

DIRECTORATE FOR GEOSCIENCES
OFFICE OF POLAR PROGRAMS

Antarctic Research Vessel (ARV)

UNOLS AICC Meeting

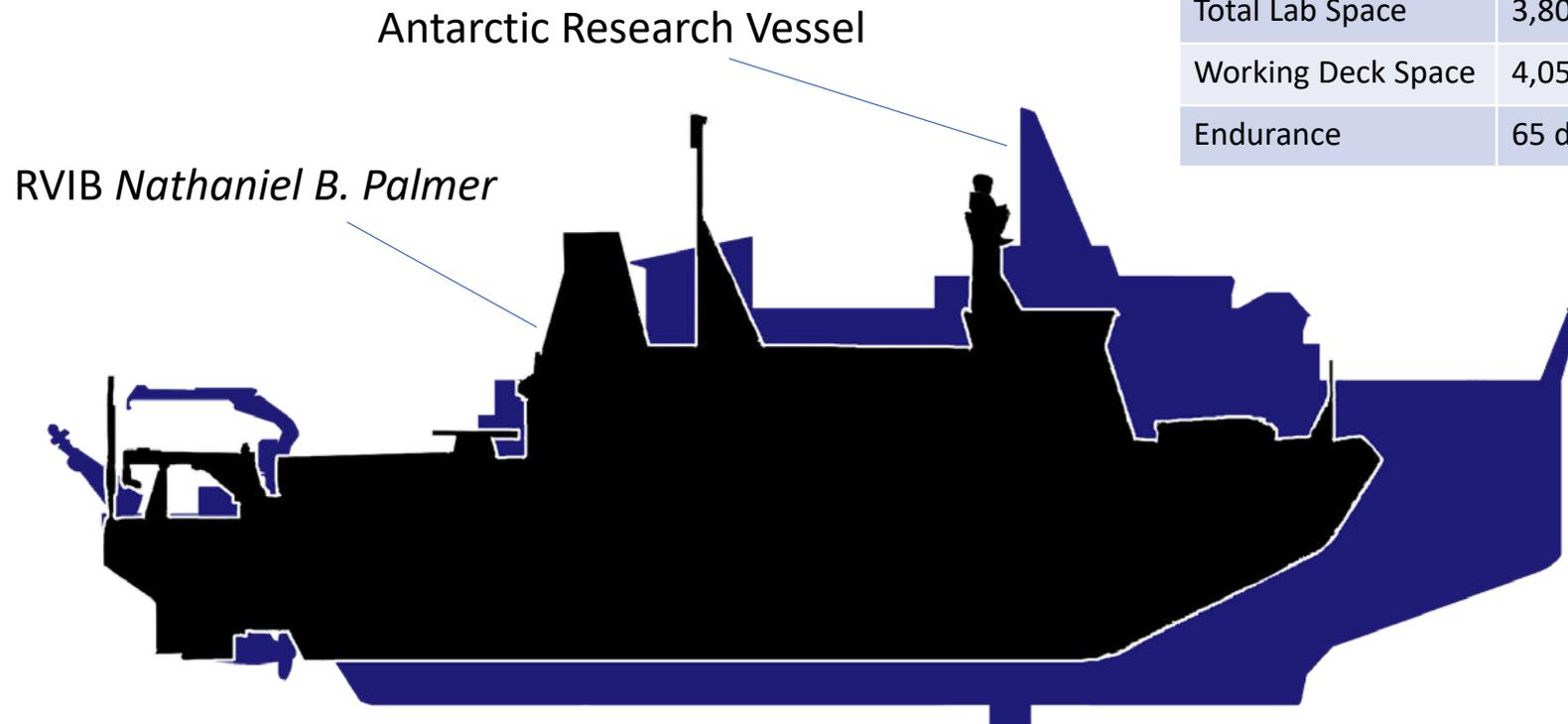
12 January 2023

NSF ARV Team

