DIRECTORATE FOR
GEOSCIENCES

OFFICE OF POLAR PROGRAMS

Antarctic Research Vessel (ARV)

UNOLS AICC Meeting

10 January 2024

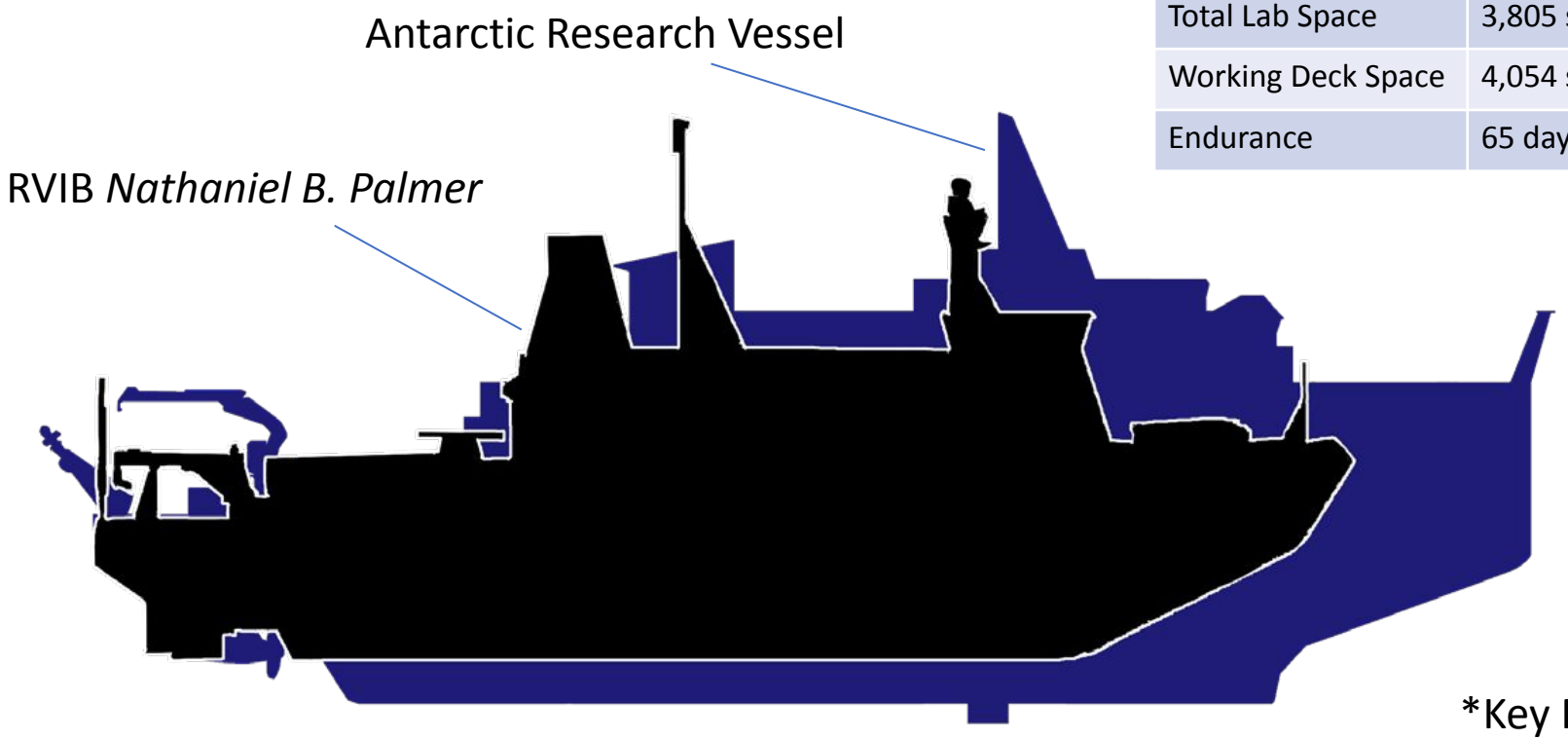
NSF ARV Team
Stephanie Short, ARV Program Lead
Tim McGovern, ARV Program Manager
Caitlin Jarecki ARV Assistant Program Manager (USN PEO Ships)
Mike Prince, ARV Project Manager

National Science Foundation
WHERE DISCOVERIES BEGIN

Overview

	Nathaniel B. Palmer	Antarctic Research Vessel	
Length	309 ft	365 ft	**Bigger**
Sci/Tech Berthing	45	**55***	**More scientists**
Total Lab Space	3,805 sq ft	4,497 sq ft	**More lab space**
Working Deck Space	4,054 sq ft	7,197 sq ft	**More deck space**
Endurance	65 days	**90 days***	**Longer endurance**

