UNOLS and The U.S. Academic Research Fleet

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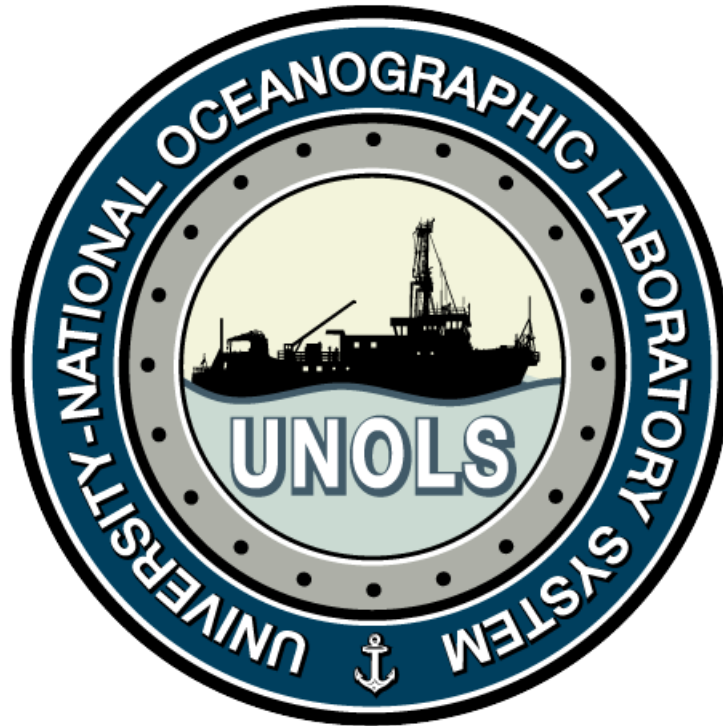Bigelow Laboratory for Ocean Sciences

Doug Russell – UNOLS Executive Secretary

UNOLS Agenda

- **UNOLS and the current U.S. Academic Research Fleet (ARF)**
- **Decadal survey recommendations**
- **Recent UNOLS Activities**

UNOLS and the Current U.S. Academic Research Fleet (ARF)

What is UNOLS?