Stephanie Short, ARV Program Lead

Tim McGovern, ARV Program Manager

Mike Prince, ARV Project Manager



	<i>Nathaniel B. Palmer</i>	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

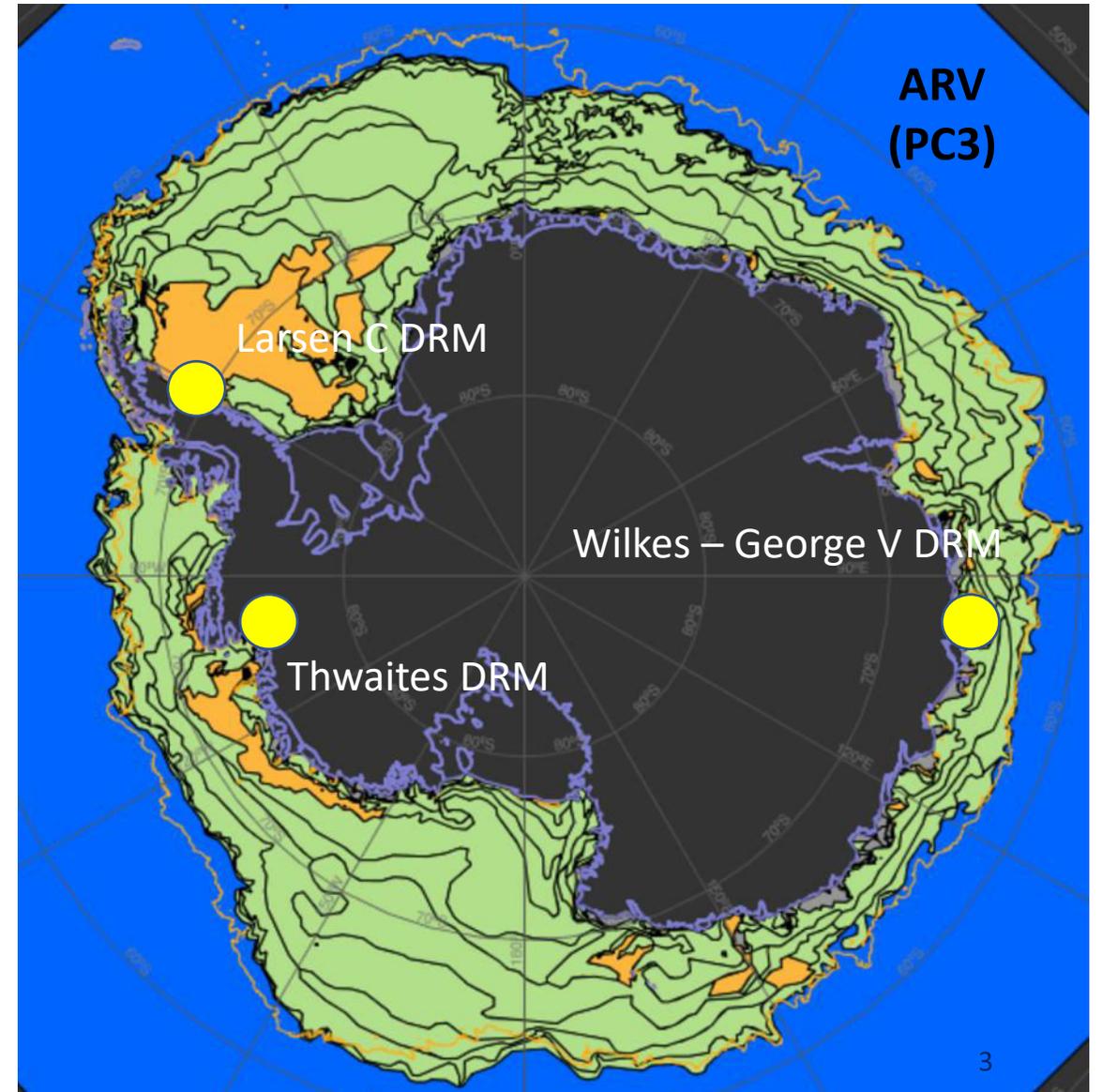
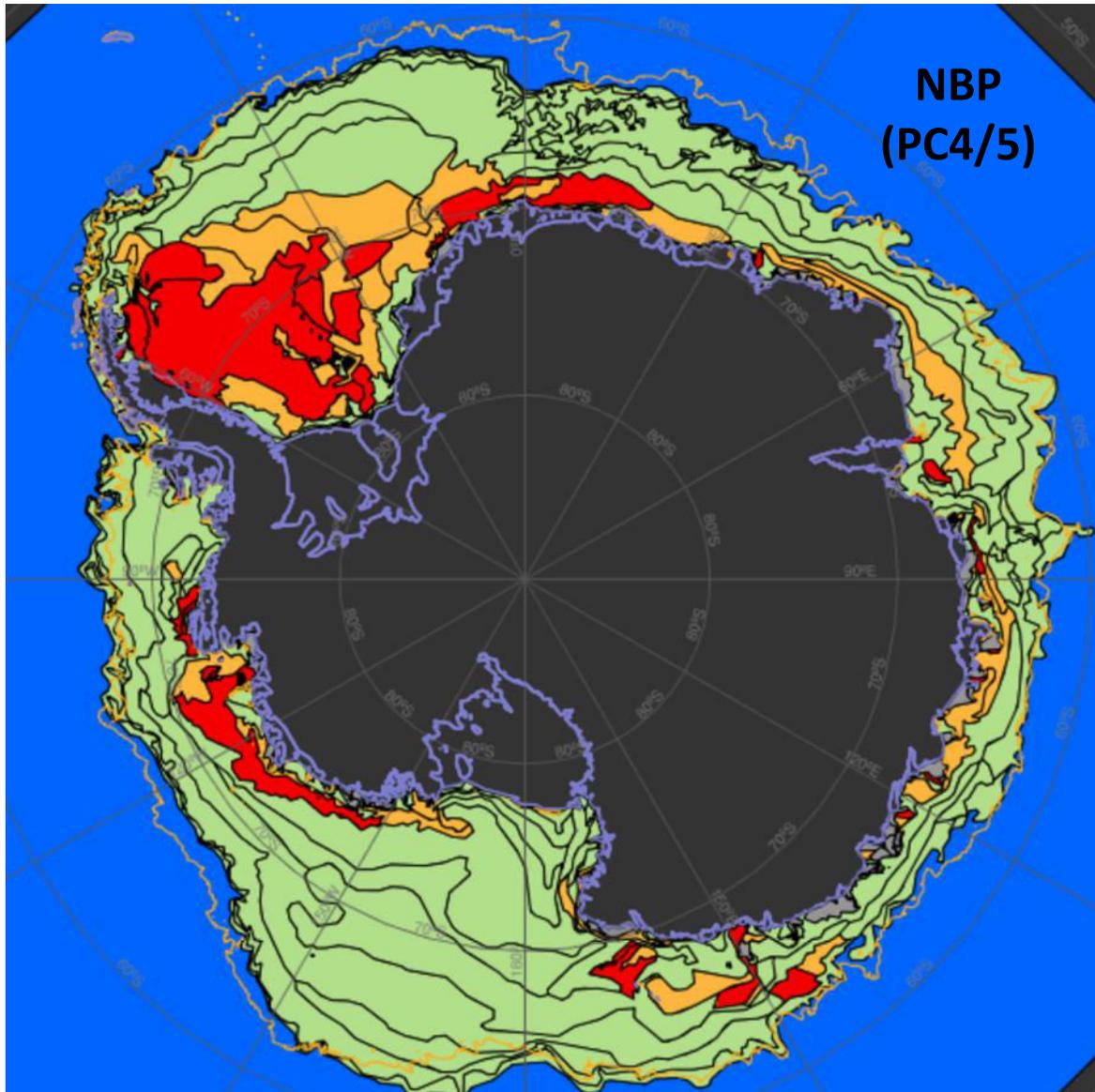
**AND greater icebreaking capability
≥4.5 ft @ 3 kts (Polar Class 3)***