AND greater icebreaking capability
≥4.5 ft @ 3 kts (Polar Class 3)*



*Key Performance Parameter (KPP)
Current Design & Hull Form meets all KPPs

ARV Placemat with Specifications

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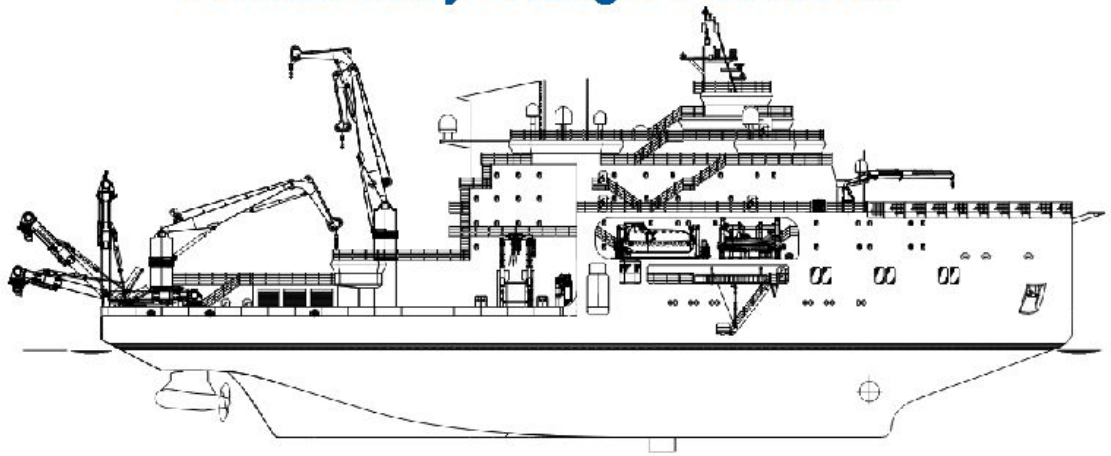
Antarctic Research Vessel (ARV) Preliminary Design Placemat



REFERENCE MISSION	
Duration	90 days

DIMENSIONS	
Length, Overall	365.0 ft
Length, BP	349.0 ft
Beam, Overall	80.0 ft
Beam, WL	79.3 ft
Design Draft	32.5 ft
Working Deck Freeboard	13.0 ft
Displacement (Design Draft)	13,430 LT
Light Ship Weight (including margins)	9,790 LT
Deadweight	3,640 LT

ACCOMMODATIONS	
Ship's Crew	29
Science Complement	55 (Including 2 ADA-accessible berths)

PROVISIONS	
Freeze	90 days
Chill	90 days
Dry	90 days

AVIATION	
UAV Launch/Recovery	150 lbs
UAV Hangar	1,472 ft²
Helicopter Landing	Bell 407 Airbus H125

MACHINERY SYSTEMS	
Azimuthing Podded Propulsors	2 x 9.5 MW
Bow Thrusters	1 x 1.9 MW
Ship Power Plant	22.3 eMW
Propeller	2 x 16.0 ft FPP

AUXILIARY SYSTEMS	
A/C Plants	Qty 3 @ 205t
Fire Suppression	NOVEC and Water Mist
Mission Fuel Capacity	60,000 gal
Ship Service Battery	2.7 MWh
Wastewater Holding	20 days

COMMUNICATIONS
HF Transmit and Receive
Ku, Ka, C, and UHF SATCOM
GMDSS
INMARSAT
UHF/VHF LOS Comms
UAS Comms
Fleet Broadband

NAVIGATION
AIS
ECDIS
S & X Band Radar
Ice Radar
DGPS

MISSION EQUIPMENT	
2 Main Deck Cranes	Maximum reach: 65ft 70,000 lbs @ 50ft
Portable Utility Crane	4,000 lbs @ 40ft
Forward Crane	4,000 lbs @ 40ft
Stern A-Frame Side A-Frame	80,000 lbs slewing
Meteorology Mast	1
Atmospheric Mast	1
CTD Hydroboom	Fast-acting, Reaches water level
Piston Core LARS	40m
Multibeam Sonar Suite	
Sonar Drop Keel	0 ft / 3 ft /10 ft
Container Quantity	20 TEU

PERFORMANCE	
Open Water	
Maximum	> 17 kt
Cruise	11 kt
Quiet	8 kt
Ice	
Continuous 3 kt	> 4.5 ft + 1 ft snow
Continuous 6 kt	> 1.6 ft
Turning out	> 4.5 ft
Range	> 17,000 nm
Towing	
4 kt	25,000 lbs
6 kt	10,000 lbs

CLASSIFICATION	
ABS ✠A1 Oceanographic	✠AMS
CCO-POLAR (-35°C,-45°C)	Ice Class PC3
✠ACCU	CRC
Unrestricted service	R2
EEDI-PH3	ENVIRO
HAB+ +(WB)	BWT+
ESS-LIBATTERY	HYBRID IEPS
ILM	UWILD
POT	

MISSION SPACES	
Containers	8 in Science Hold 12 on Weather Decks
Lab Area, Total	8,263 ft²
Aft Work Deck	7,724 ft²
Science Stores	42,571 ft³
Side Deck Length	170 ft.
Baltic Room Area	704 ft²
HAZMAT Storage	214 ft²
Science Observation Deck	1,163 ft²

ASC ANTARCTIC SUPPORT CONTRACT

leidos

GIBBS & COX A Leidos Company

November 7, 2023

PC3 & Icebreaking KPP

Green = accessible; Orange = accessible with difficulty & slower speeds; Red = not accessible