Supporting Federal Agencies NSF, Navy/ONR, NOAA, USGS, BOEM

UNOLS Member Institutions

UNOLS Ship & Facility Operators & Tech Staff
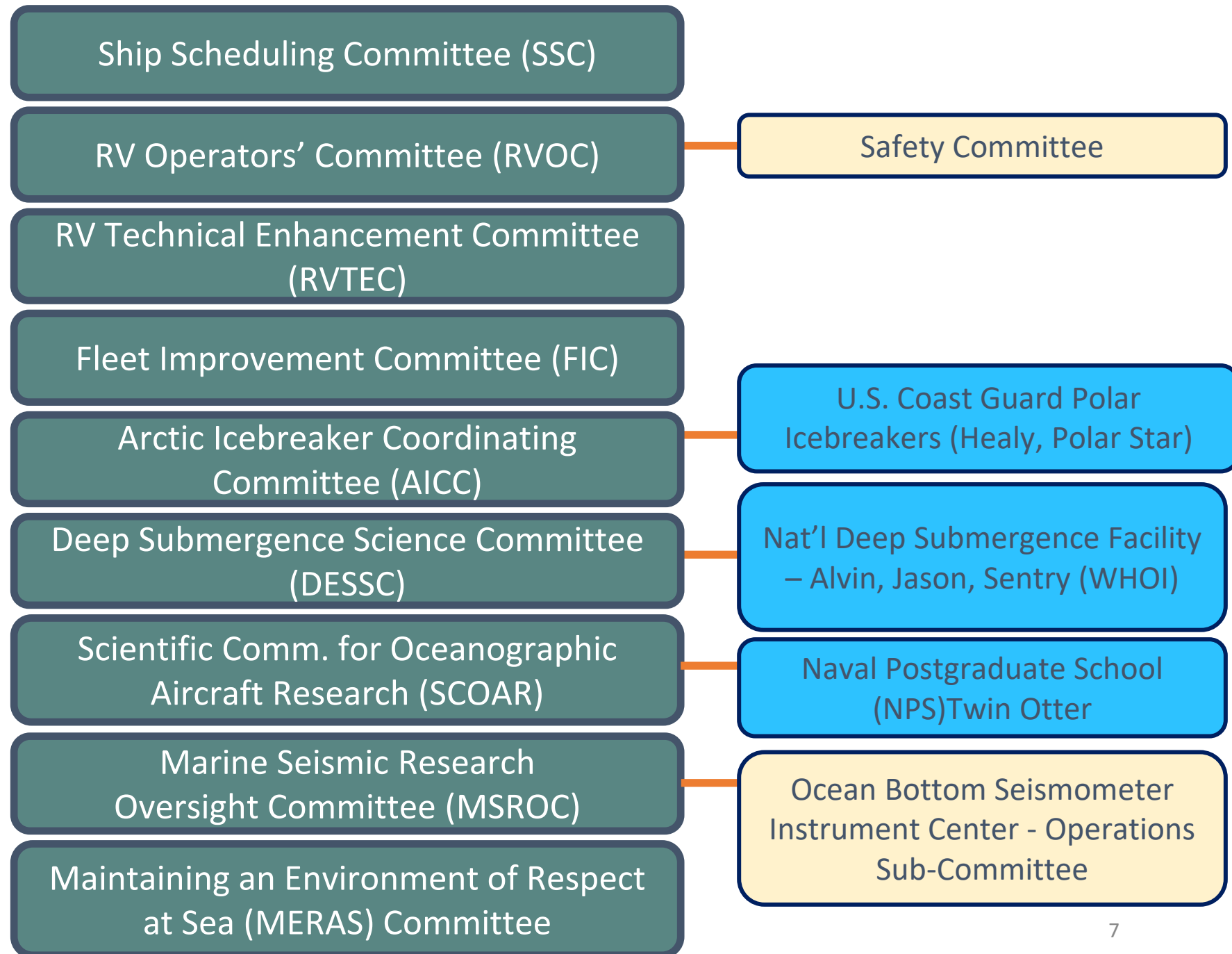RVs, Aircraft, Submersibles

The UNOLS Community

UNOLS Office

UNOLS Council

The Seagoing Science Community

UNOLS Standing Committees

Report to UNOLS Council

UNOLS Standing Committees	
Ship Scheduling Committee (SSC)	
RV Operators' Committee (RVOC)	Safety Committee
RV Technical Enhancement Committee (RVTEC)	
Fleet Improvement Committee (FIC)	
Arctic Icebreaker Coordinating Committee (AICC)	U.S. Coast Guard Polar Icebreakers (Healy, Polar Star)
Deep Submergence Science Committee (DESSC)	Nat'l Deep Submergence Facility – Alvin, Jason, Sentry (WHOI)
Scientific Comm. for Oceanographic Aircraft Research (SCOAR)	Naval Postgraduate School (NPS)Twin Otter
Marine Seismic Research Oversight Committee (MSROC)	Ocean Bottom Seismometer Instrument Center - Operations Sub-Committee
Maintaining an Environment of Respect at Sea (MERAS) Committee	

R/V *Atlantis* & ALVIN

R/V *Sikuliaq*

Academic Research Fleet 2025

- 17 oceanographic research vessels
  - Size range Global class to Coastal/Local class
  - Vessels owned by NSF (2 ea), the Office of Naval Research (ONR - 6 ea), and U.S. universities and laboratories
  - Operated by 13 different institutions currently
  - UNOLS coordinates access to ARF vessels and vehicles
  - Adhere to the UNOLS Research Vessel Safety Standards (see: https://www.unols.org/document/research-vessel-safety-standards-rvss)
  - Will be reduced to 16 vessels shortly w/Endeavor retirement
  - Anticipate return to 18 vessels in late 2027 / early 2028