*Key Performance Parameter

PC3 & Icebreaking KPP



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Key Characteristics and Capabilities



LOA	365' (111 m)
LBP	349' (106 m)
Beam (max)	80' (24 m)
Draft	32' 6" (9.9 m)
Displacement (full load w/345 LT SLA)	13,004 LT
Accommodations with one ADA stateroom	55 Science 29 Crew
Range	17,000 nm
Endurance	90 Days
Speed	11-12 kts cruise 14 kts Max

Characteristics

- Large Configurable Labs
- Science Sea Water System
- Baltic Room – CTD Operations
- Science Staging Bay – Back Deck Operations
- UAV/Aviation Deck and forward Hanger
- Marine Mammal and Sea Bird Observation Area (enclosed)
- Science Container Hold (8ea 20' ISO containers)
- Box Keel sonars w/ Ice Windows
- Retractable Center Board (Drop Keel) sonars w/o Ice Windows
- Science Support Small Boats (4)

Capability

- 40m – 50m Piston Coring System
- Coring and Oceanographic Traction Winches
- Primary and Secondary Hydrographic Winches
- CTD Launch and Recovery System (LARS)
- 20 ton Stern and Starboard A-Frames
- 7,000+ sq ft Aft Working Deck
- 170 ft open Starboard Deck
- 8,000+ sq ft Main Deck Lab space

