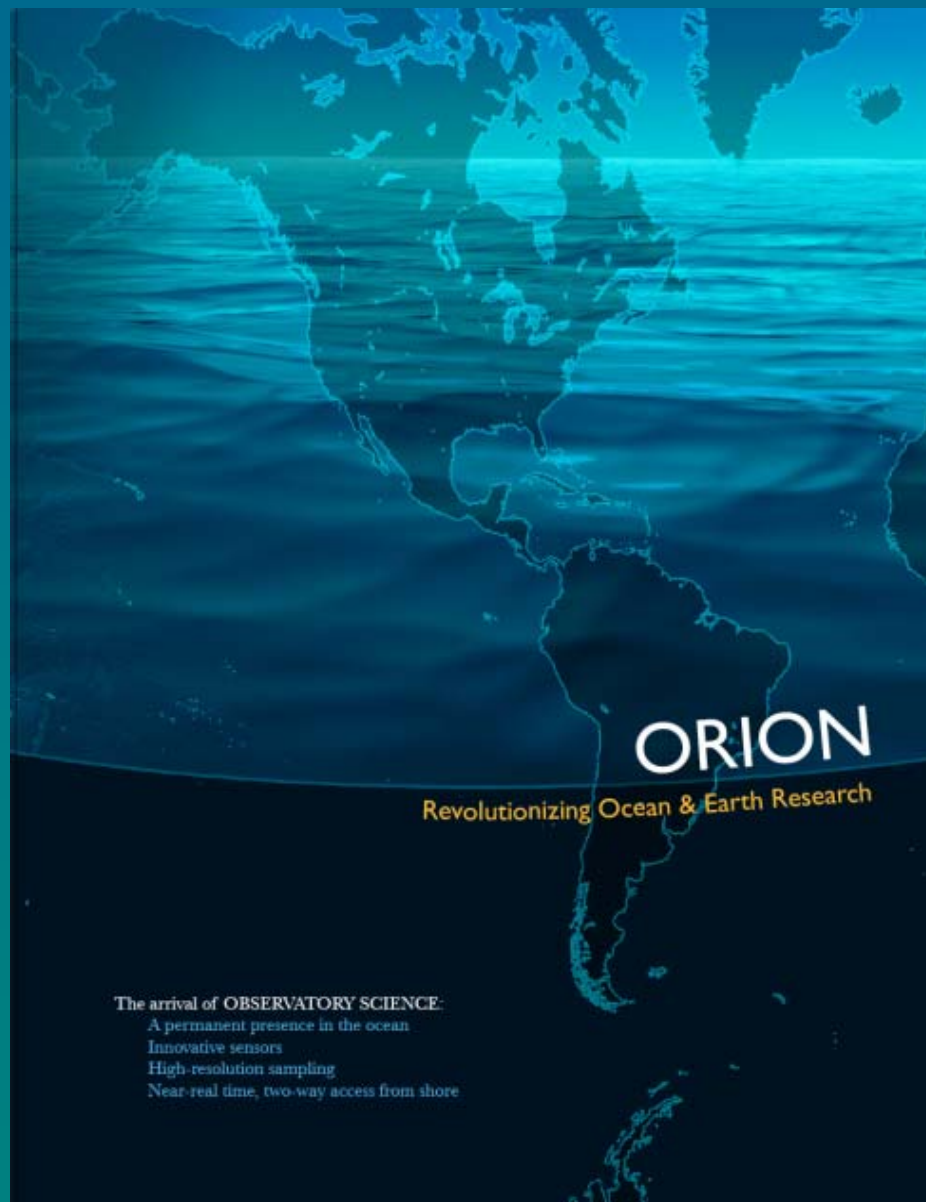




Ocean Research Interactive Observatory Networks



ORION

Revolutionizing Ocean & Earth Research

- The arrival of OBSERVATORY SCIENCE:
- A permanent presence in the ocean
 - Innovative sensors
 - High-resolution sampling
 - Near-real time, two-way access from shore



Ocean Research Interactive Observatory Networks



From Proposed FY08 Budget

OOI Funding Profile

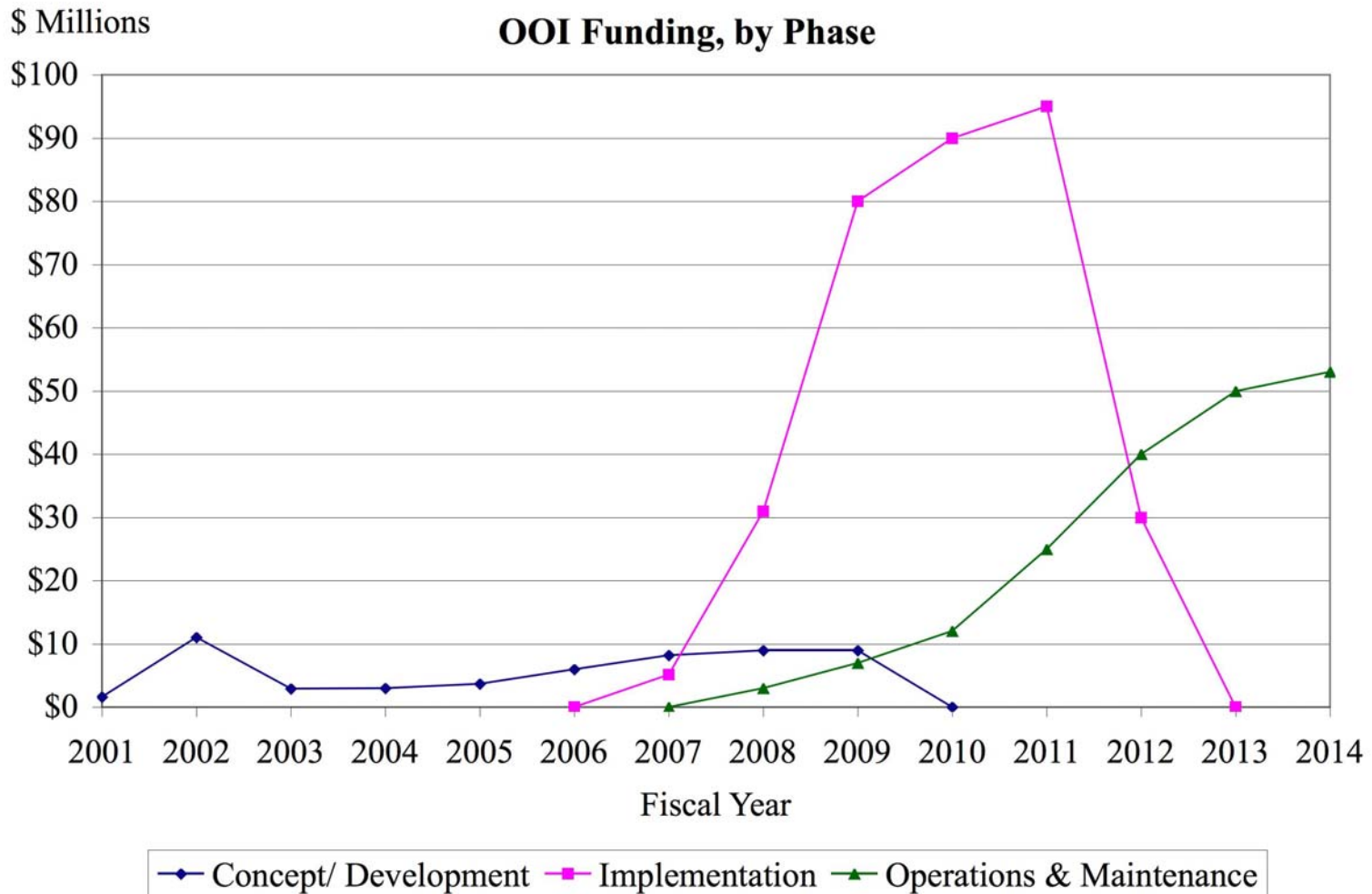
(Obligated Dollars and Estimates in Millions)