New Regional Class R/V

R/V *F.G. Walton Smith*
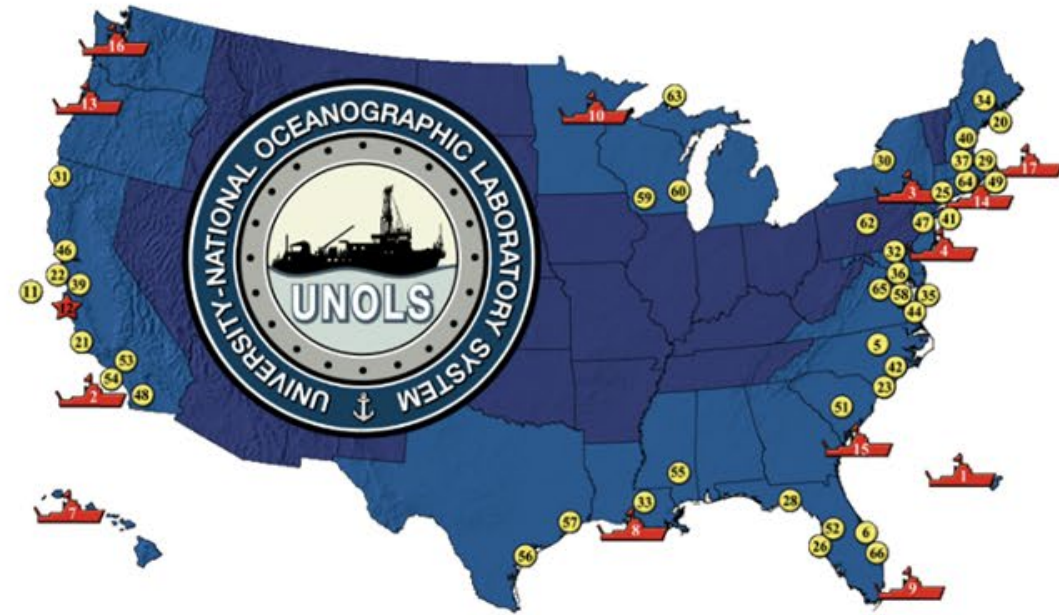
National Deep Submergence Facility (NDSF)

HOV Alvin
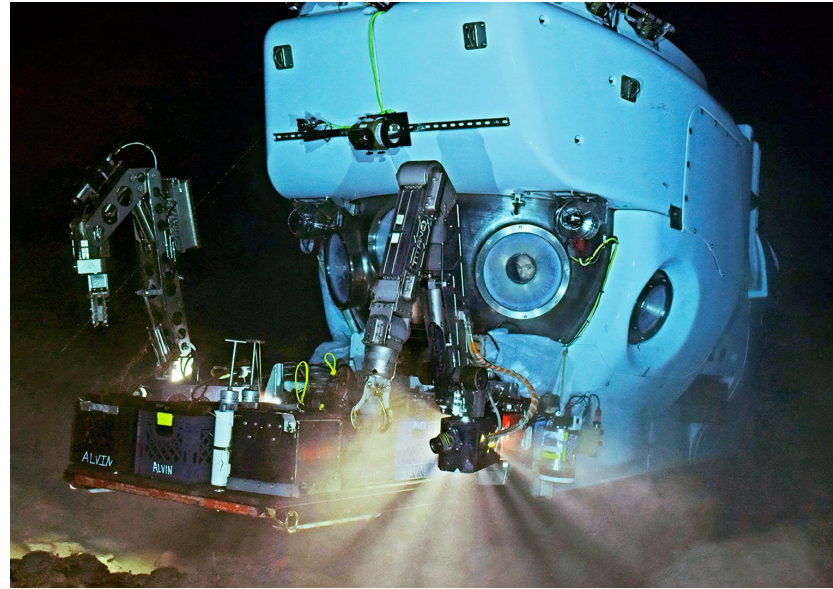
AUV Sentry

ROV Jason

Operated by Woods Hole Oceanographic Institution (WHOI)

