

UNOLS Fleet Improvement Plan



October 11, 2007

FIP – Executive Summary and Section I

- Executive Summary
 - This should be drafted last and summarize findings and recommendations.
 - Keep brief
- Section I - Introduction
 - Provides background
 - Explains why the plan is needed.

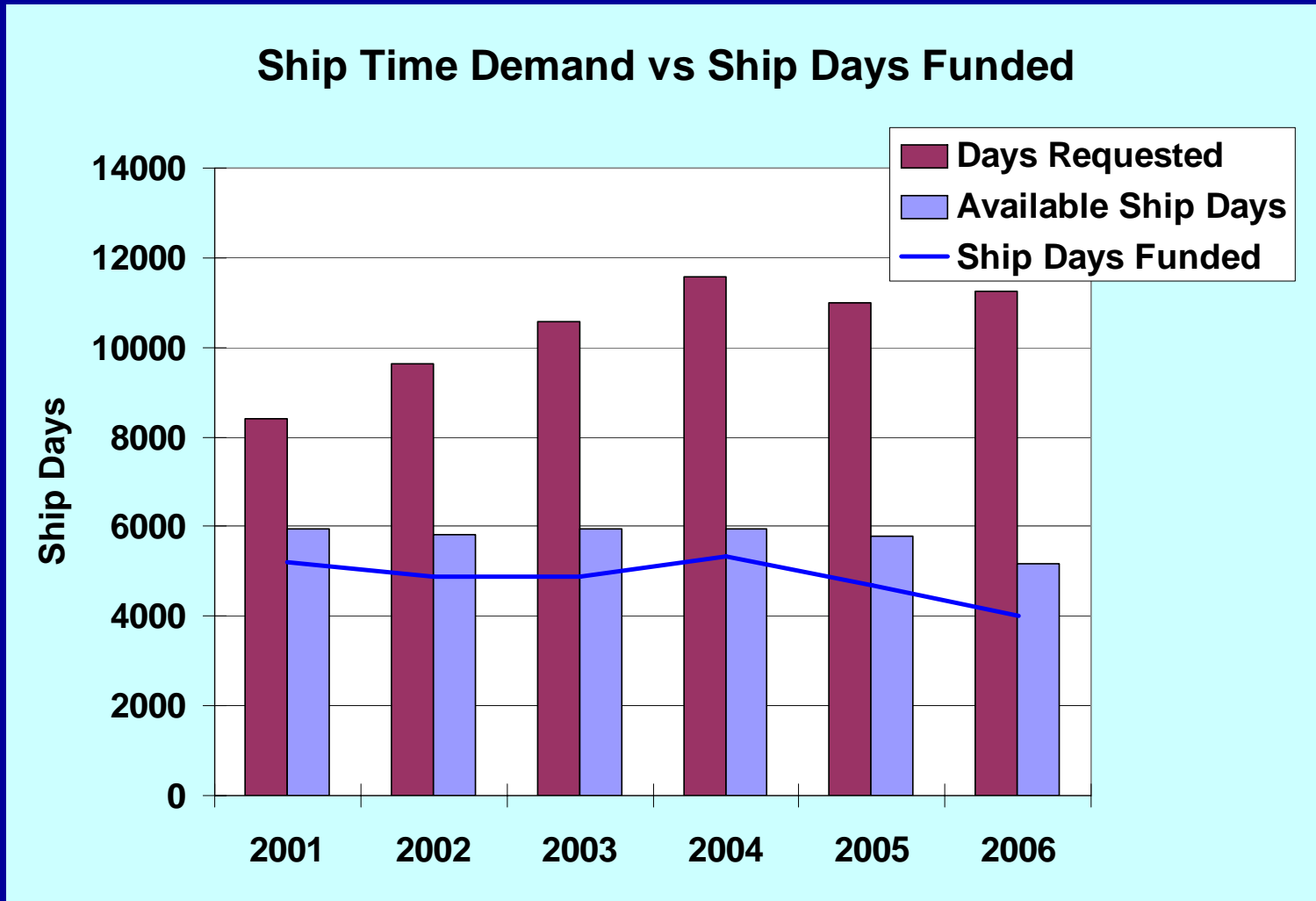
Section II – Future Science Initiatives

Description of present scientific questions in each discipline, etc, that require ships.

Section III: UNOLS, the 2006 Facility Composition and Trends

Describe UNOLS, the organization, and scheduling process, fleet listing, service life chart.