	Concept/ Development		Implementation		Operations & Maintenance		Totals		Grand Total
	R&RA	MREFC	R&RA	MREFC	R&RA	MREFC	R&RA	MREFC	
FY 2004 & Earlier	35.72						\$35.72	-	\$35.72
FY 2005	3.20						\$3.20	-	\$3.20
FY 2006	4.15						\$4.15	-	\$4.15
FY 2007 Request	8.30			5.12			\$8.30	\$5.12	\$13.42
FY 2008 Request	9.00			30.99	6.10		\$15.10	\$30.99	\$46.09
FY 2009 Estimate				80.00	10.20		\$10.20	\$80.00	\$90.20
FY 2010 Estimate				90.00	15.20		\$15.20	\$90.00	\$105.20
FY 2011 Estimate				95.00	29.30		\$29.30	\$95.00	\$124.30
FY 2012 Estimate				30.00	46.40		\$46.40	\$30.00	\$76.40
FY 2013 Estimate					50.00		\$50.00	-	\$50.00
FY 2014 Estimate					53.00		\$53.00	-	\$53.00
Subtotal, R&RA	\$60.37		-		\$210.20		\$270.57		
Subtotal, MREFC		-		\$331.11		-		\$331.11	
Total, Each Stage		\$60.37		\$331.11		\$210.20			\$601.68

NOTE: A steady state of about \$50.0 million in operations support is expected to occur in or about FY 2013. The expected operational lifespan of this project is 30 years, beginning in FY 2011. Operations estimates for FY 2008 and beyond are developed strictly for planning purposes and are based on current cost profiles. They will be updated as new information becomes available.