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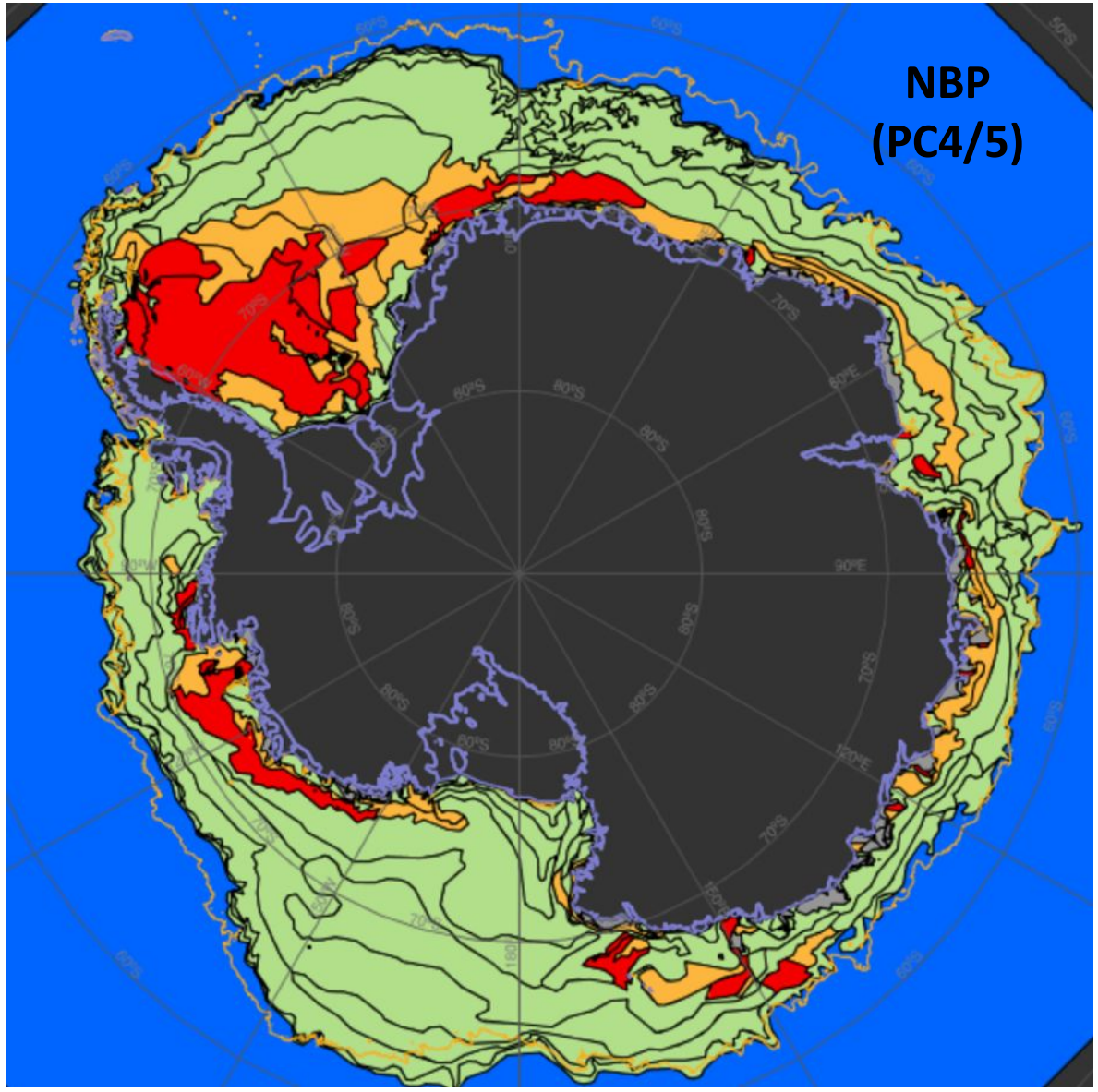