Ship time demand, ship days funded, and days available



Revised: Section IV: Future Fleet Utilization Projections and Future Requirements

A. Current Fleet Renewal Plans

- a. Definition and Composition
- b. Construction Timeline and Costs
- c. Projected Fleet capacity

B. Constraints and Challenges

1. Federal Budgets
2. Escalating Operating Costs

C. Comparison of the Current UNOLS Fleet with the IWG-F Fleet of 2025

D. Alternate and Emerging Technologies (e.g. AUV/gliders, observatories) - And impact on ship use

Updated FOFC Figure 17



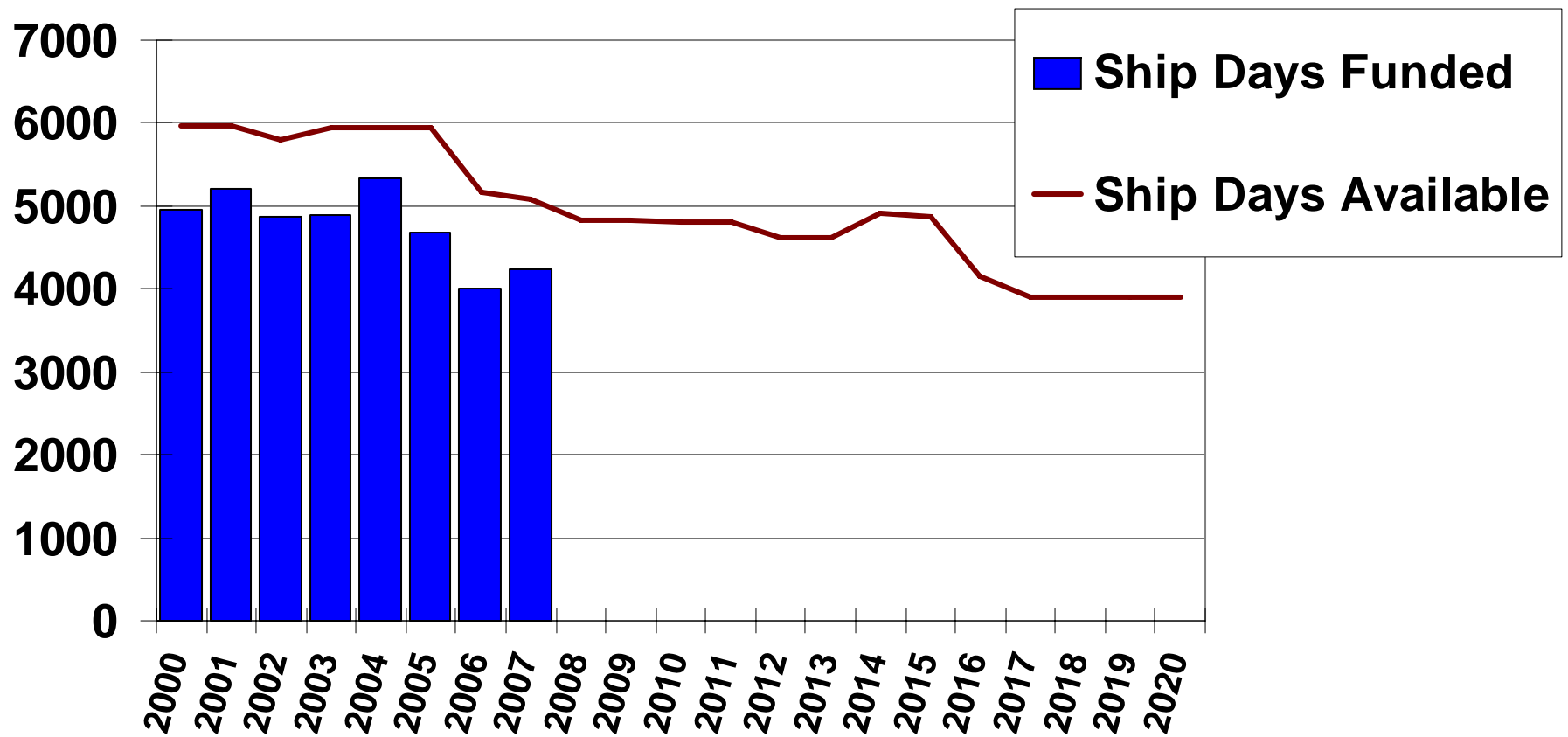
IV. B. - A Comparison of Today's Fleet with the Fleet 2025

Class	Number of Ships in 2005	Total # Science Berths in 2005	Days Available	Avg Days Used (2003 - 2006)		Number of Ships in 2025	Total # Science Berths in 2025	Available Days
Global	6	199	1800	1483		3	94	900
Ocean	1	30	275	249		4	120	1100
Intermed.	7	147	1750	1431		0	0	0
Regional	3	39	600	420		4	70	800
Fleet Total	17	415	4425	3583		11	284	2800