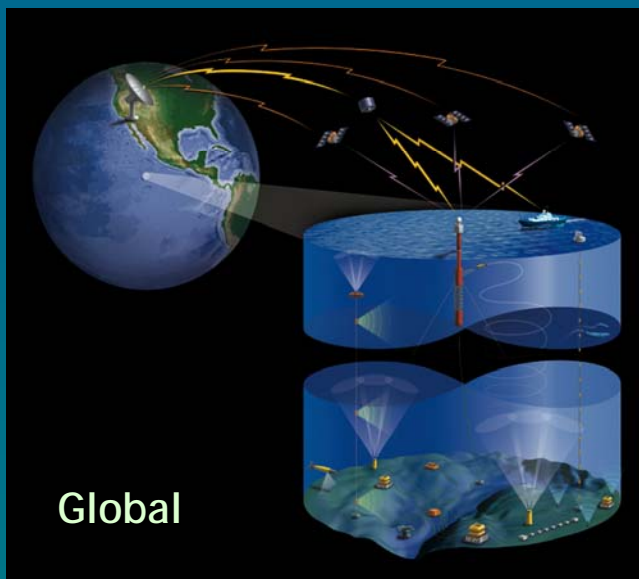


Ocean Research Interactive Observatory Networks

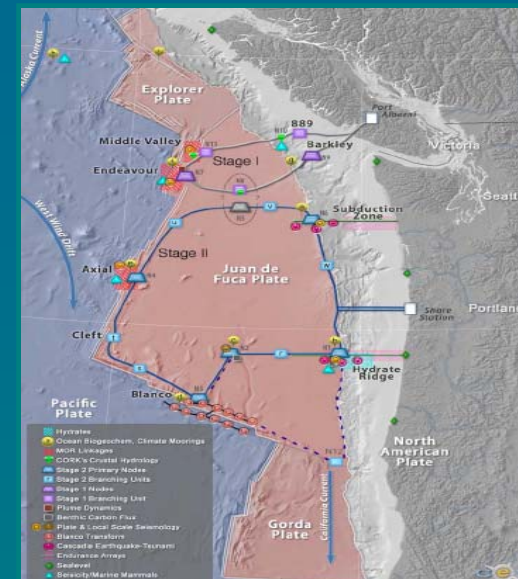




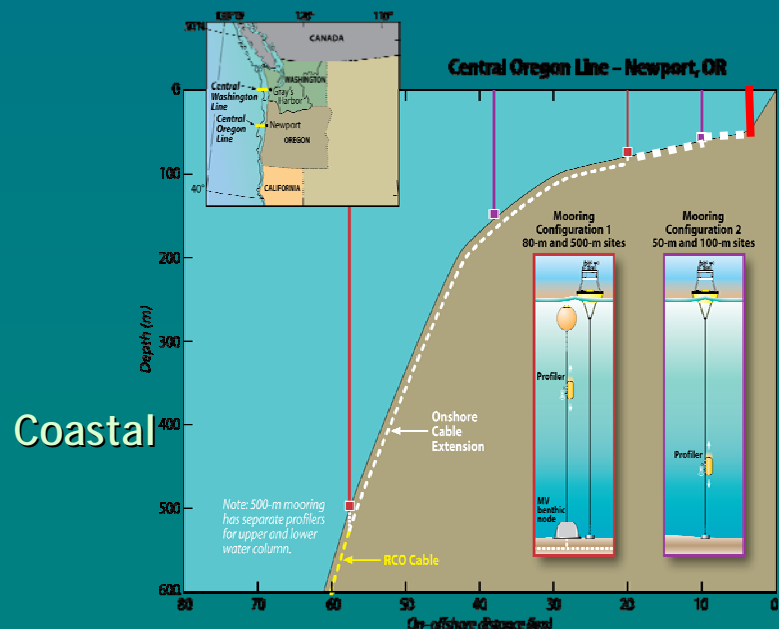
Ocean Research Interactive Observatory Networks



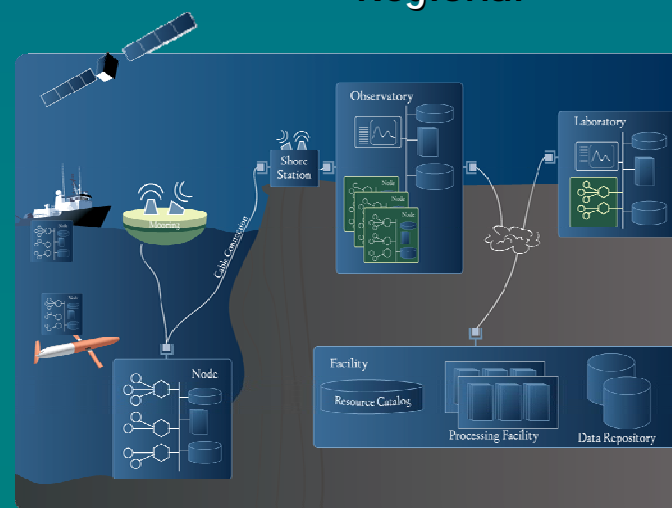
Global



Regional



Coastal



Cyberinfrastructure



Capital and Operations & Maintenance Costs by Component (as spent dollars)

<u>Component</u>	<u>Construction/Installation</u>	<u>O&M</u>
Coastal	\$60 M	\$18.4 M
RCO	\$147.5 M	\$22 M
Global	\$45.8 M	\$14.6 M
Cyberinfrastructure	\$30 M	\$2.5 M

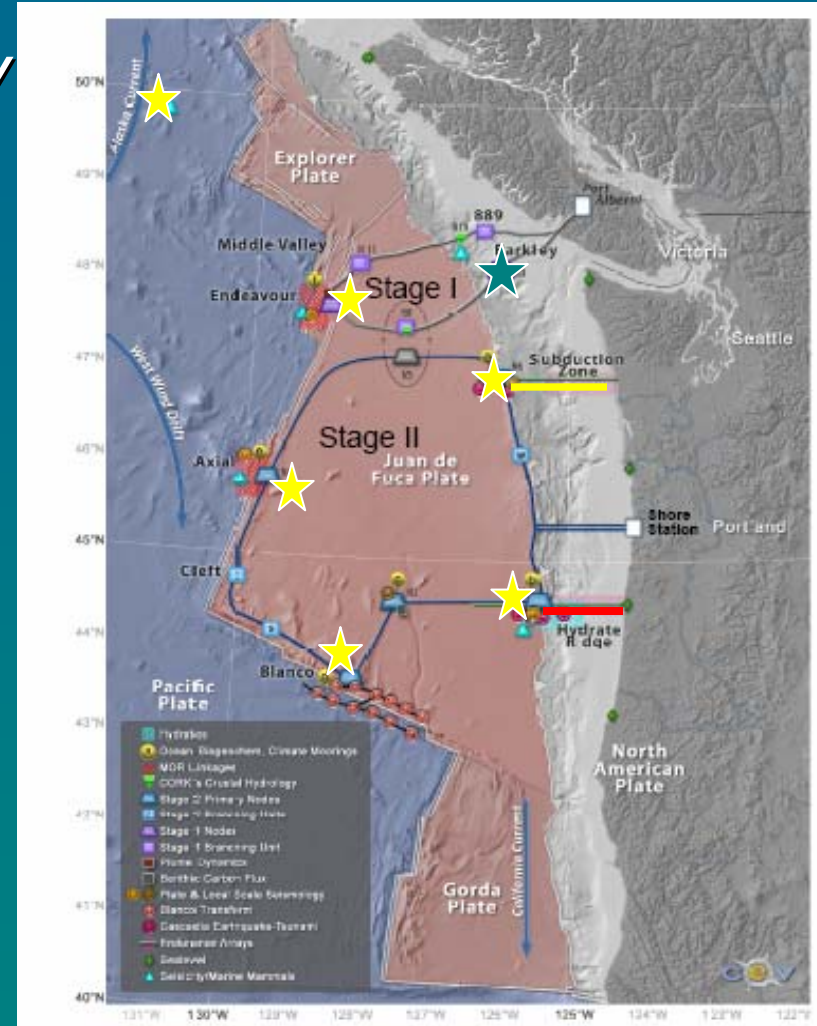


The Regional Cabled Observatory

- ❖ Unprecedented power and bandwidth
- ❖ Two-way communication
- ❖ Near-real time data return
 - *Water column measurements*
 - *Seafloor: plate-scale experiment*

Risk reduction activities

- ❖ MARS test-bed
commissioning Sept. 2007
- ❖ Neptune Canada (Stage 1)
 - >\$80M, installation 2007/2008
 - VENUS (\$10M) test-bed
deployed 2006

