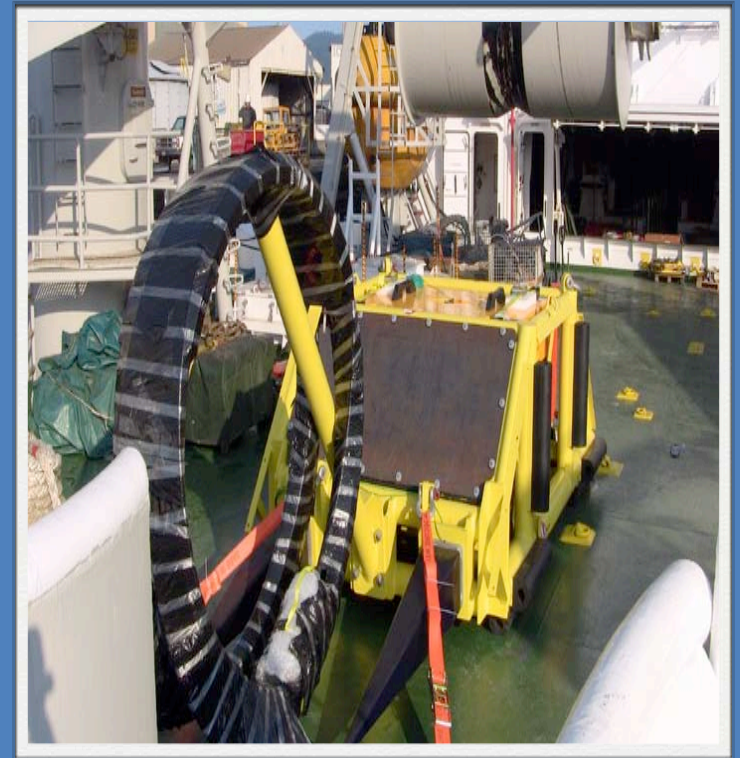
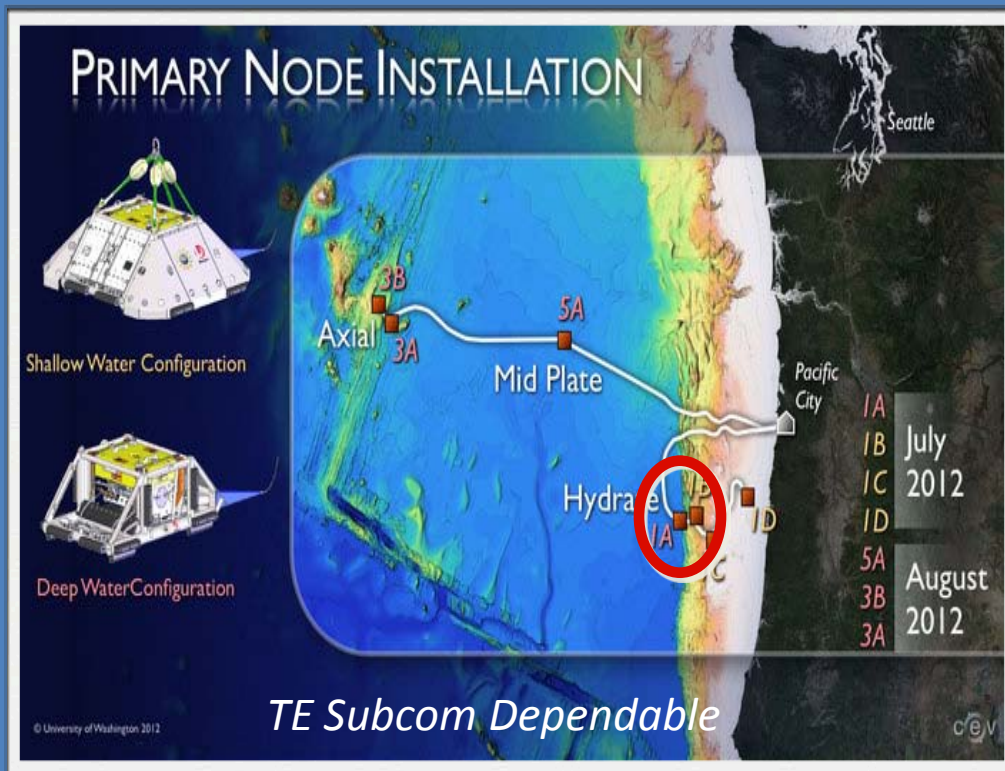


July 19, 2012

Primary Node 1B spliced and connected to backbone on seafloor



UNIVERSITY of WASHINGTON



July 13, 2012

Primary Node 1A powered up on deck