Classification

ABS ✕ A1
Oceanographic

AMS
ILM

ACCU
BWT+

Unrestricted service
CCO-Polar

HAB++(WB)
ENVIRO

ESS-LIBATTERY
HYBRID IEPS

ILM
UWILD

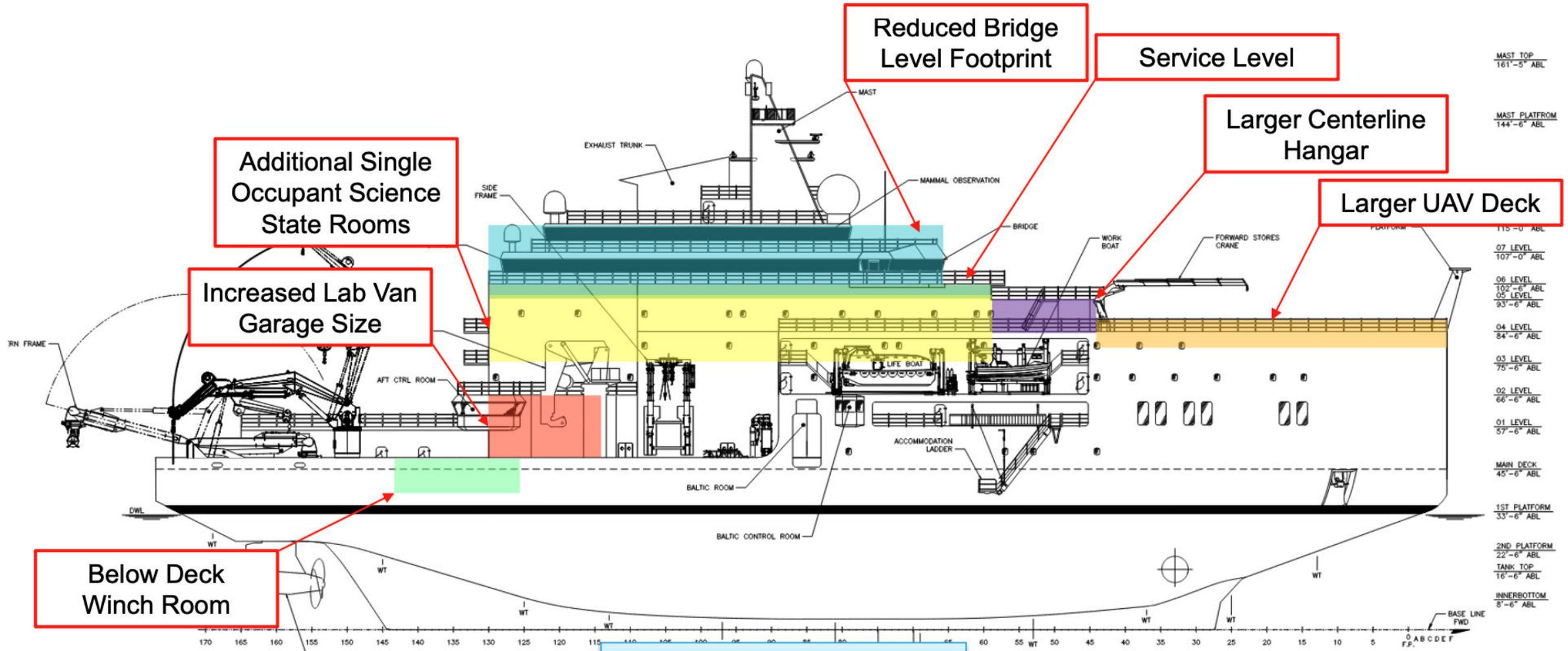
Ice Class
PC3

NIBS

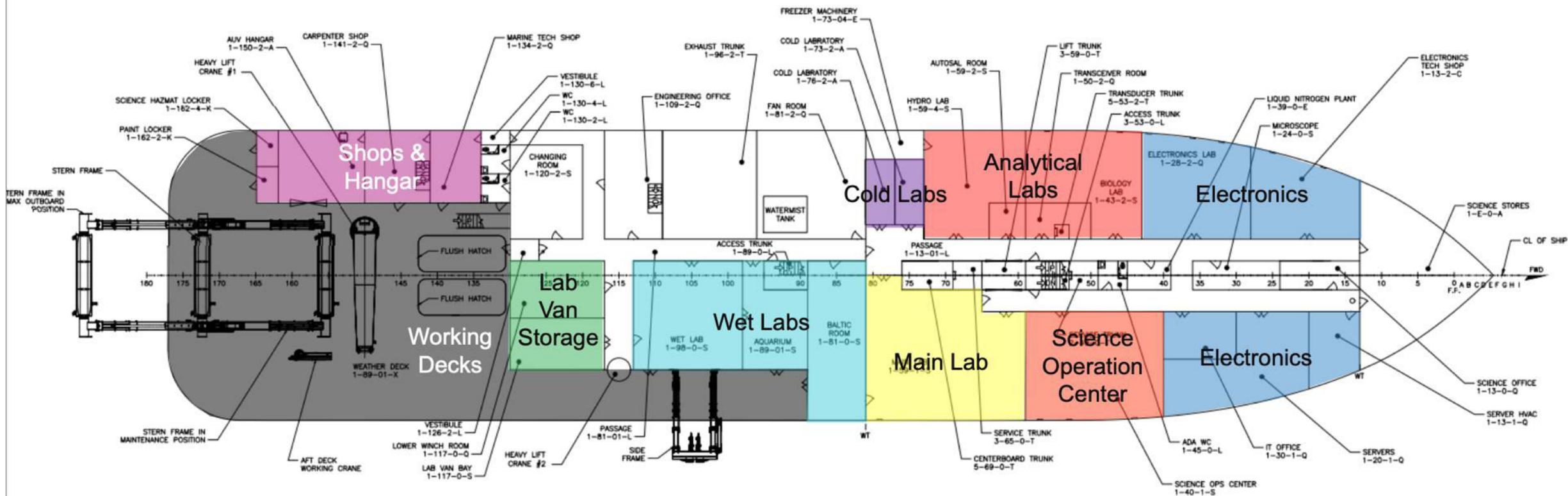
DPS 1

CS 2

General Arrangement – Recent Changes



General Arrangement – Main Deck



Over 7,000 sq. ft aft working deck

Preliminary Design Rendering



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Preliminary Design Rendering



