The U.S. Academic Research Fleet

Testimony provided to the
Decadal Survey of Ocean Science Committee
15 February 2024

Dr. Deborah Bronk, Chair UNOLS Council
Doug Russell, UNOLS Executive Secretary
Dr. Kipp Shearman, Chair UNOLS Fleet Improvement Committee
Rose Dufour, NSF/GEO/OCE Ship Operations Program Director
Rob Sparrock, ONR Oceanographic Research Vessel Program Officer

UNOLS
UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

Agenda

- UNOLS and the U.S. Academic Research Fleet (ARF) (Doug)
  - What is the ARF?
  - How is the ARF used today?
- NSF Perspective (Rose)
- ONR Perspective (Rob)
- How might the ARF look in the coming decade? (Kipp)
- Key Take Aways (Deb)

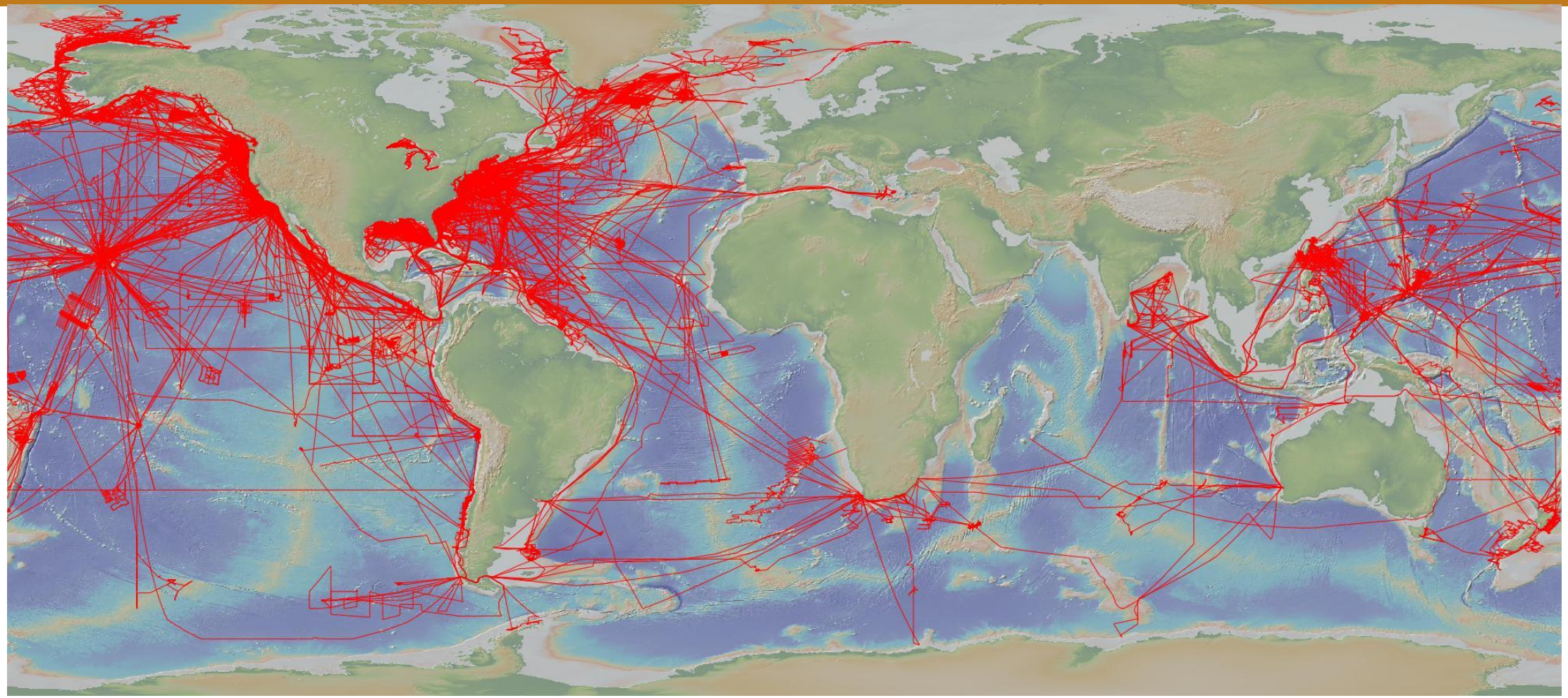
Academic Research Fleet Composition

1972-2025

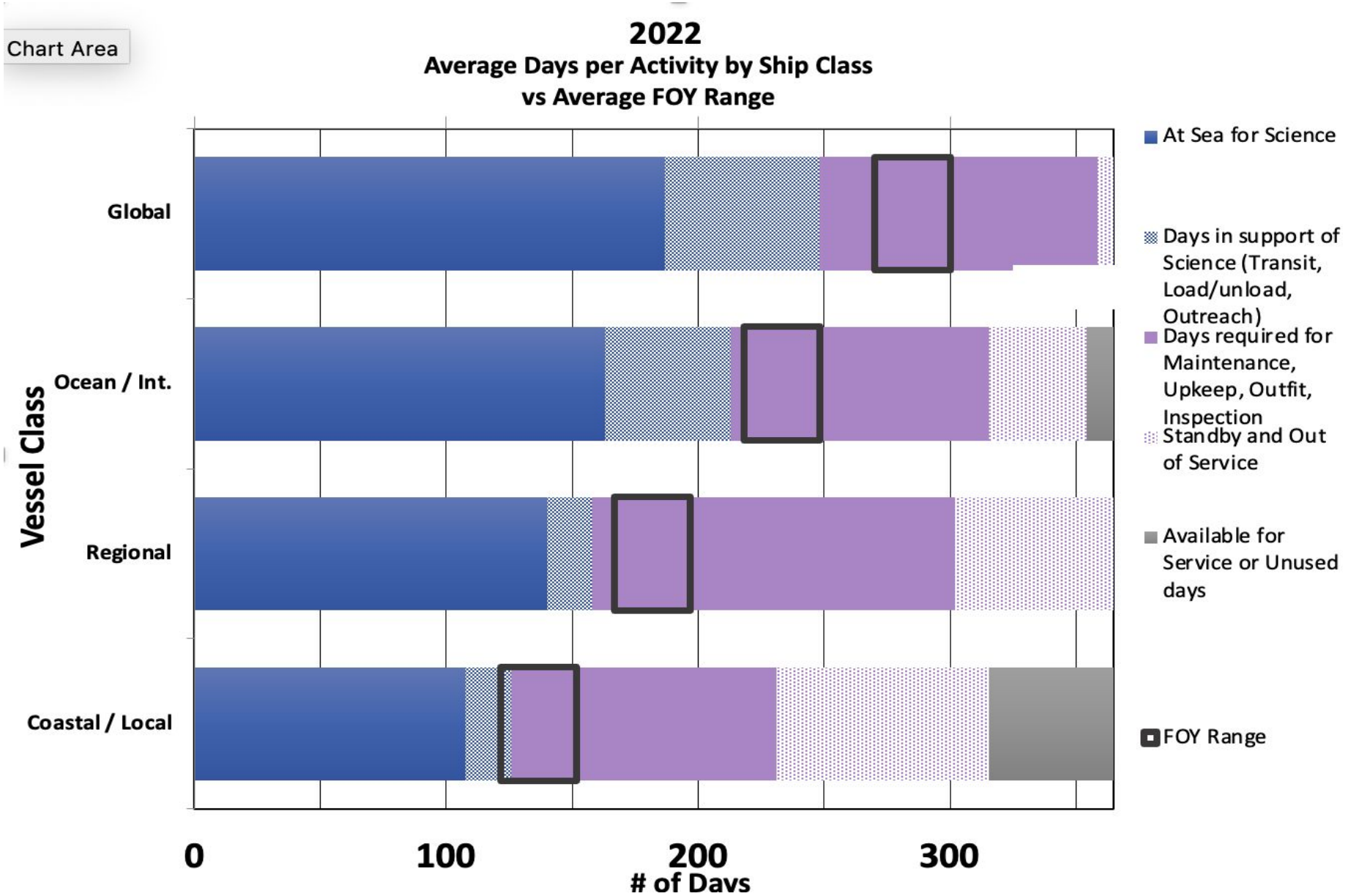
	1972	1980	1990	2000	2010	2020	2023	2025
Global	8	6	5	6	6	5	5	5
Ocean	0	0	0	0	1	3	3	3
Intermediate	6	8	9	7	5	2	1	0
Regional	2	2	3	3	4	2	2	5
Coastal	7	5	6	7	3	3	3	2
Local	12	6	4	5	4	3	3	3
Total	**35**	**27**	**27**	**28**	**23**	**18**	**17**	**18**

How is the Fleet being used?