Note: ARRV and 2 Ocean Class ships will have 30 bunks each

New Regional class ships each have 16 bunks

Ship Days Funded and Ship Days Available



Ships days available is based on all planned ships being built:
ARRV, 3 Regional, ARRV, 2 Ocean, and all current Locals are

Modeling Schedules on Future Fleet

2006 Cruises on 2017 Fleet

Process

- Use the 2006 Spreadsheet of final schedules as starting point.
- Import to Fasttrack to graphically show schedules.
- Save a copy of the 2006 Fasttrack file.
- Start by keeping cruises on the same ship and time frame as much as possible.
- Un-assign cruises originally scheduled on ships that are “retired.”
- Make changes to fit in cruises left orphaned on remaining ships, using STR as a guide when moving dates or ships.
- Save and duplicate the file.
- Create OOI cruises and fit them in as possible.
- Make notes on Spreadsheet about cruises that can or cannot be scheduled to quantify the impact.
- Export from Fasttrack to Excel with “modeled” schedules to create graphics about utilization and number of cruises/days left unscheduled (if any).

2017 Fleet

19 Active Ships (4)

- Atlantis
- Revelle
- Thompson
- Kilo Moana
- ARRV
- Ocean Class Pacific
- Ocean Class Atlantic
- Regional Class Pacific
- Regional Class Atlantic
- Regional Class Gulf
- Atlantic Explorer
- R.G. Sproul (1)
- H.R. Sharp
- Walton Smith
- Pelican (2)
- Blue Heron
- Clifford Barnes
- Savannah
- Urraca
- M.G. Langseth (3)

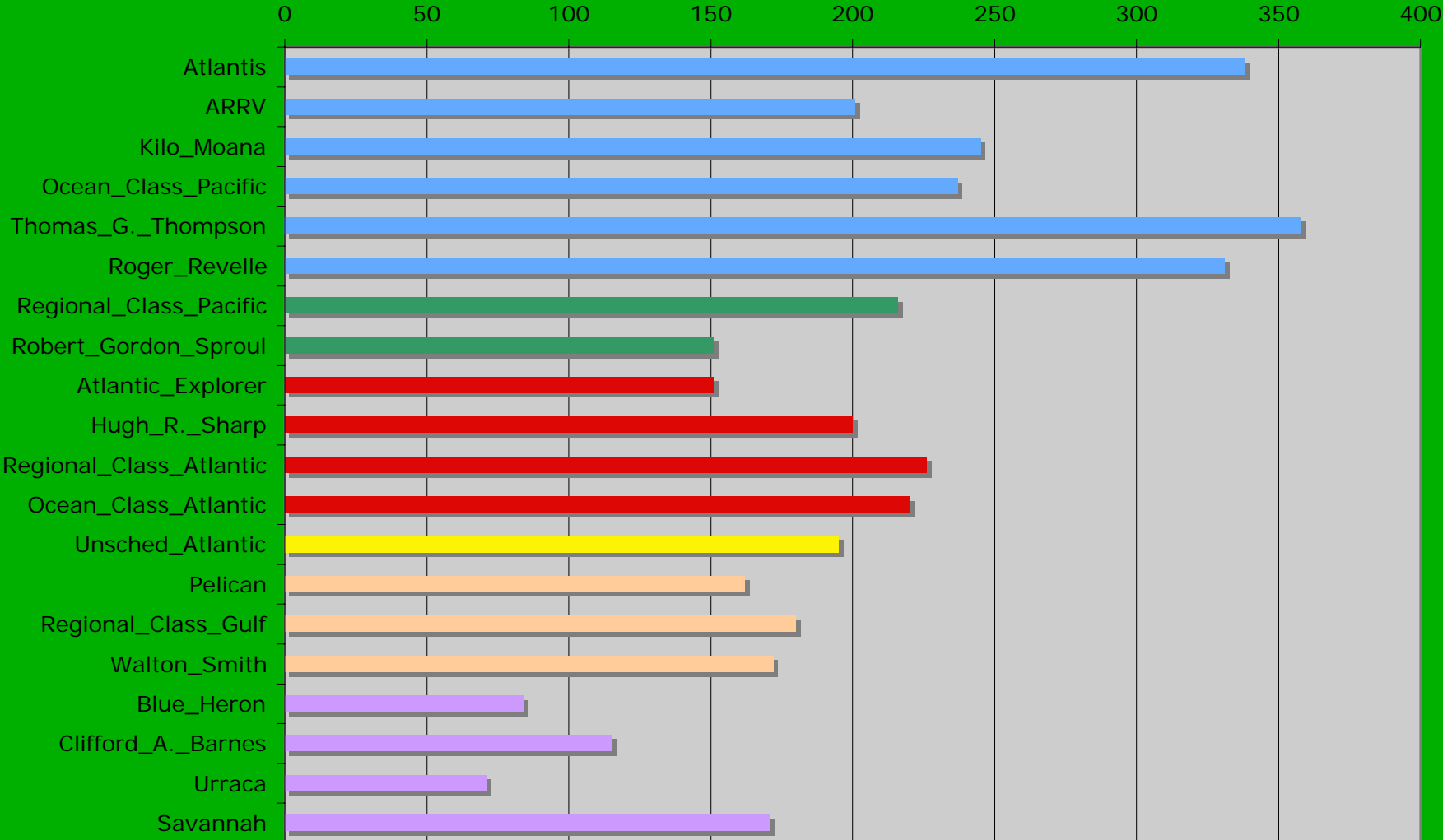
(1) Retired 2015 - assumed a replacement or extension.