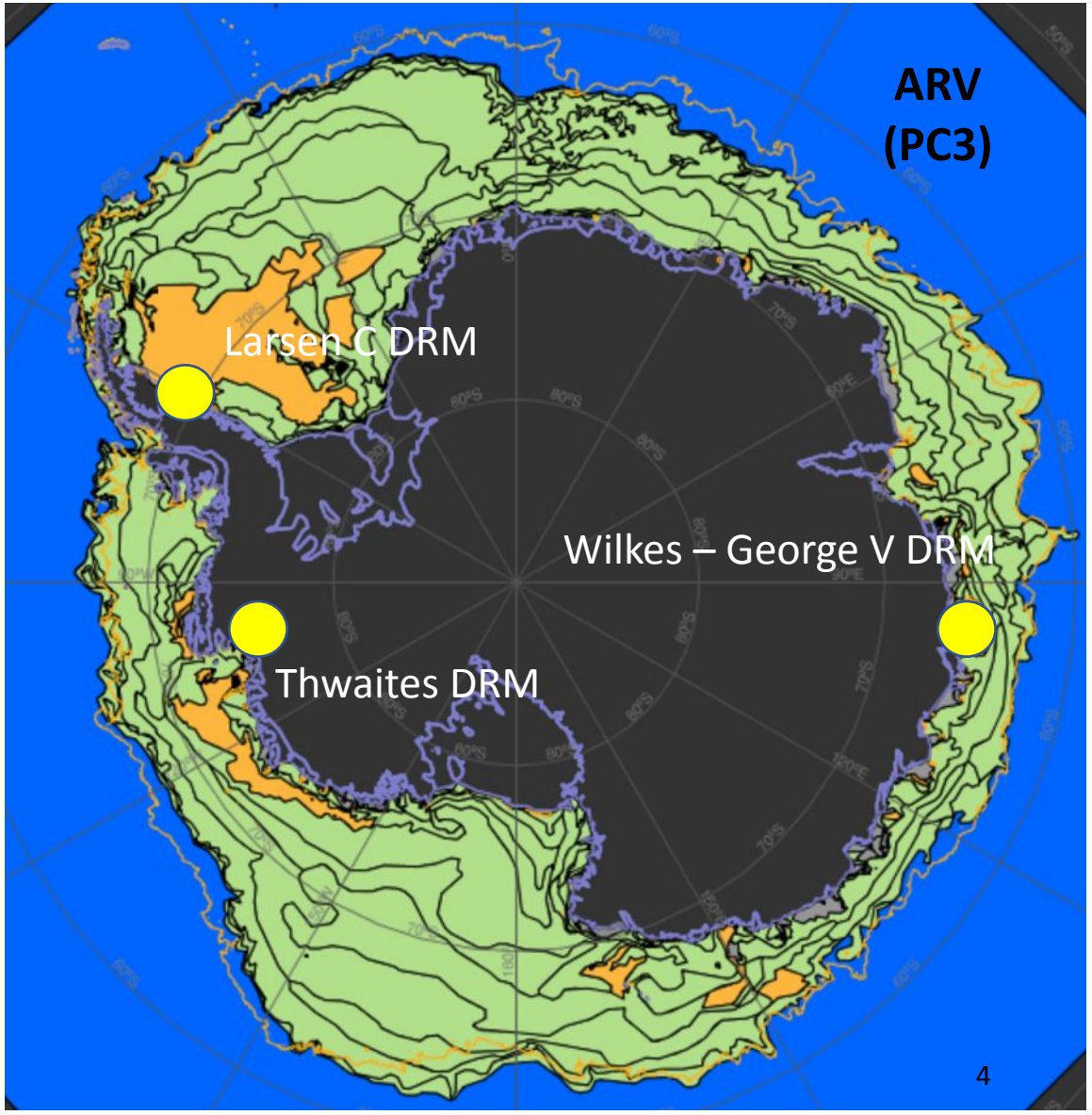
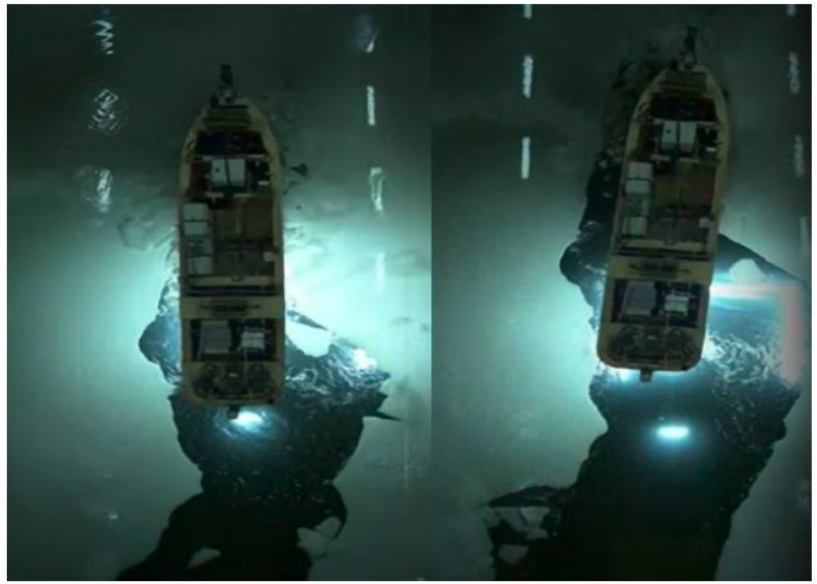