Where has the fleet been used? 2009-2024



ARF Full Optimal Year



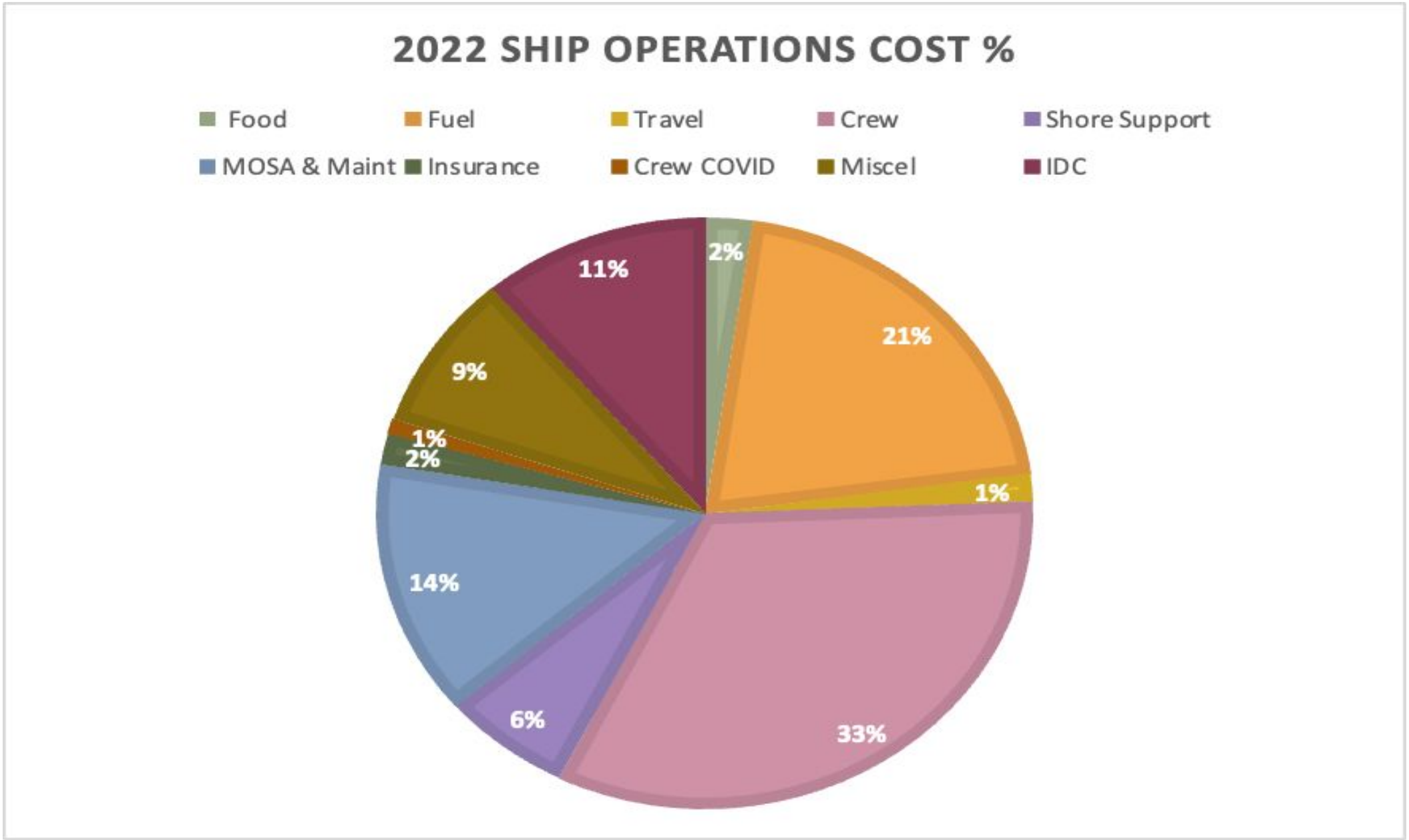
NSF Perspective

Rose Dufour

ARF Challenges

- Current Global / Ocean class
- Cyber Security
- Overuse of NDSF assets - makes scheduling a challenge
- Capability changes
- Less bunks for science community 4% decline - Complex ships requiring more crew members, collaboration internationally
- *Kilo Moana* not able to effectively do agency science to desired standards
- Pools – technology, autonomy, gliders with technical support – force multipliers
- Greening the Fleet, Net-zero by 2050
- Underutilization of local/regional class vessel