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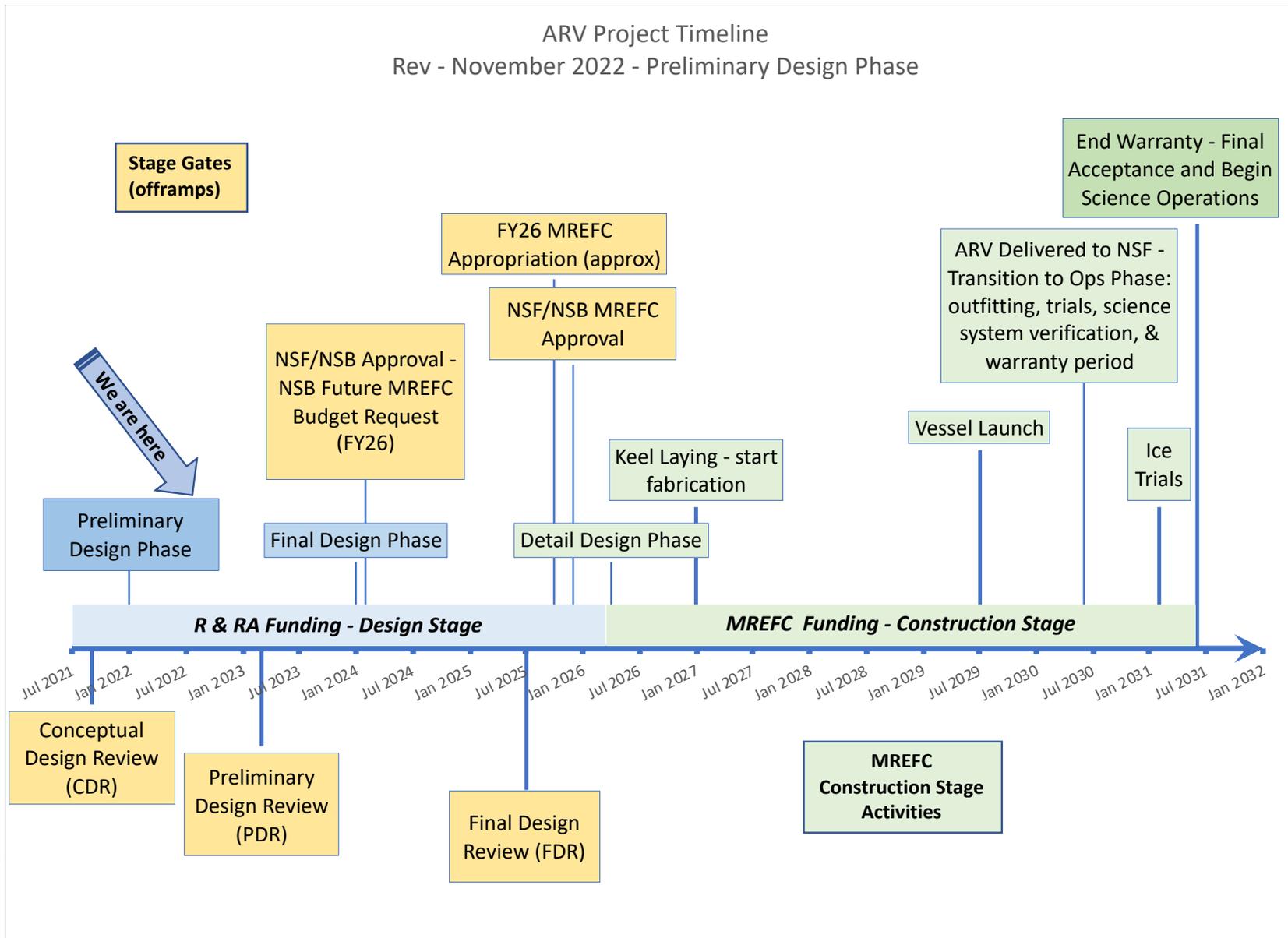
Preliminary Design Rendering



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ARV Schedule

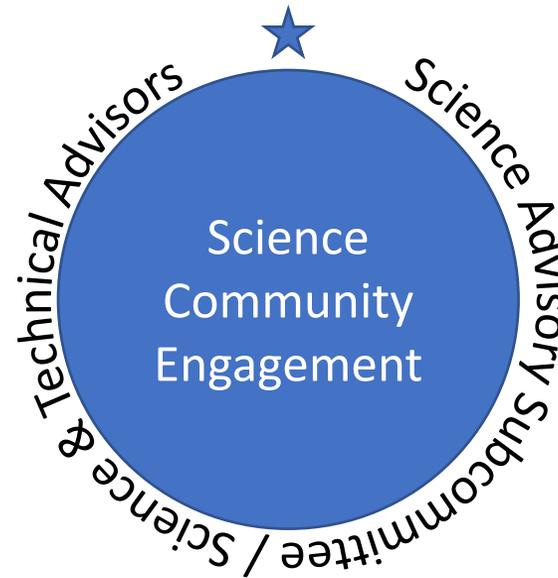


Science & Technical Advisors (STAs)