Model Test Results Showing Ice Management

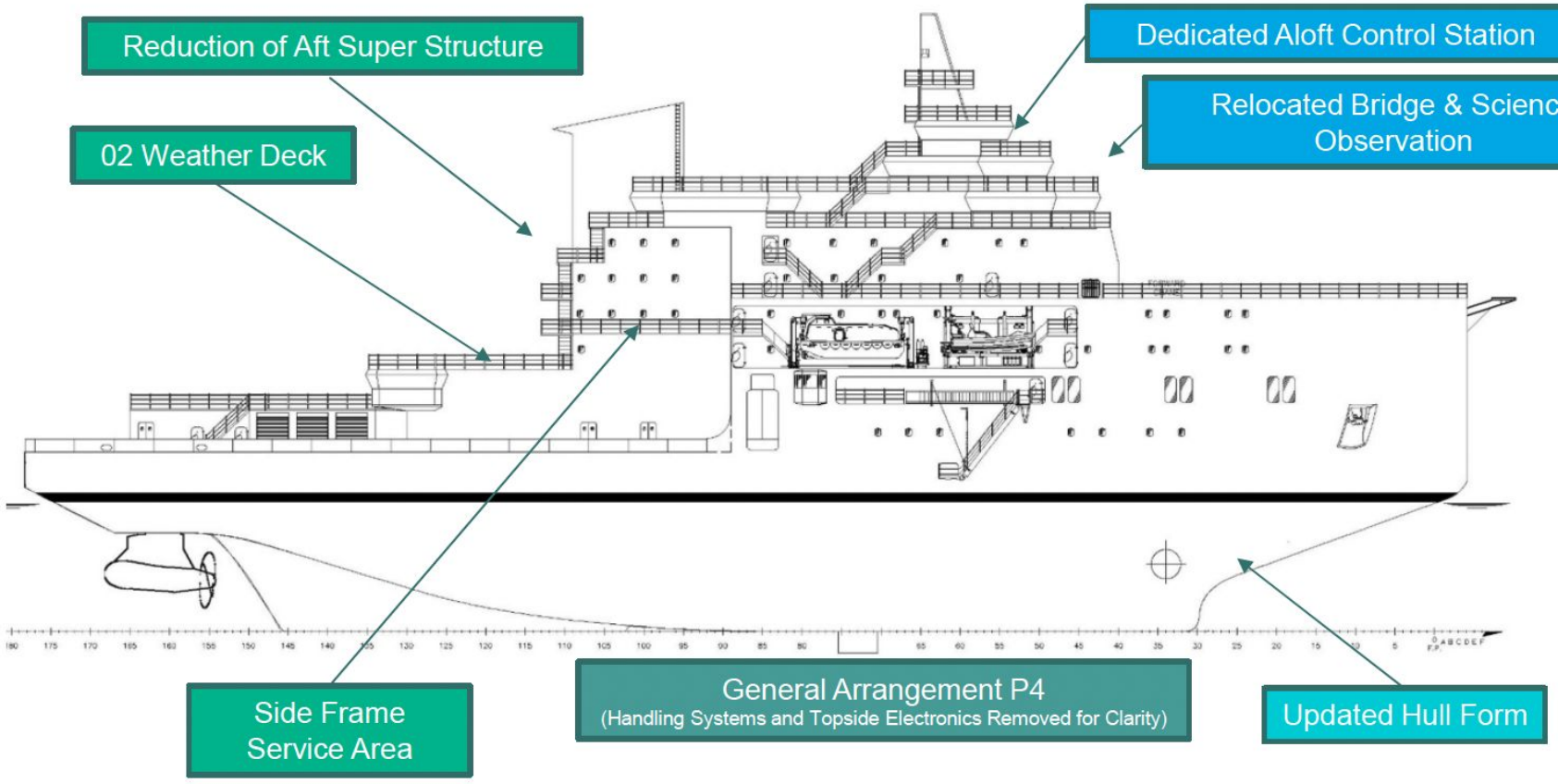


Clearing of a pool with thrusters in the HSVA Test Basin (Side Step)

R/V Sikuliaq creating pool in Ice with thrusters

Ice Management Astern in the HSVA Test Basin (30° toe-in angle)