Prospective on what goes into Ship Day Rate



ONR Perspective

Rob Sparrock

ONR Perspective

- The Congressional Budget Office analyzes the Navy's annual, 30 year shipbuilding plan and assess its costs by law. However, non-Battle Force ships such as the Oceanographic Research Vessels (AGOR) are excluded from the plan. While there is not yet a formal build plan for a 2036 AGOR replacements, the current requirement is six AGOR.
- Next decade: between 2036 - 2042, three Globals (and sister ship *NOAAS Ronald H. Brown)* and RV *Kilo Moana* will reach End of Service Life (ESL).
- Additionally, RV *Sikuliaq*, *Sally Ride* & *Neil Armstrong* will likely need Midlife Refit which historically take a year or more and are needed in the same replacement period.
- Opportunities for 'Greening the Fleet' with new platforms designed to last 4-5 decades with the right mix of capacity and capabilities including newer technologies and affordability (open architecture, integrated power, unmanned systems, upgrades to DSV ALVIN).
- Risks with New Construction and Midlife Refit vessel program are shipyard delays that would force tough decisions such as extending existing vessels beyond ESL, delaying Midlife Refits, delaying equipment upgrades, or creating gaps in capacity and capability

How might the ARF look in the coming decade?

Kipp Shearman

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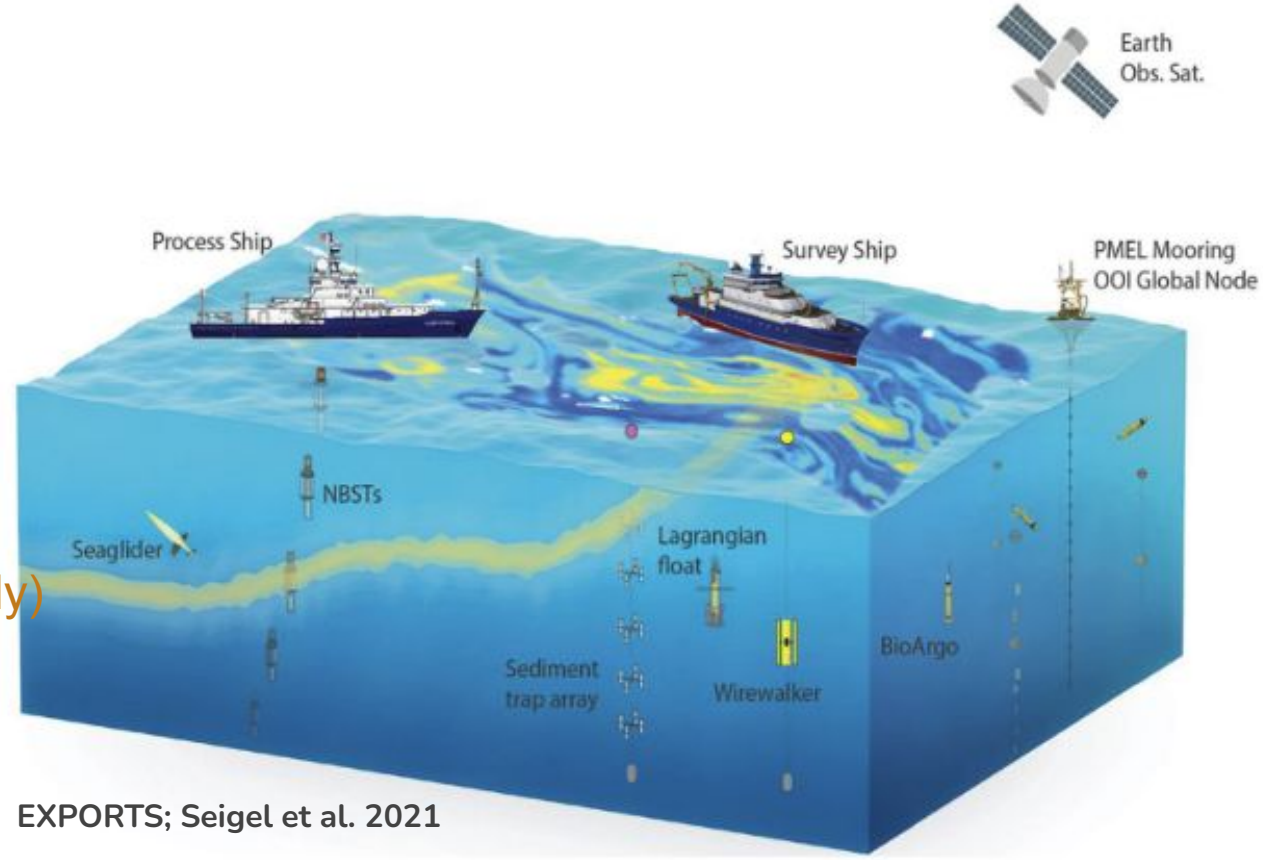
How might the ARF look in the coming decade?