https://ndsf.whoi.edu/
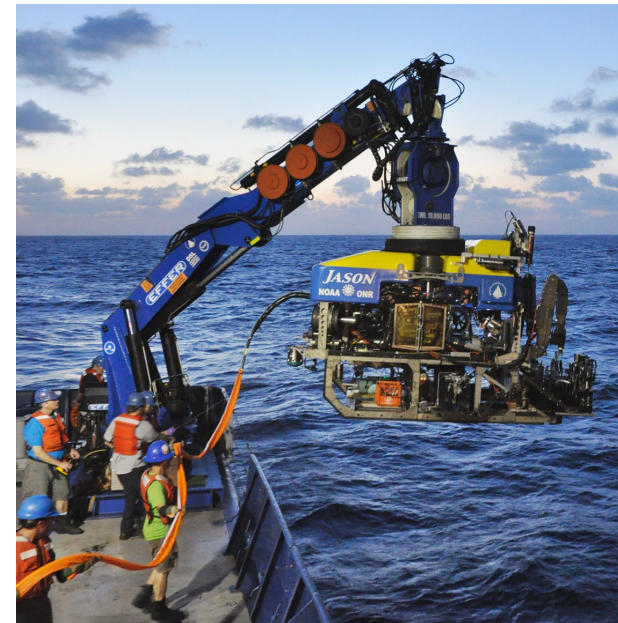
Pooled Equipment & Technical Support

- NSF/UNOLS Laboratory Van Pools
- NSF/UNOLS Winch Pools
- NSF/UNOLS Wire Pool
- UNOLS Technician Pool
- Ocean Bottom Seismic Instrument Center (OBSIC)
- Marine Sediment Sampling Group (MARSSAM)
- WHOI Mooring Facilities & Services
- Multidisciplinary Instrumentation in Support of Oceanography (MISO) and Potential Fields Pool Equipment (PFPE)

Instrumentation & Data Support

- Multibeam Advisory Committee (MAC)

- Ocean Data Facility (ODF)

- Operation SWAB - Enhanced Isotope Testing

- Rolling Deck to Repository Program (R2R) / Underway Data Support

- University of Hawaii Currents Group / ADCP Support

- UNOLS Satellite Network Advisory Group (SatNAG)