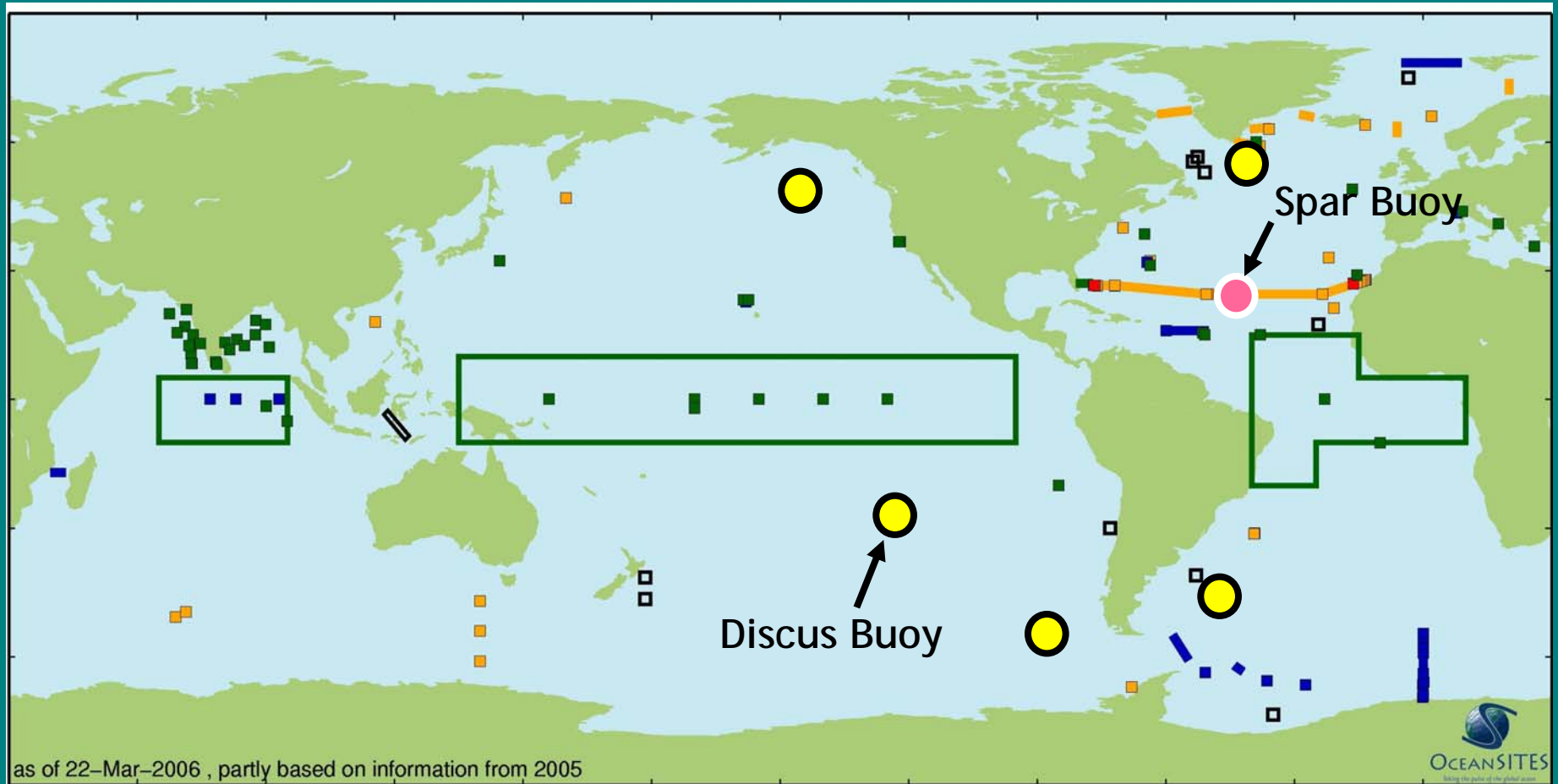


★ Water column moorings



Global Scale Observatories

Acoustic or EOM moorings, gliders, and core sensors

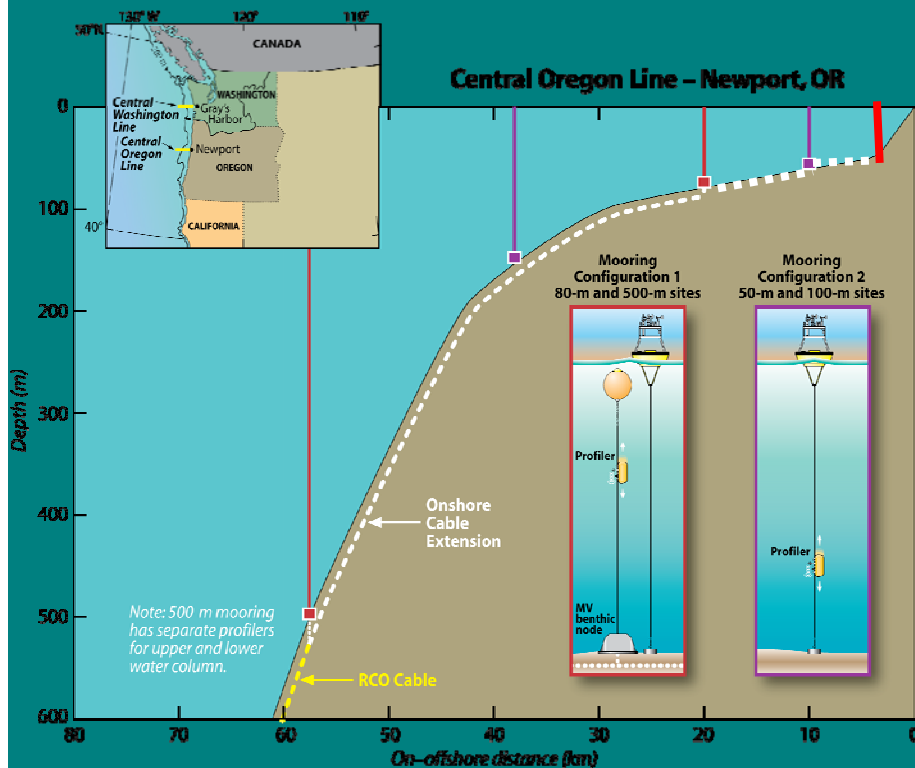


Pacific Northwest Endurance Array

Endurance Array designed for high-power, high-bandwidth observation & interpretation of long-term interannual variability