General Arrangement – Recent Changes

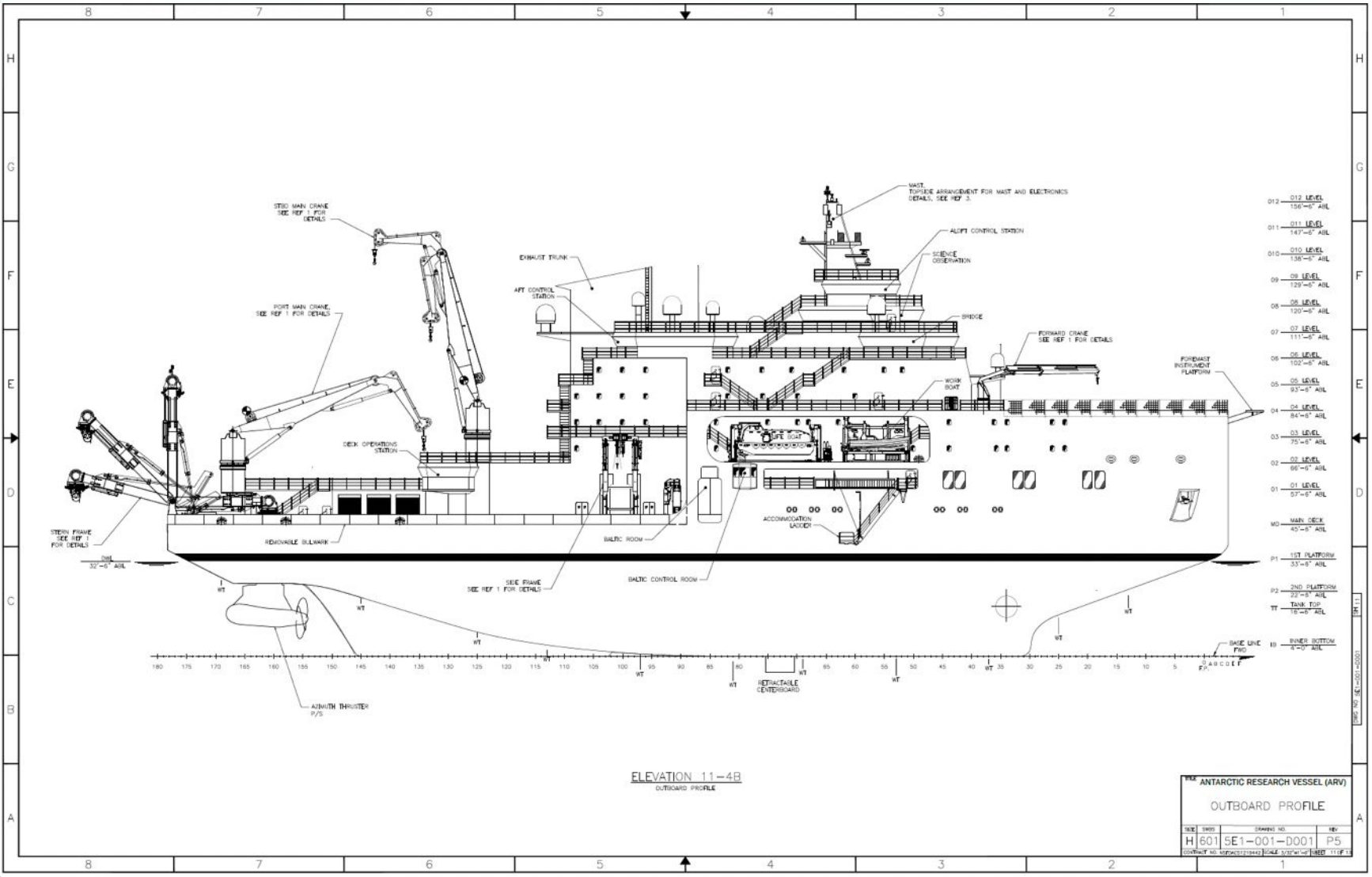


Sightline Improvements
- 08 Level Aloft Control Station
- 07 & 06 Level Relocation

Superstructure Modifications
- Improved Incubation Area
- Creation of Side Frame Servicing Area
- Improved Range of Motion for Starboard Main Crane
- Improved Location for Flagging Block to Serve Aft A- Frame

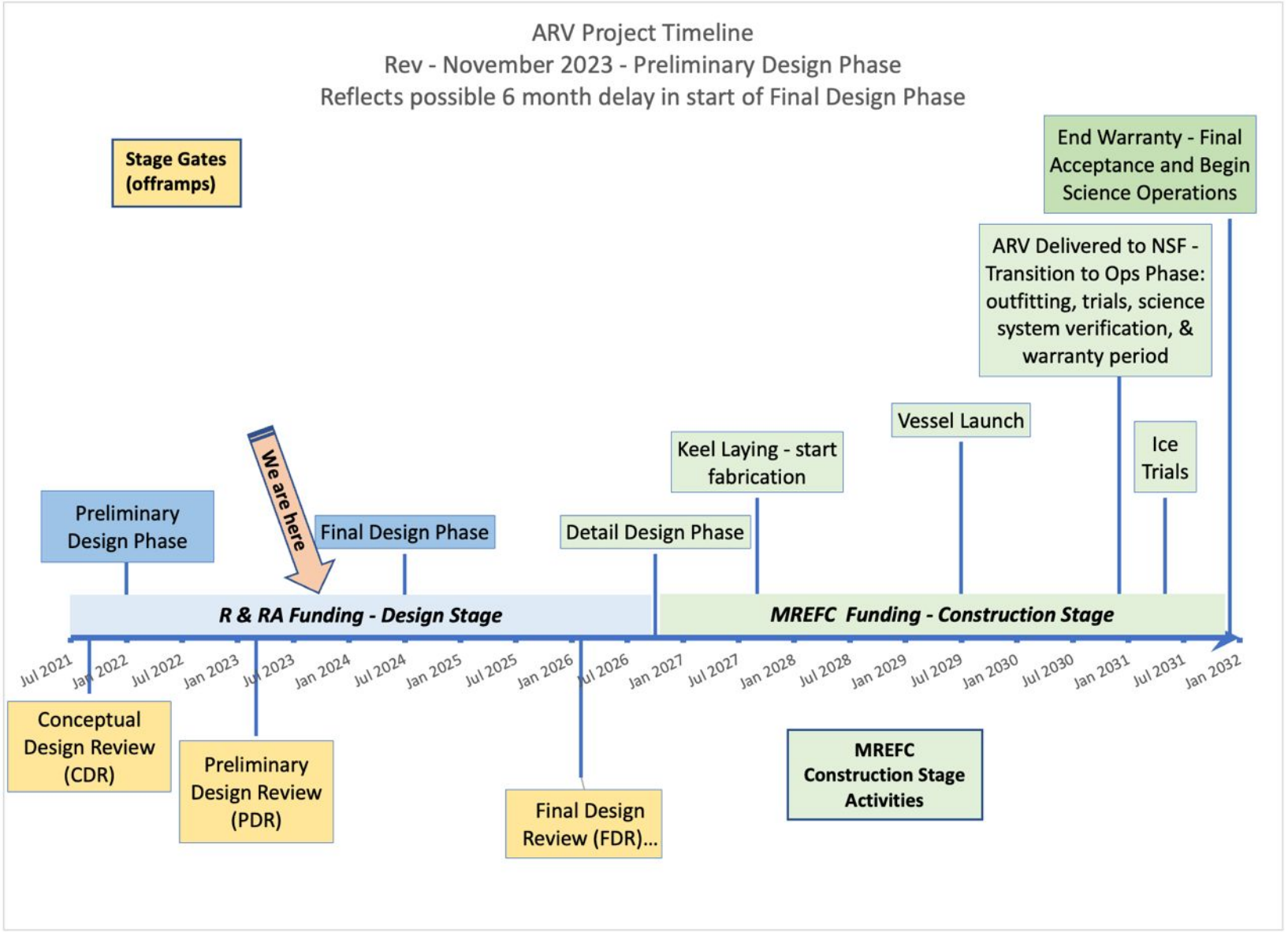
Improved Hull Form
- Improved Bubble Sweepdown Performance
- Improved Fuel Oil Capacity