- **Autonomy will be commonplace as technology becomes robust**
  - Never a replacement for people on ships
  - Enhance footprint, provide endurance, sample dangerous conditions
- **Finding the right composition of research vessels**
  - -Global class RVs are oversubscribed
  - -Coastal/Local class RVs are underutilized
- **Polar Research**
  - -Antarctic Research Vessel (2031 - unfunded currently)
  - -USCG Arctic Surface Capability Science Mission Requirements
- **Greening of the Fleet**
  - -Net-zero emissions from overall federal operations by 2050, including a 65 percent emissions reduction by 2030



EXPORTS; Seigel et al. 2021

How might the ARF look in the coming decade?

SHIP/CLASS	BUILT	Owner	LOA m(ft)	Science Berths	Total Ship Days Used (2022)	Ship Operation + Tech Day Rates	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	End Year
Global Class																											
Thomas G. Thompson	1991	NAVY	84 (274)	36																							2036
Roger Revelle	1996	NAVY	84 (274)	37																							2041
Atlantis	1997	NAVY	84 (274)	37																							2042
Marcus G. Langseth	1991	LDEO	71 (235)	35																							2025
Sikuliaq	2014	NSF	80 (261)	26																							2045
Total in Class							5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	
Ocean/Intermediate Class																											
Kilo Moana	2002	NAVY	57 (186)	29																							2032
Endeavor	1976	NSF	56 (185)	18																							2022
Atlantic Explorer	1982	BIOS	51 (168)	20																							2026
Neil Armstrong	2015	NAVY	73 (238)	24																							2045
Sally Ride	2015	NAVY	73 (238)	25																							2046
Total in Class							5	5	5	5	5	5	5	5	5	4	4	3	3	3	3	3	3	2	2	2	
Regional Class																											
Hugh R. Sharp	2005	UDel	44 (146)	14																							2035
Taani	2024	NSF	60 (199)	16																							2054
Narragansett Dawn	2025	NSF	60 (199)	16																							2055
Gilbert R. Mason	2025	NSF	60 (199)	16																							2055
Total in Class							1	1	1	1	1	1	1	1	1	2	4	4	4	4	4	4	4	4	4	4	
Coastal/Local Class																											
Robert Gordon Sproul	1981	SIO	38 (125)	12																							2025
Pelican	1985	LUMCON	36 (116)	14																							2025
Walton Smith	2000	U.Miami	30 (96)	16																							2030
Savannah	2001	SkIO/UG	28 (92)	19																							2031
Blue Heron	1985	UMINN	26 (86)	6																							2030
Rachel Carson	2003	UW	22 (72)	9																							2033
Total in Class							6	6	6	6	6	6	6	6	6	6	4	4	4	4	4	2	1	1	0	0	
TOTAL NUMBER OF VESSELS							17	17	17	17	17	17	17	17	17	17	16	15	15	15	15	13	12	11	10	10	

Design Life Extended Life

Service Life for Current & Planned ARF Vessels

2025 - 2035 will see …

- the ARF shrink from
  - 18 to 10 vessels
  - 13 to 8 operating institutions
- three Globals end their design life and enter extended life
- the retirement of ALL Intermediate, Coastal, and Local vessels

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Key Take Aways

Deborah Bronk

Bigelow | Laboratory for Ocean Sciences

Suggestions to be included in the plan:

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- Should R/V Kilo Moana be replaced, and if so, with what?
- Global/Ocean class capacity will be reduced due to retirements and mid-life refits – how do we fill the vacuum?
- Coastal / Local class vessels are currently underutilized for science
    - Why?
    - Valuable for training – sufficient justification for their cost?

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- Must optimize the use of autonomous tools as force multipliers for accomplishing science – do we need a national strategy?
- National Deep Submergence Facility – “Is that still all we’ve got?”
- Fleet plans need to include a blueprint for achieving Carbon Net-Zero by 2050
- Investments in Cyber Security are essential

We need a BOLD new vision for the Academic Research Fleet and the funds to implement it

Discussion questions:

1. With the retirement of the JR, could we remobilize parts of that community to serve the whole ARF?