Cabled mooring line off Newport, Oregon

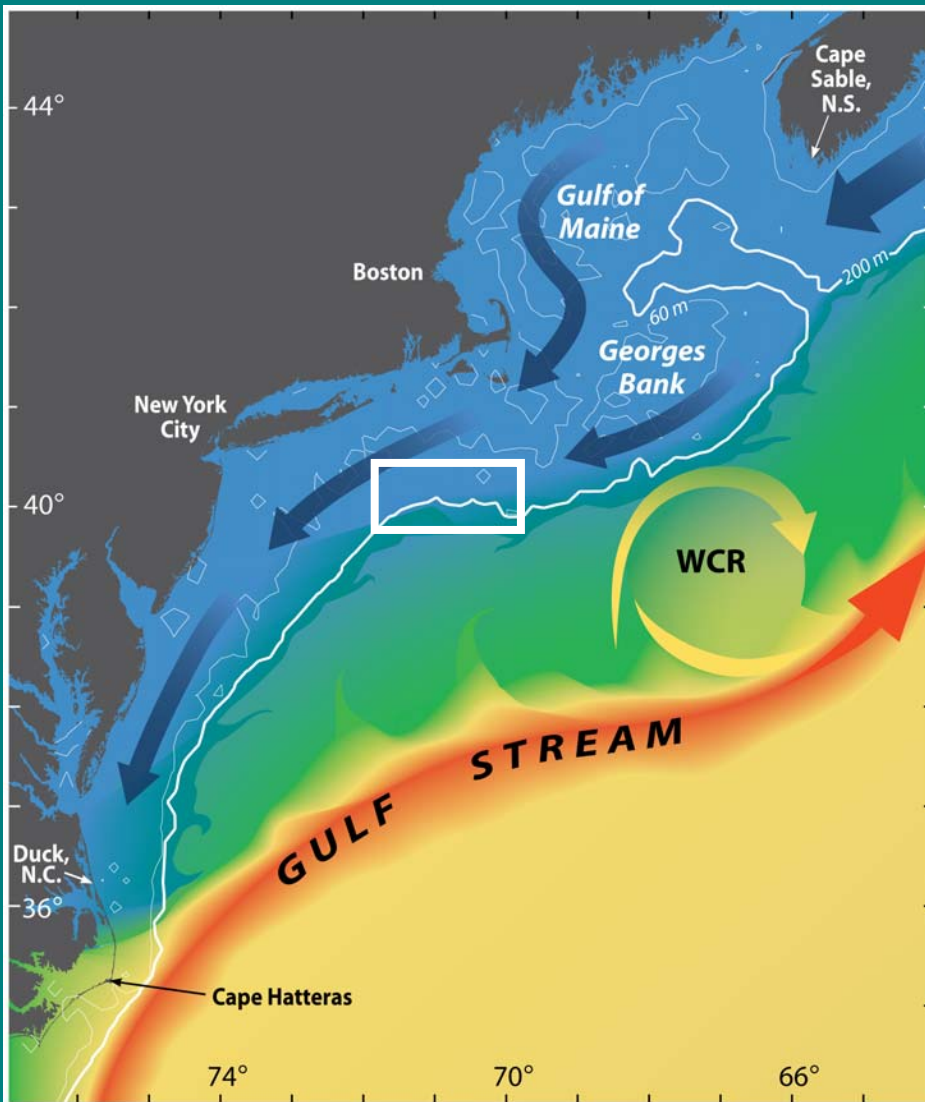
Uncabled line off Greys Harbor, Washington



- Highly capable moorings with sensors at
25 m (inner shelf)
120 m (mid shelf)
500 m (upper slope)
- Less capable moorings with sensors at
50 and 150 m
- 8 Gliders with core sensors
- Cable will support high power and
bandwidth chemical & biological sensors
- Potential capitalization on mobility of
uncabled moorings

Coastal Pioneer Array: Shelfbreak Front Experiment

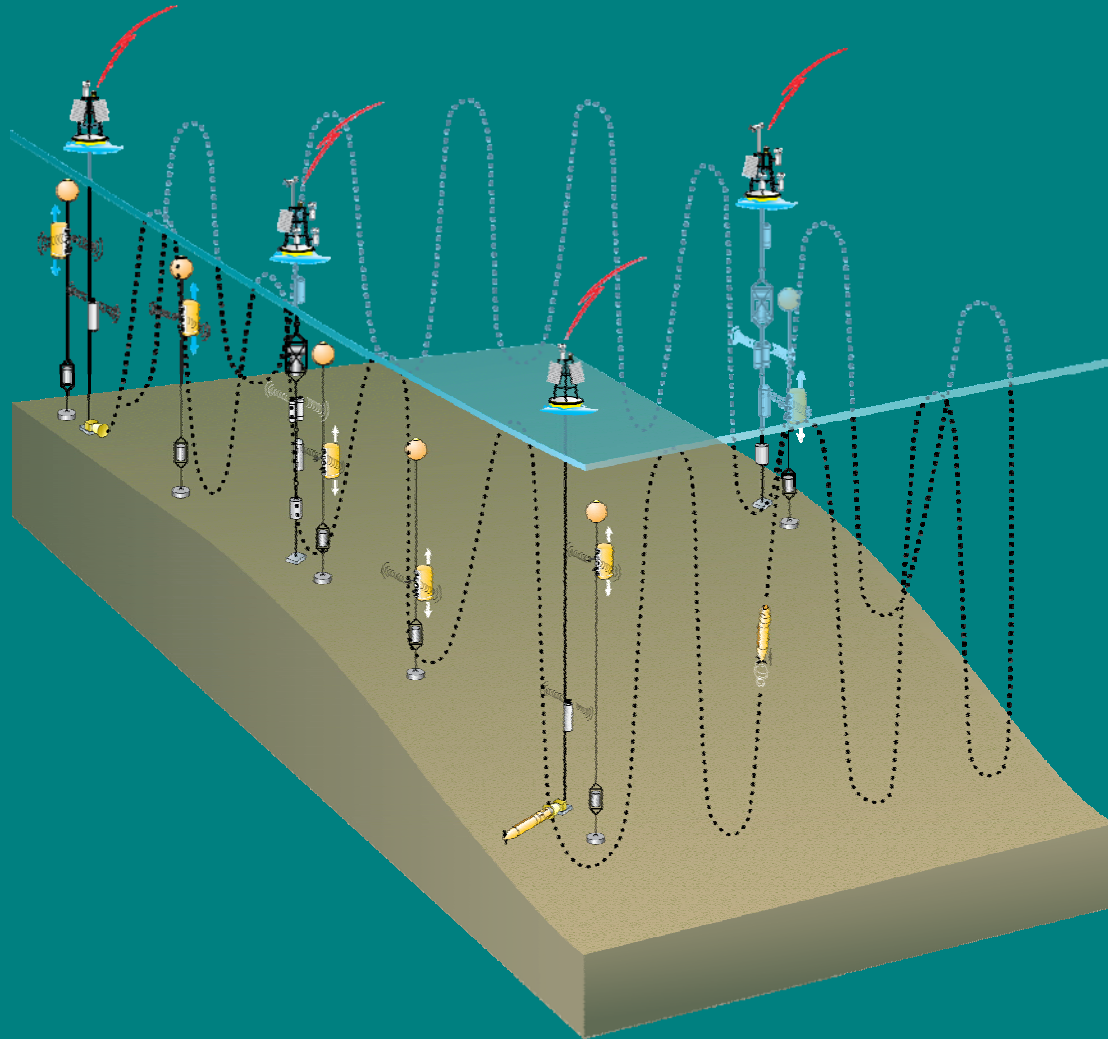
Moveable Pioneer Array designed for adaptive sampling of mesoscale variability, processes, and fluxes