(2) Retired 2013 - assumed a replacement or extension.

(3) Not scheduled to maintain comparison with 2006.

(4) Actual number including Langseth and not including Sproul or Pelican would be 17, Need to create version with Langseth schedule/costs added and perhaps without Sproul and Pelican.

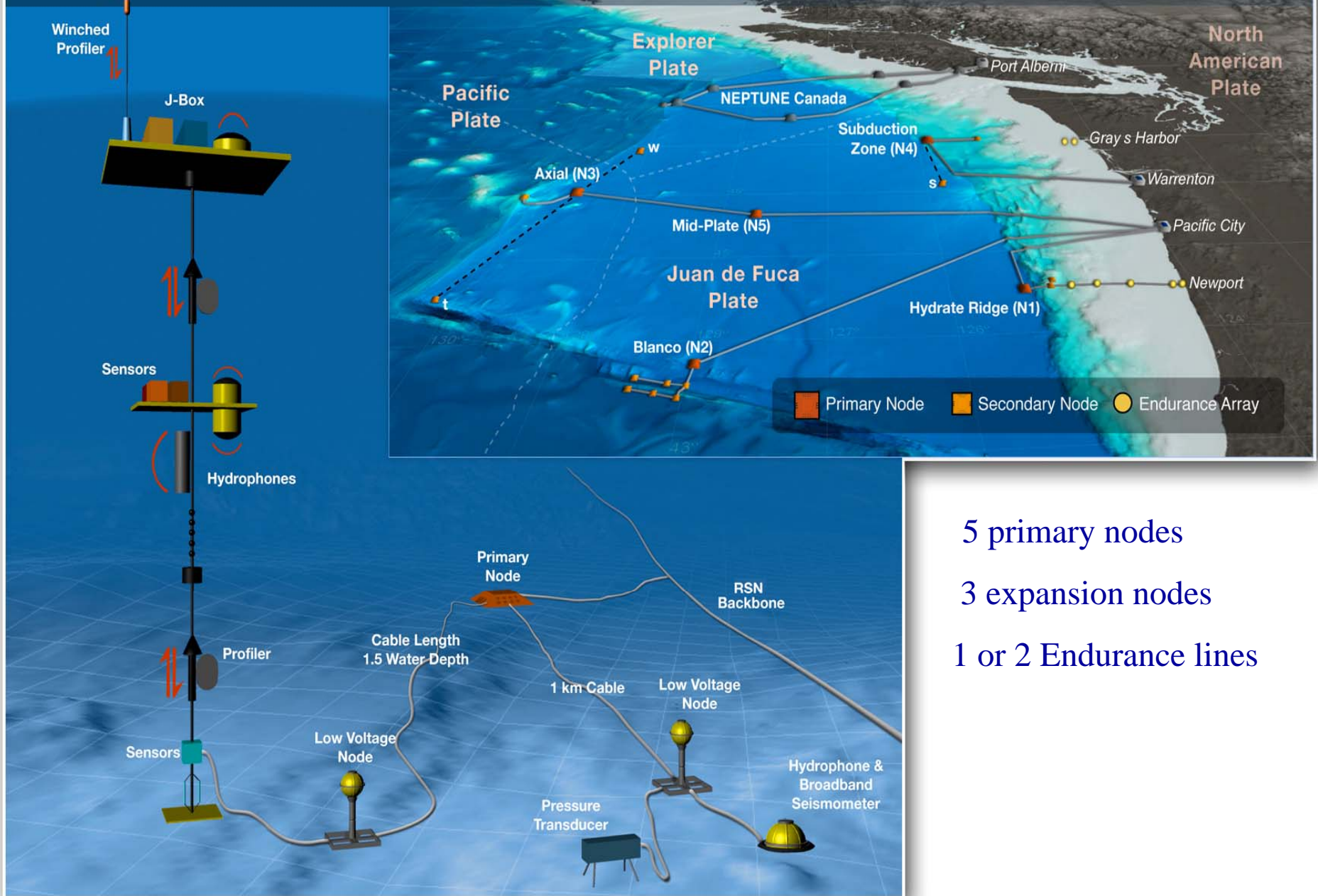
2017 Fleet with 2006 Cruises Version One