Where has the ARF been used?
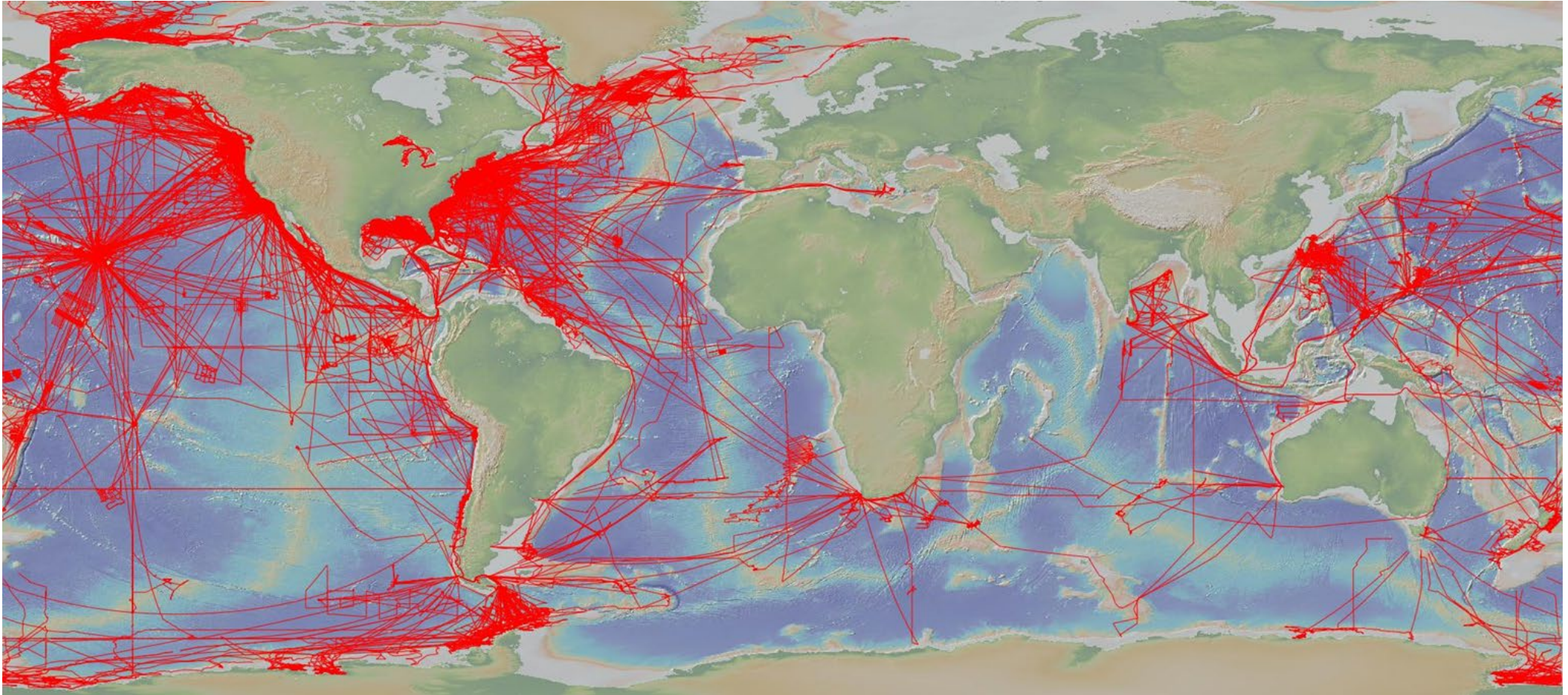
Summary of relevant Decadal Survey recommendations

Conclusion 4.1 – U.S. ocean science faces reduced research vessel capacity as older ships retire, with limited replacement plans.