Mid-Atlantic Bight site:

- Analog to other broad shelf-slope coastal systems with an energetic western boundary current worldwide
- Provides comparison with Pacific NW coastal system
- Air-sea, benthic-pelagic, and shelf-ocean fluxes
- Cross-front exchange of nutrients & carbon
- High biological productivity
- Variability at ~10 km
- Potential for early success

Details of Pioneer Array



- Autonomous, adaptive, synoptic sampling with high payload at scales up to tens of km by AUVs with docking stations
- Temporal context from profiling moorings
- Sampling of far-field variability with gliders
- Real-time communications & wind/solar power



Status of OOI Planning

- ✓ **Successfully completed Conceptual Design Review, August 2006**
- ✓ **Preparation for Preliminary Design Review on track (see schedule)**
 - **Revised Conceptual Designs (to be completed February 2007)**
 - **Maintained Coastal, Regional, and Global components**
 - **Serves broad number of science & engineering disciplines**
 - **Retained transformative elements**
 - Plate-scale cabled observatory**
 - Endurance and Pioneer Arrays**
 - High-latitude moored buoys**
 - Cyberinfrastructure that provides real-time data and two-way communication for interactive instrument control**



Status of OOI Planning (cont.)

- **Hiring of Implementing Organizations on track**
 - RCO IO in final review stage award February 2007
 - Cyberinfrastructure IO under review award April 2007
 - Coastal/Global IO award August 2007
- **SRI hired for programmatic NEPA environmental assessment**
- **Implementation of Earned Value Management System and Master Scheduler on track**

Other Supporting Activities (risk reduction)

MARS cabled test bed to be commissioned September 2007
NEPTUNE Canada cable (Stage I) to be deployed 2008; >\$80M
investment & MOU
Venus cabled test-bed commissioned 2006 (\$10M)



Ocean Research Interactive
Observatory Networks



ORION Program

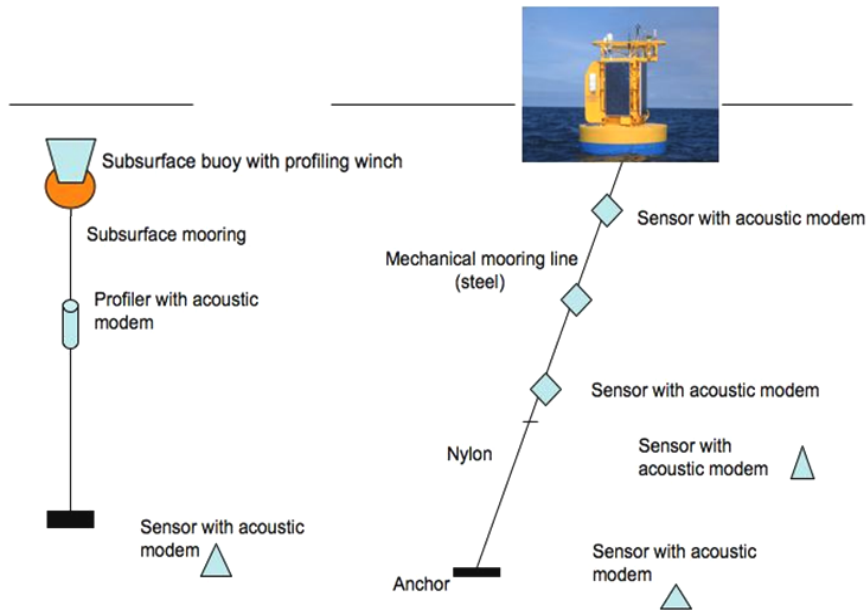
www.orionprogram.org



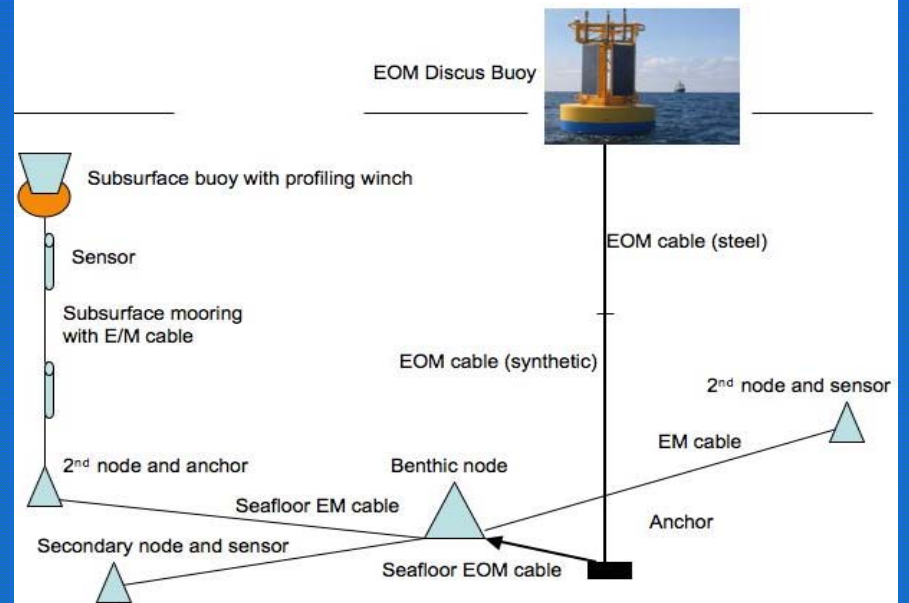
Ocean Research Interactive Observatory Networks



