

DIRECTORATE FOR  
GEOSCIENCES

OFFICE OF POLAR PROGRAMS

# Antarctic Research Vessel (ARV)

UNOLS Annual Meeting

17 November 2022

## NSF ARV Team

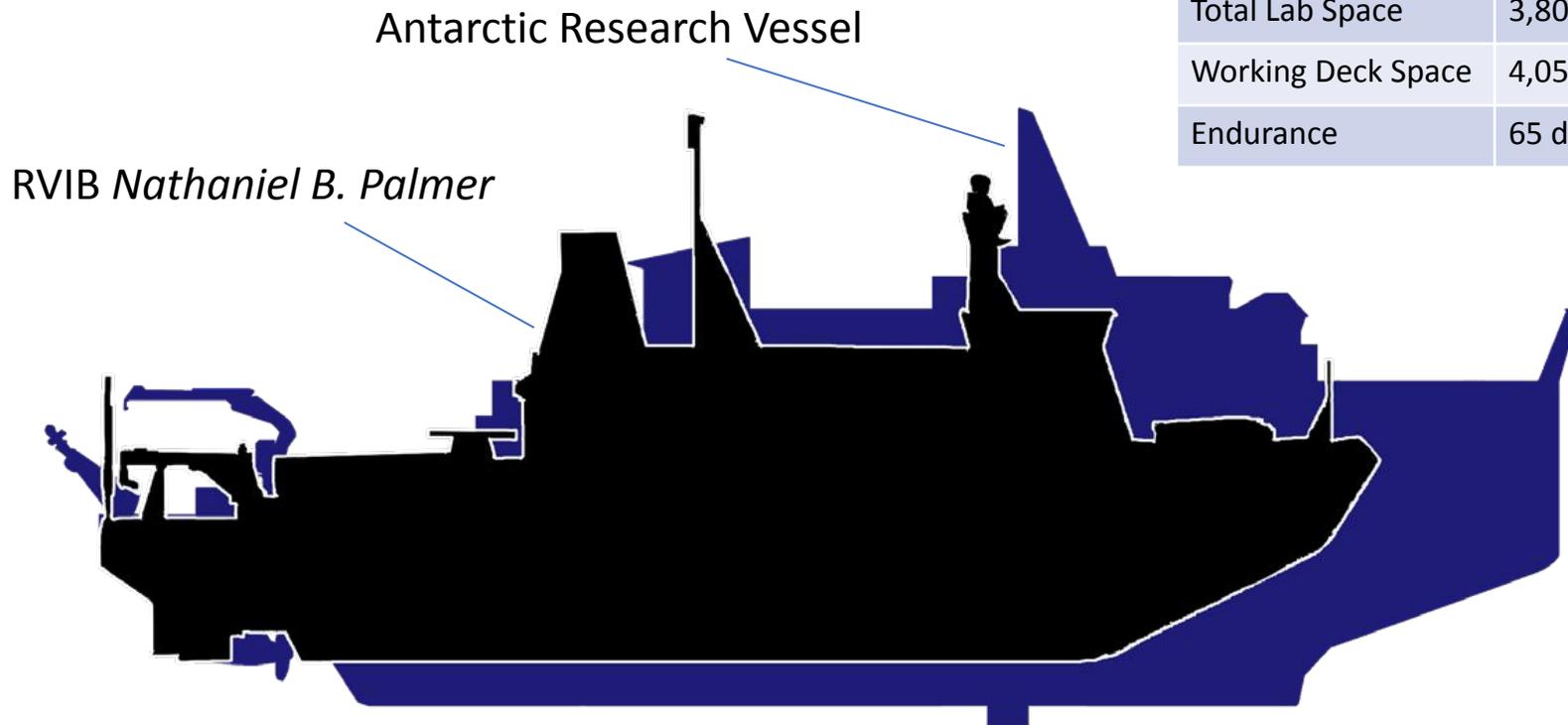