Academic Research Fleet Composition

Academic Research Fleet Composition
1972-2025

	1972	1980	1990	2000	2010	2020	2023	2025
Global	8	6	5	6	6	5	5	5
Ocean	0	0	0	0	1	3	3	3
Intermediate	6	8	9	7	5	2	1	1
Regional	2	2	3	3	4	2	2	1
Coastal	7	5	6	7	3	3	3	3
Local	12	6	4	5	4	3	3	3
Total	35	27	27	28	23	18	17	16
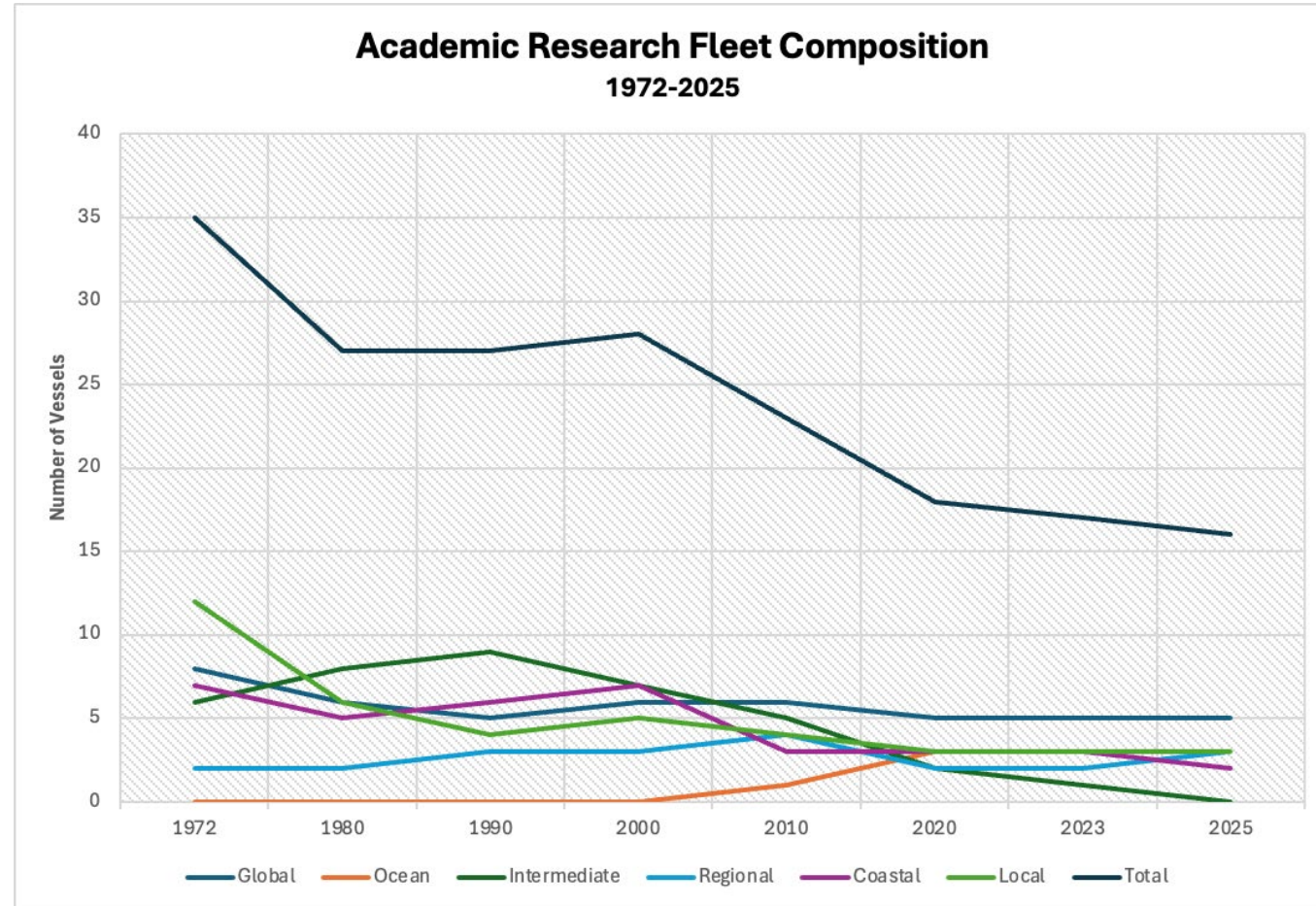
The fleet is dropping to 16 ships with Endeavor's retirement this year. It is anticipated it will return to 18 in 2027 with completion of the 3 RCRVs

Ship/Class	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	Retire Year
Total Fleet	16	16	18	18	17	16	14	14	13	14	14	13	12	13	13	12	11	11	11	11	11	
Total Science Berths	373	373	405	407	372	350	326	326	302	292	292	245	209	209	209	193	##	144	120	120	120	
Global Class	5	5	5	5	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	
Thomas G. Thompson																						2036
Roger Revelle																						2041
Atlantis																						2042
Marcus G. Langseth																						2028
Sikuliaq*																						2045
Class Renewal																						
Global Replacement 1								Design & Build														
Global Replaceent 2										Design & Build												
Global Replacement 3																						
Langseth Replacement																						
Ocean/Intermediate Class	4	4	4	4	4	3	3	3	2	4	4											
Kilo Moana																						2032
Atlantic Explorer																						2029
Neil Armstrong*																						2045
Sally Ride*																						2046
Class Renewal																						
Kilo Moana Replacement																						
Atlantic Explorer Replacement			Design & Build																			
Regional Class	1	1	3	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	
Hugh R. Sharp																						2040
Taani																						2053
Narragansett Dawn																						2053
Gilbert R. Mason																						2054