General Arrangement – Profile



Drawings & Reports go to:
https://future.usap.gov/arv-doc-library/

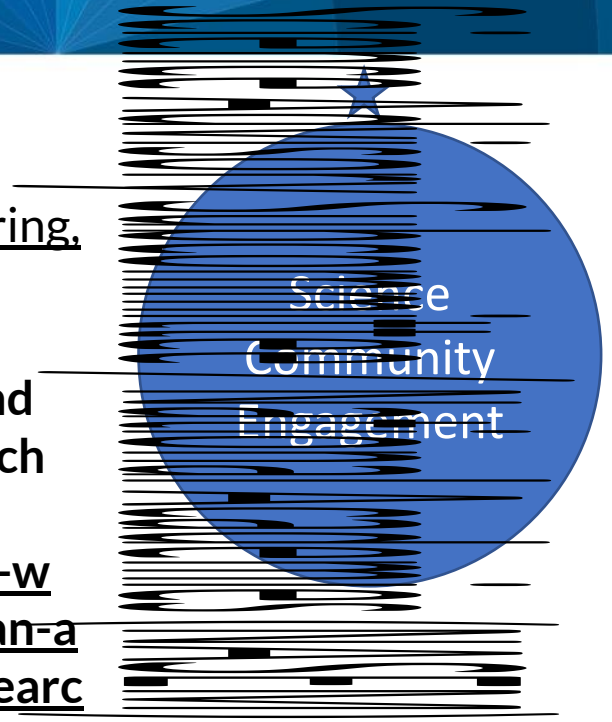
ARV Schedule



Next Steps:

- RFP and Selection of the Vessel Integrator to complete the project. (CY 24)
- Final Design Phase (CY 24-26)
- Final Design Review (CY 26)
- Appropriation and Approvals to start Construction Stage (CY 26)

Science Community Engagement



National Academies of Sciences, Engineering, and Medicine

Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research

https://www.nationalacademies.org/our-work/future-directions-for-southern-ocean-and-antarctic-nearshore-and-coastal-research

Science Advisory Subcommittee (SASC)
Reports:
https://future.usap.gov/arv-community-input/

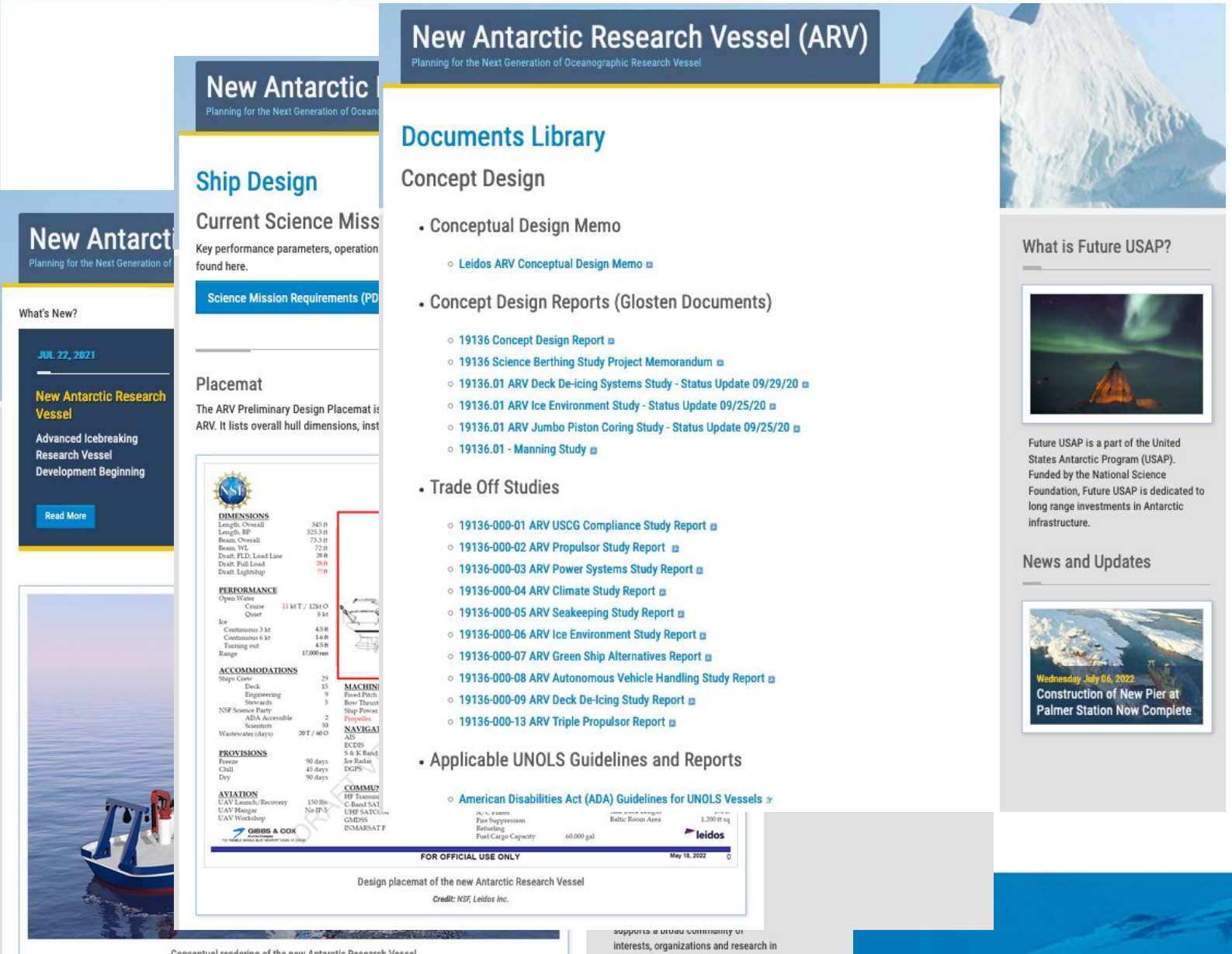
- Dr. Amy Leventer, (Chair) Colgate University
- Ms. Alice Doyle, UNOLS
- Dr. Carlos Moffatt, Univ of Delaware
- Dr. Deborah Steinberg, VIMS
- Dr. Kristin O'Brien, UAF; GEO AC Rep