2-10 individuals

Broad range of scientific & technical backgrounds, including:

- ✓ USCG icebreaker development & operations
- ✓ Naval Sea Systems Command shipbuilding
- ✓ Academic institution researchers
- ✓ Scientific technical managers
- ✓ Research vessel operators



Science Advisory Subcommittee (SASC)

- Dr. Amy Leventer, (Chair) Colgate University
- Dr. Bruce Appelgate, UCSD/Scripps
- Ms. Alice Doyle, UNOLS
- Dr. Carlos Moffatt, Univ of Delaware
- Dr. Patricia Quinn, NOAA/PMEL
- Dr. Clare Reimers, OSU
- Dr. Deborah Steinberg, VIMS
- Dr. Kristin O'Brien, UAF; OPP AC



New Antarctic

Planning for the Next Generation of Oceanographic Research Vessel

Ship Design

Current Science Missions

Key performance parameters, operational requirements, and other information found here.

Science Mission Requirements (PDF)

Placemat

The ARV Preliminary Design Placemat is a key document in the design of the ARV. It lists overall hull dimensions, installation requirements, and other information.

DIMENSIONS

Length Overall	345 ft
Length BP	325.5 ft
Beam Overall	73.5 ft
Beam IWL	72 ft
Draft FLD Load Line	28 ft
Draft Full Load	28 ft
Draft Lightship	27 ft

PERFORMANCE

Open Water	11 kt / 12 kt
Crude	8.5 kt
Quiet	8.5 kt
Ice	
Continuous 3 kt	45 ft
Continuous 6 kt	16 ft
Turning out	4.5 ft
Range	17,000 nm

ACCOMMODATIONS

Ships' Crew	29
Deck	15
Engineering	9
Stowage	5
NSF Science Party	2
ADA Accessible	2
Scientists	30
Wastewater (days)	20 / 40

PROVISIONS

Freeze	90 days
Chill	45 days
Dry	90 days

AVIATION

UAV Launch/Recovery	150 lbs
UAV Hangar	No JP-5
UAV Workshop	

COMMUNICATIONS

HF Transmitter	
C-Band SAIL	
UHF SATCOM	
GNSS	
INMARSAT F	

FOR OFFICIAL USE ONLY May 18, 2022

New Antarctic Research Vessel (ARV)

Planning for the Next Generation of Oceanographic Research Vessel

Documents Library

Concept Design

- Conceptual Design Memo
 - Leidos ARV Conceptual Design Memo
- Concept Design Reports (Glosten Documents)
 - 19136 Concept Design Report
 - 19136 Science Berthing Study Project Memorandum
 - 19136.01 ARV Deck De-icing Systems Study - Status Update 09/29/20
 - 19136.01 ARV Ice Environment Study - Status Update 09/25/20
 - 19136.01 ARV Jumbo Piston Coring Study - Status Update 09/25/20
 - 19136.01 - Manning Study
- Trade Off Studies
 - 19136-000-01 ARV USCG Compliance Study Report
 - 19136-000-02 ARV Propulsor Study Report
 - 19136-000-03 ARV Power Systems Study Report
 - 19136-000-04 ARV Climate Study Report
 - 19136-000-05 ARV Seakeeping Study Report
 - 19136-000-06 ARV Ice Environment Study Report
 - 19136-000-07 ARV Green Ship Alternatives Report
 - 19136-000-08 ARV Autonomous Vehicle Handling Study Report
 - 19136-000-09 ARV Deck De-icing Study Report
 - 19136-000-13 ARV Triple Propulsor Report
- Applicable UNOLS Guidelines and Reports
 - American Disabilities Act (ADA) Guidelines for UNOLS Vessels



What is Future USAP?



Future USAP is a part of the United States Antarctic Program (USAP). Funded by the National Science Foundation, Future USAP is dedicated to long range investments in Antarctic infrastructure.