First conclusions

- Some work could not be scheduled due to fewer ships in the area (multi-ship ops) and remote locations (med work).
- Some work not scheduled due to specialized equipment (HBOI Submersible)
- Work to be scheduled reflected fleet of 2006 and did not take into account requests that would exist for ARRV, LANGSETH and OCEAN CLASS vessels.
- Generally larger ships were used without taking into account the possibility of combining projects on the larger ship. The larger more capable ships would be used this way to take advantage of their larger bunk space and lab space.
- Costs are slightly more if you consider the cost of unscheduled work, but slightly less if you don't, however the costs would be considerably more if the new ships were fully utilized.
 - 2006 cost estimate: \$69,473,473
 - 2017 cost estimate with unscheduled: 70,320,481
 - 2017 cost estimate with out unscheduled: 68,348,836

Regional Scale Nodes



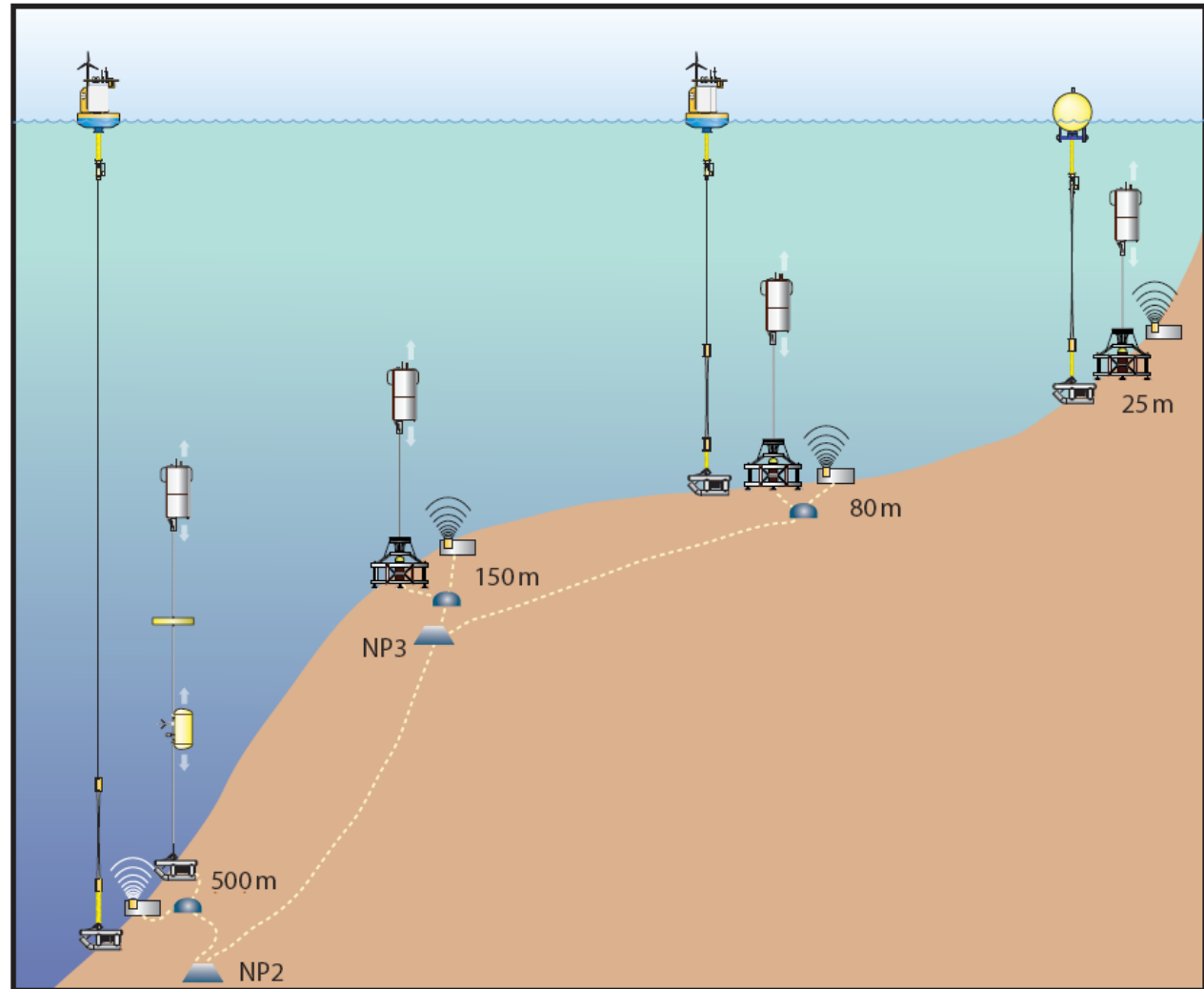
5 primary nodes

3 expansion nodes

1 or 2 Endurance lines

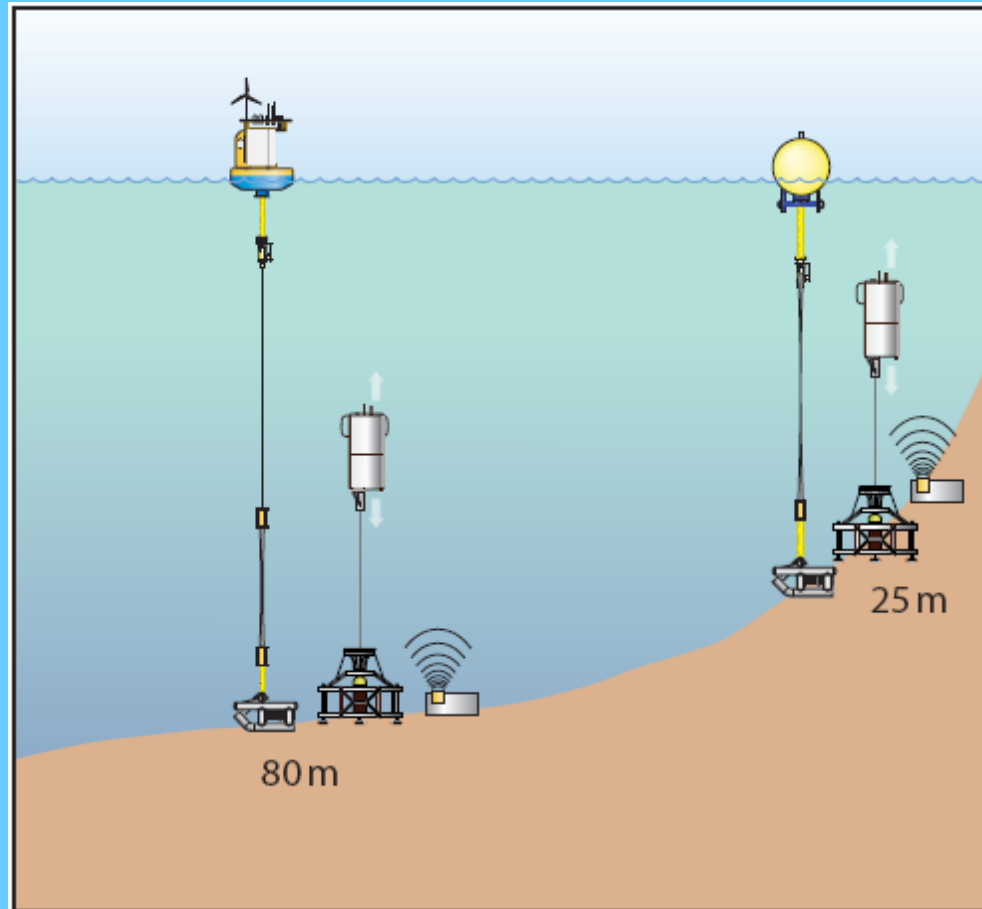
Endurance Array – Oregon Line

- Along Newport Line
- Surface moorings at 3 sites
- Subsurface profiler moorings at all sites
- 3 sites connected to RSN extension cable
- 50 m site not shown