No current Navy activity

CU/LDEO fundraising efforts ongoing

UH Seeking Funding

BIOS/ASU Seeking Funding

Conclusion 4.2 – Investments in ocean research infrastructure benefit both science and regional communities economically, educationally, and socially.

- **Jobs and technical training, boost to local businesses that support the assets**
- **Can be the foundation of an innovation hub**
- **Hands on learning, inspiration, pride, and partnerships with educational programs**

Conclusion 4.3 – Replacing aging global-class research vessels and upgrading ocean-class ships is essential to sustain U.S. ocean research leadership.

- **It takes 10-15 years from need identification to ship delivery for federal construction programs**
- **It takes 2-4 years to fund, design and plan for a Global/Ocean class mid-life refit and then 1-2 years to complete**

Conclusion 4.4 – NSF-supported training at sea is vital to prepare the next generation of ocean scientists.

- **NSF funds the STEMSEAs and UNOLS MATE Internship programs**
- **NSF funds Chief Scientist and AICC Early Career Scientist cruises as well as other Early Career activities**

Conclusion 4.5 – Autonomous systems can complement but not replace ship-based ocean observations.

Autonomous systems are force multipliers for observing and collecting data.
Ships are the logistical hubs that enable autonomous systems.

Conclusion 4.6 – Needed National Deep Submergence Facility (NDSF) assets:

- Lower-cost ROVs and AUVs for coastal use

NSF has initiated the Mobile Remotely Operated Vehicle (mROV) program - NDSF is designing and building new mROVs that can be deployed from smaller vessels with lower costs to maintain and operate

Conclusion 4.6 – Needed NDSF assets cont.

- Broaden impact with remote and autonomous capabilities

NSF and ONR have supported increased internet connectivity

Conclusion 4.6 – Needed NDSF assets cont.

- International cooperation and use of non-U.S. assets

NSF, UNOLS working with UK and other European countries via Barter program to support NSF funded cruises. Working similarly with NOAA.

Conclusion 4.6 – Needed NDSF assets cont.

- Increase early-career participation through workshops
- Trainee program to support STEM workforce needs

NSF funds AICC, DeSSC, and MSROC early career programs plus STEMSEAs and UNOLS MATE Internship seagoing experiential programs

Conclusion 4.7 – The Academic Research Fleet and NDSF are essential to U.S. ocean science leadership and access to the sea.

- **See RECOS papers on ARF support to National Defense, Underwater Infrastructure, Blue Economy, and Maritime Workforce**
- **See UNOLS White Papers on Seabed Characterization and Seismic Imaging**

Recommendation 4.1 – NSF should evaluate Academic Research Fleet funding and access metrics to guide efficient resource allocation.

Replacing global-class research vessels is critical to sustain high-priority science and U.S. ocean leadership.

UNOLS has provided recommendations to ONR for more Global AGORs (4 vs 3 ea) and to initiate the process for acquiring them

Recent UNOLS Activities related to supporting the Decadal Survey Recommendations

- UNOLS provided recommendations to ONR regarding NOAA Class A and B as well as number of Global class vessels for fleet recapitalization

- Working with Marine Superintendents on advocacy for the ARF at the local level

  We inform advocacy for ocean science and oceanographic facilities – 4 RECOS white papers (posted on UNOLS website) Institutional Government Relations efforts