News and Updates



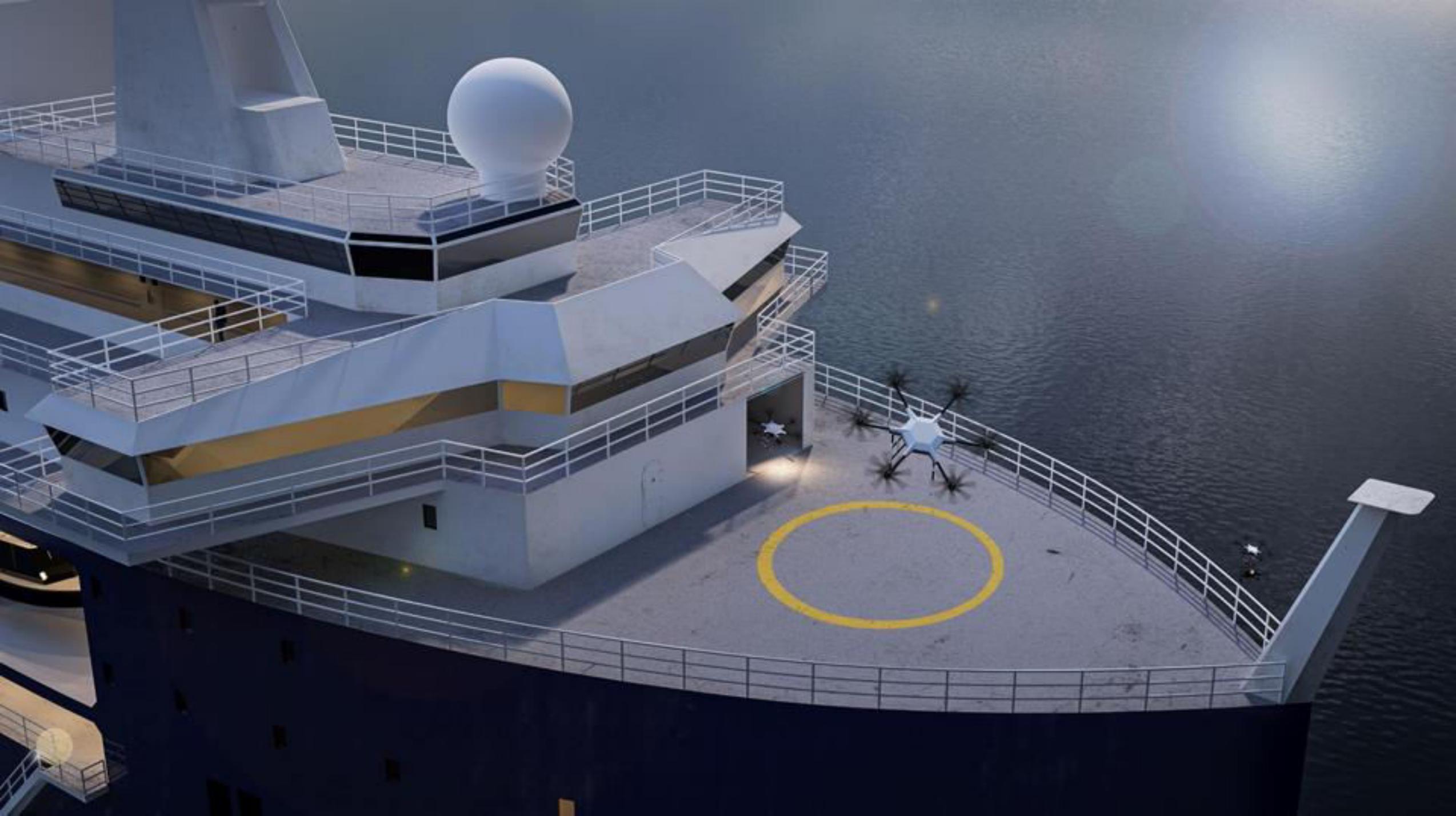
Wednesday July 06, 2022
Construction of New Pier at Palmer Station Now Complete

future.usap.gov/arv

- ❖ ~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
- ❖ Competent approach and highly qualified team









Questions? Comments?