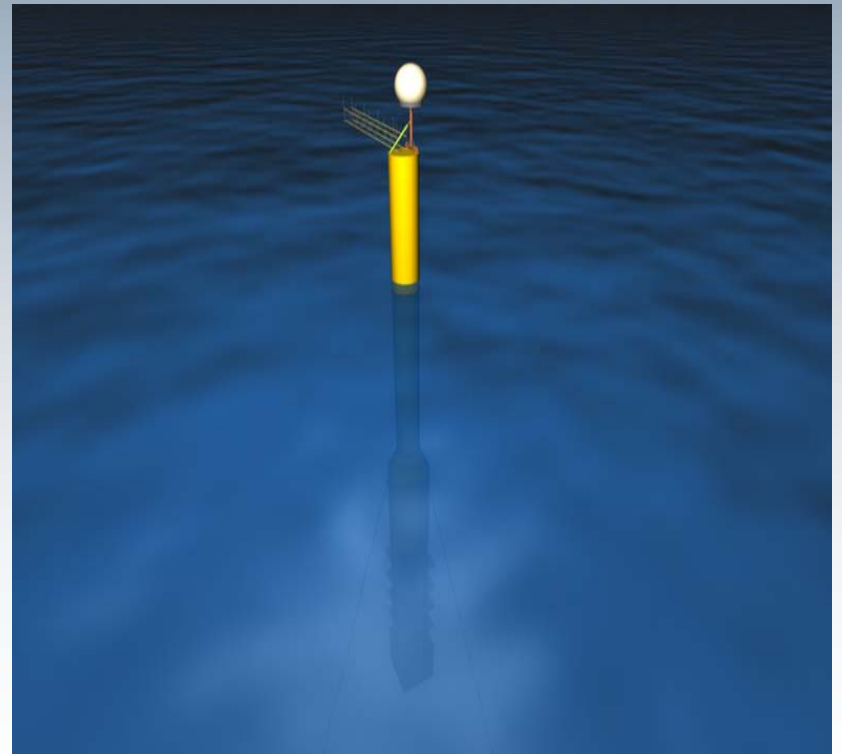
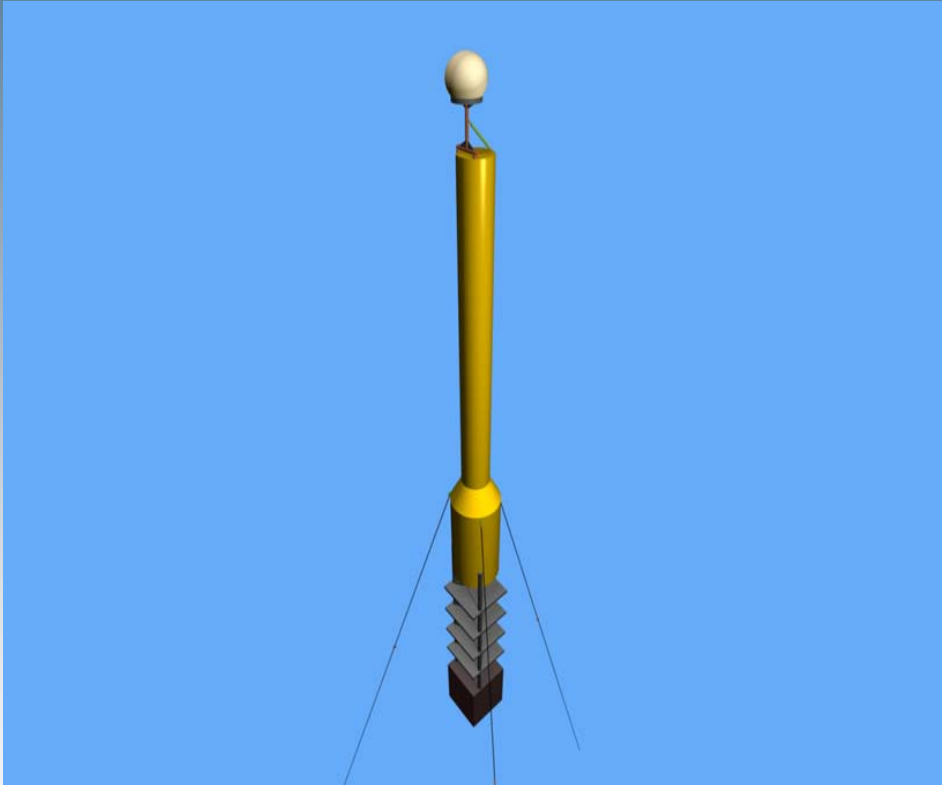
Generic Acoustically Linked Discus Buoy