- Expanded UNOLS website and distribution of info:
    - Definition of the ARF – readily available in web searches
    - Why the ARF is important
    - Fleet utilization
    - Fleet service life
    - Insight into the cost of operating research vessels
    - White paper on ARF ability to support Seabed Characterization
    - White paper on Seismic Imaging for National and Economic Security
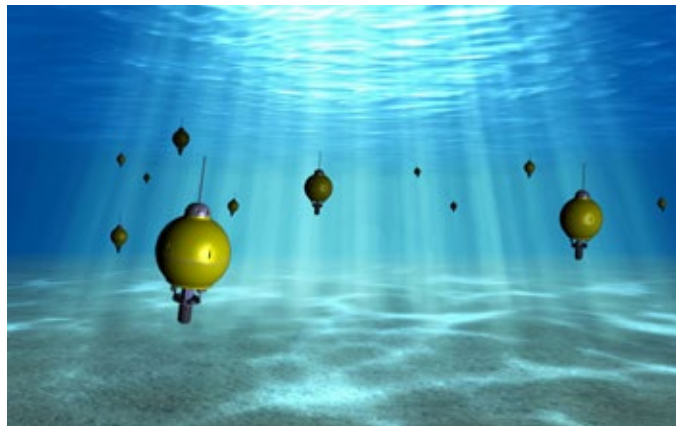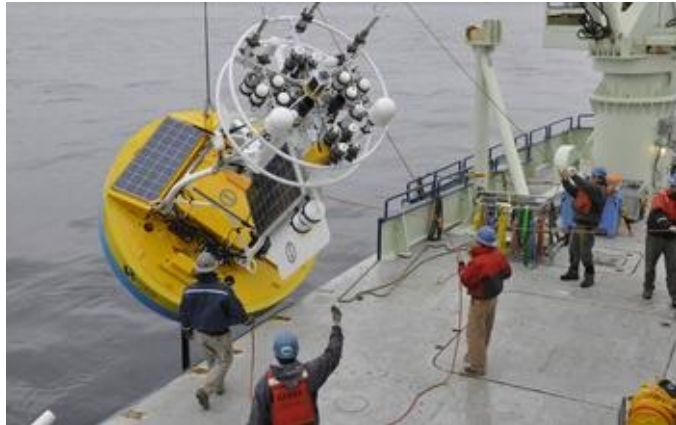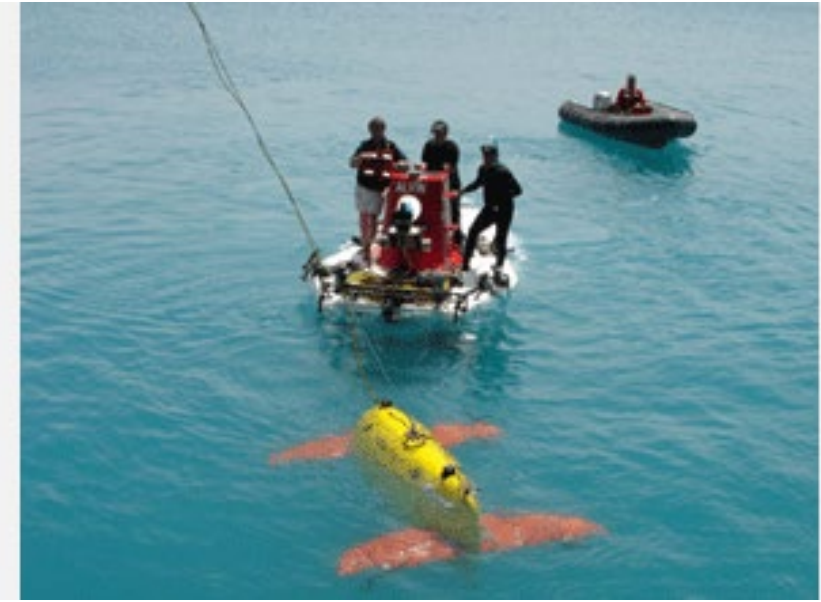
Questions?

Discussion

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