Past Members

- Dr. Patricia Quinn, NOAA/PMEL
- Dr. Clare Reimers, OSU
- Dr. Bruce Appelgate, UCSD/Scripps

** **Seeking nominations for 3 new members***

Community Outreach



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Preliminary Design Rendering

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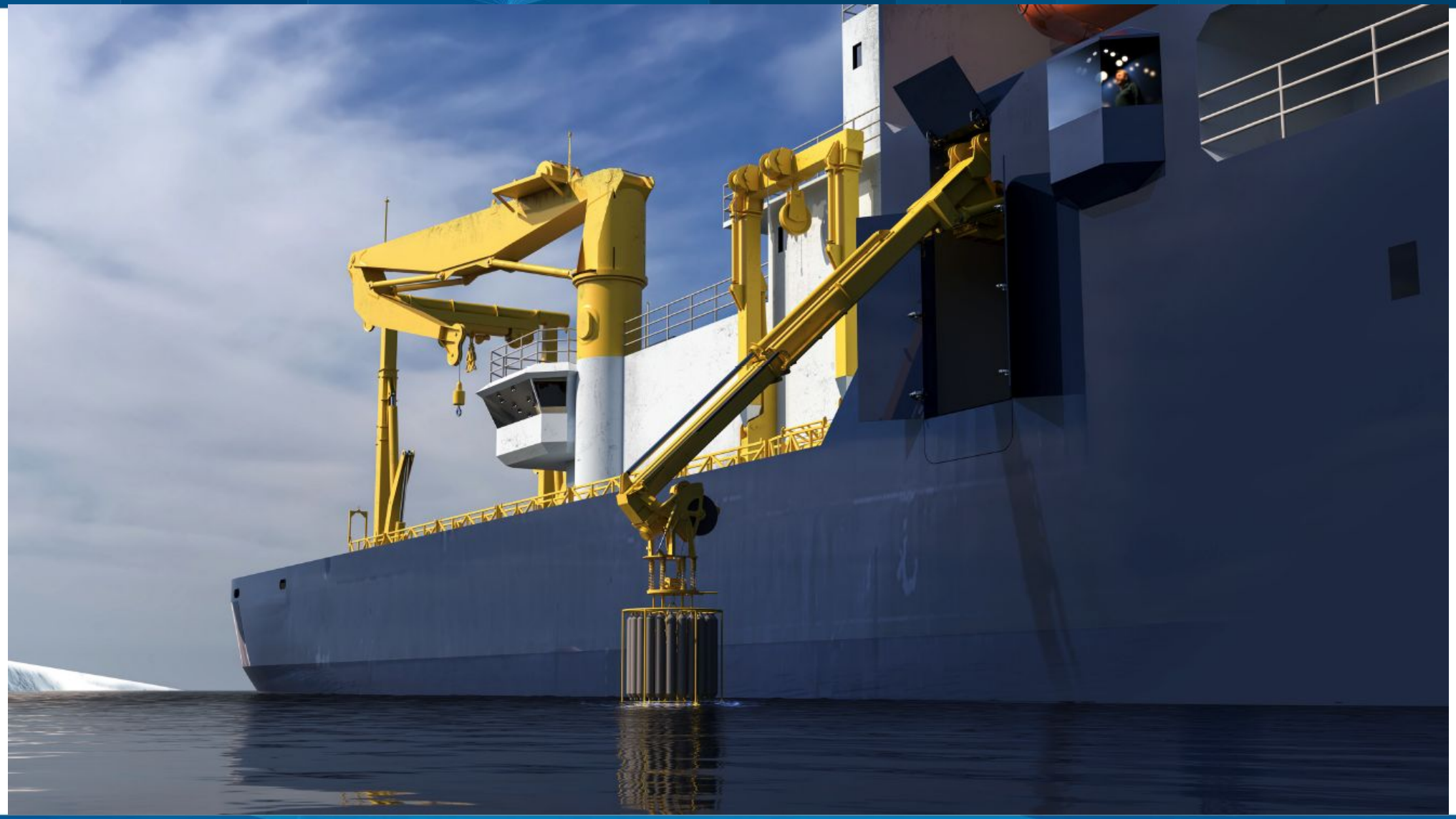

Antarctic Research Vessel Summary

- ~20 years of sustained scientific demand
- Continued ability to support cutting edge NSF research for the next 40 years
- Enhanced capabilities over existing USAP research vessel
- Strong Teaming with Industry