Generic Discus Buoy with EOM Cable

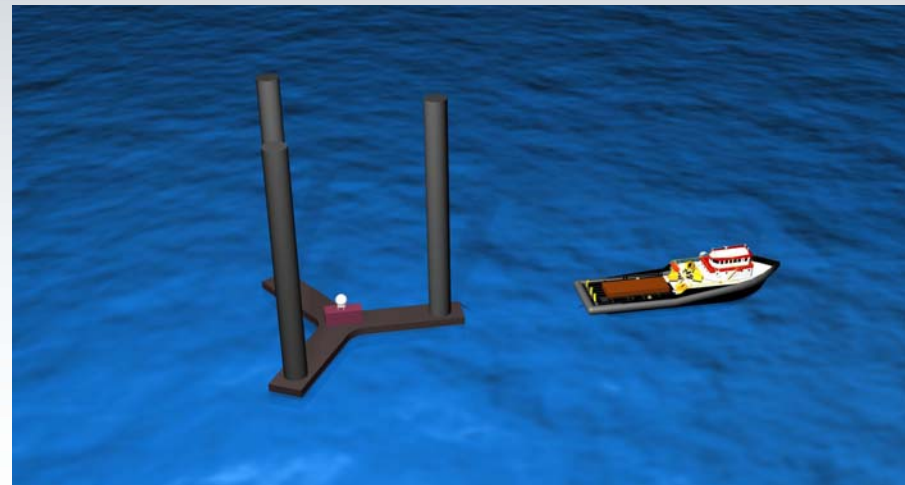
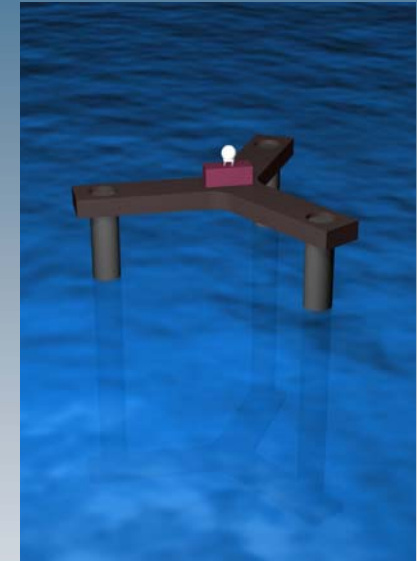
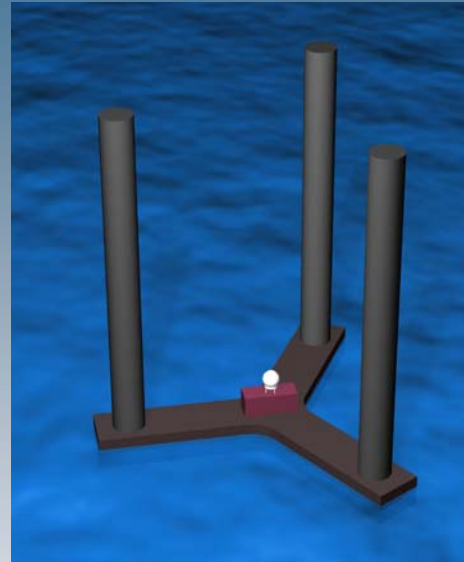


Spar Buoy

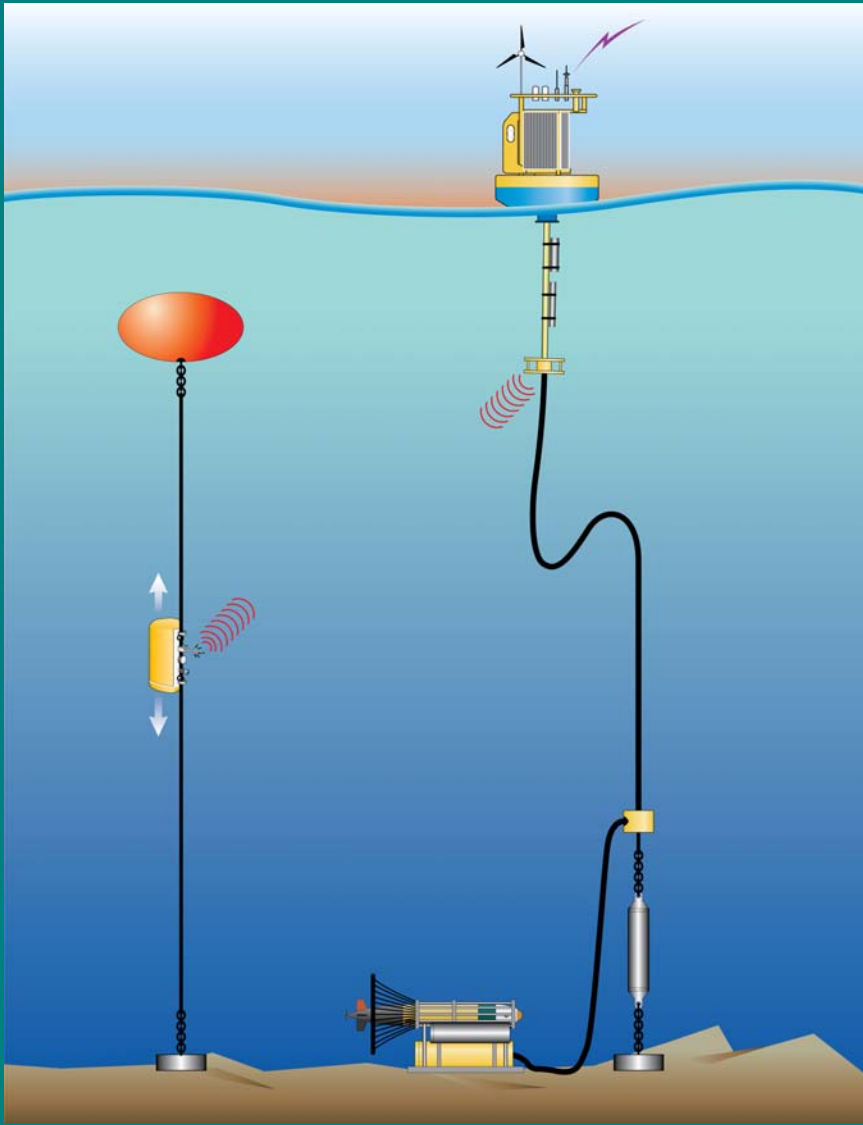


Extendable Draft (Spar) Platform

- The EDP is self-installing without upending or offshore lifts
- All equipment and systems may be pre-commissioned
- EDP can be towed using UNOLS vessels (?)
- Technip offering to fund design and sponsor industry group to fund fabrication of first buoy



Details of Pioneer Array



- 4 Buoys with communications and wind/solar power
- EOM cable to fixed sensors or AUV docking station at sea floor
- Subsurface profiling mooring with battery power and acoustic communications