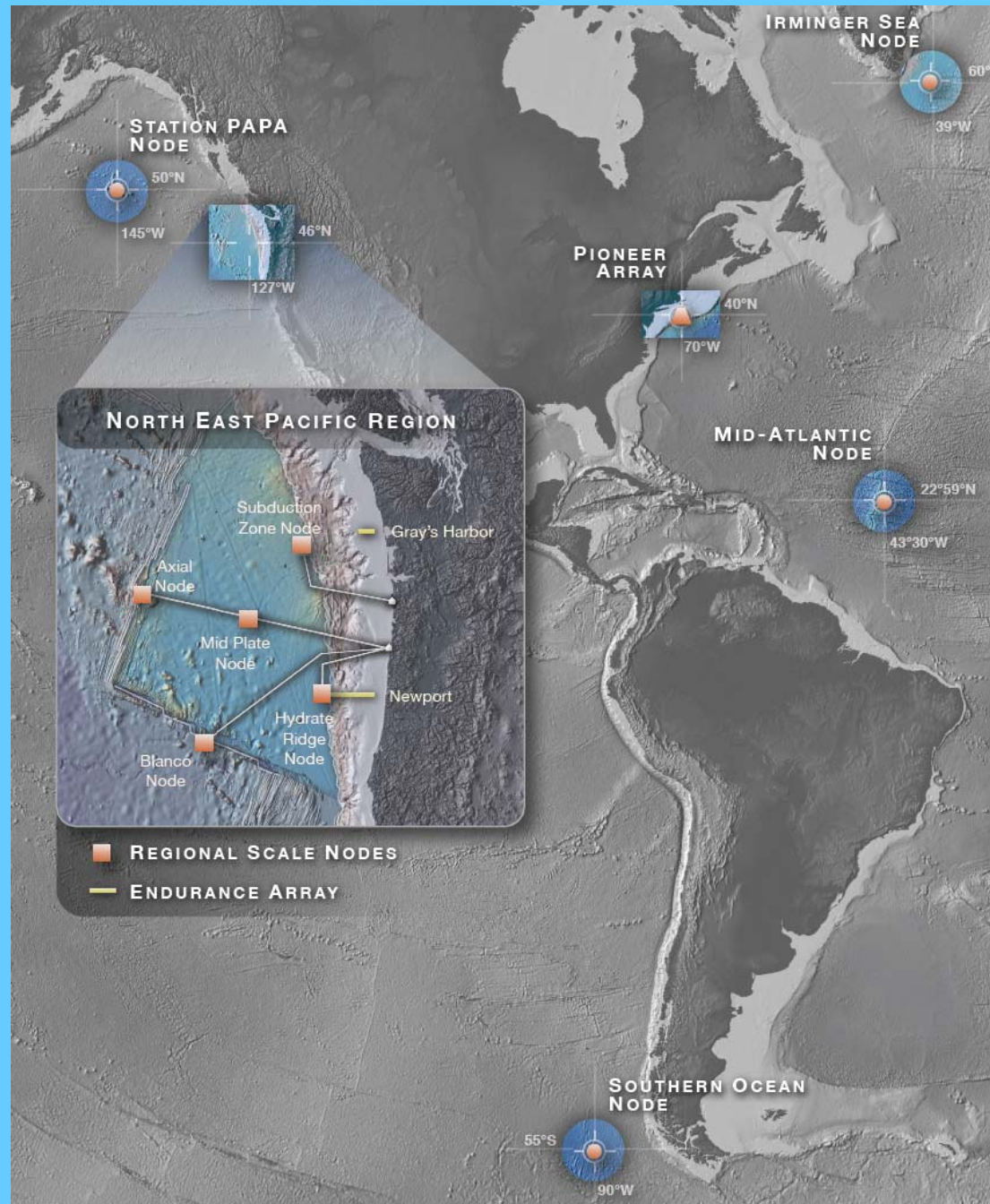
Endurance Array – Washington Line

- Central WA;
Grays Harbor
- Surface
mooring at 80 m
- Subsurface
profiler moorings
at 80 and 25 m
- Contingent on
costs

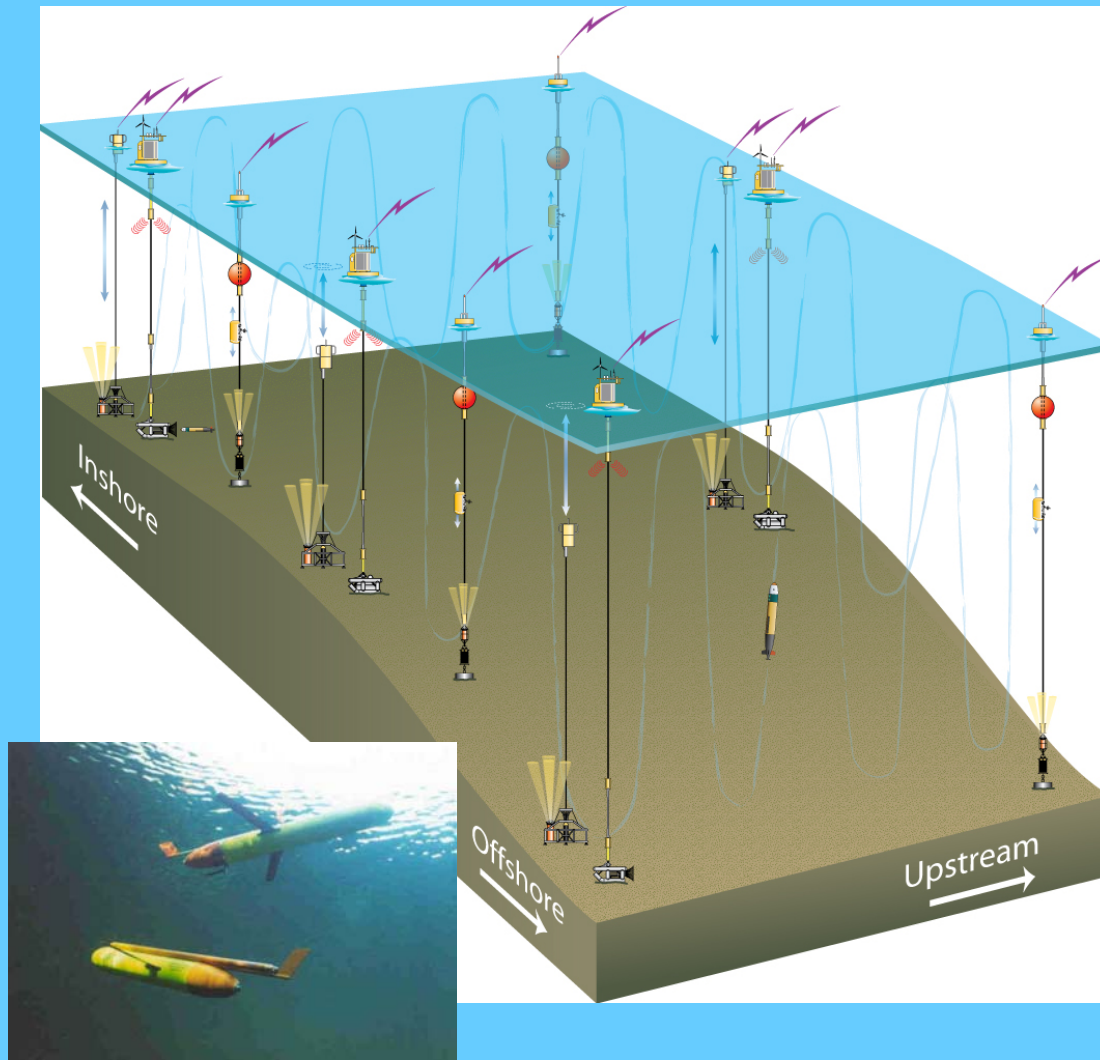


4 Global scale nodes:

Southern Ocean
Station Papa
Irminger Sea
Mid-Atlantic



Details of Pioneer Array



- 4 EM / profiling mooring pairs plus 4 sub-surface profiling moorings.
- 3 AUVs (2 docking stations) to enable autonomous, adaptive sampling at scales up to tens of km.
- At least 6-12 gliders for sampling far-field variability.
- Near-real time communications & wind/solar/wave power.

OOI Estimated Days at Sea

Infrastructure	Vessel Class	Days at Sea by year						
		2009	2010	2011	2012	2013	2014	2015
<i>Atlantic</i>								
Pioneer Array	Intermediate		13	12	12	12	12	12
	< 80 ft.		8	18	18	18	18	18
Irminger Sea	Global			23	23	23	23	23
Mid-Atlantic	Global+ROV	19	19	23	23	23	23	23
<i>Pacific</i>								
Regional-scale Nodes	Cable vessel		30	20	20	20	20	20
	Global+ROV			30	60	60	60	60
Station Papa	Global		19	19	19	19	19	19
Southern Ocean	Global				23	23	23	23
Endurance Array - OR	Global+ROV		7	7				
	Regional/Coastal			10	15	15	15	15
	Regional w ROV				7	7	7	7
Endurance Array - WA	Regional/Coastal			5	10	10	10	10
Total by vessel class	Cable vessel	0	30	20	20	20	20	20
	Global/Intermediate	0	32	54	77	77	77	77
	Global+ROV	19	26	60	83	83	83	83
	Regional/Coastal	0	0	15	25	25	25	25
	Regional w ROV	0	0	0	7	7	7	7
	< 80 ft.	0	8	18	18	18	18	18

Estimated
UNOLS DAS