Stephanie Short, ARV Program Lead

Tim McGovern, ARV Program Manager

Mike Prince, ARV Project Manager



National Science Foundation  
WHERE DISCOVERIES BEGIN



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

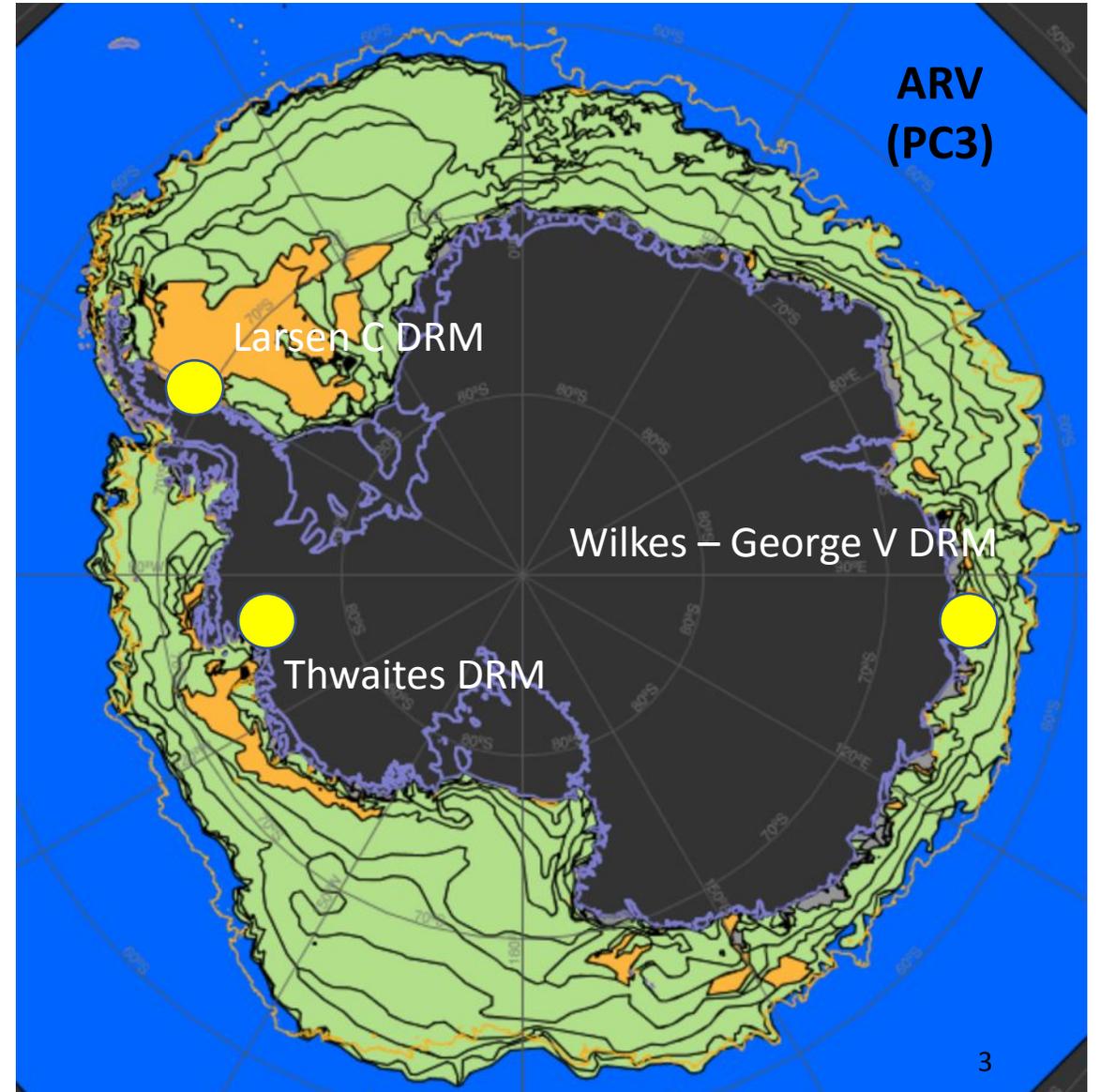
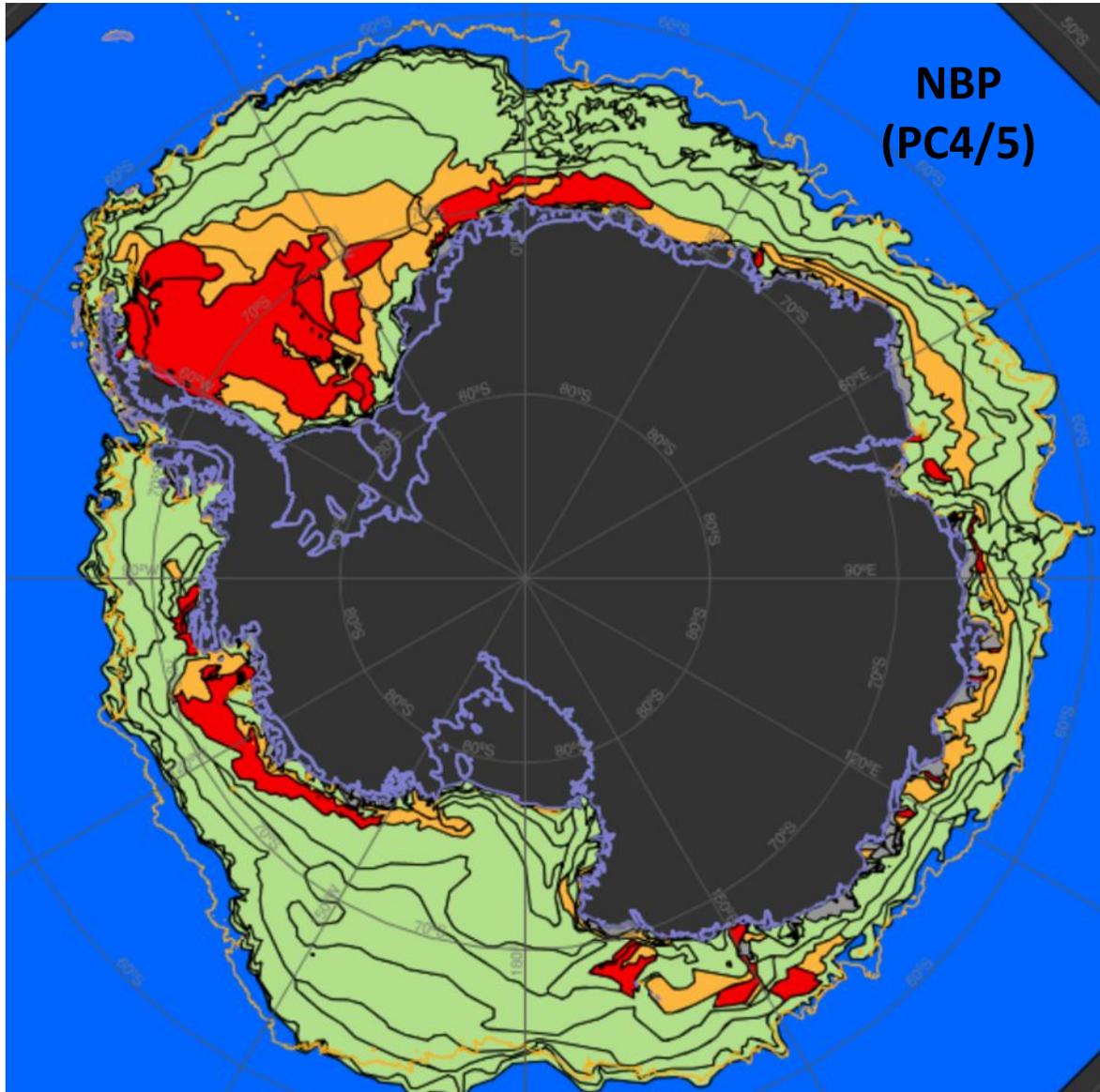
**AND greater icebreaking capability  
≥4.5 ft @ 3 kts (Polar Class 3)\***

\*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

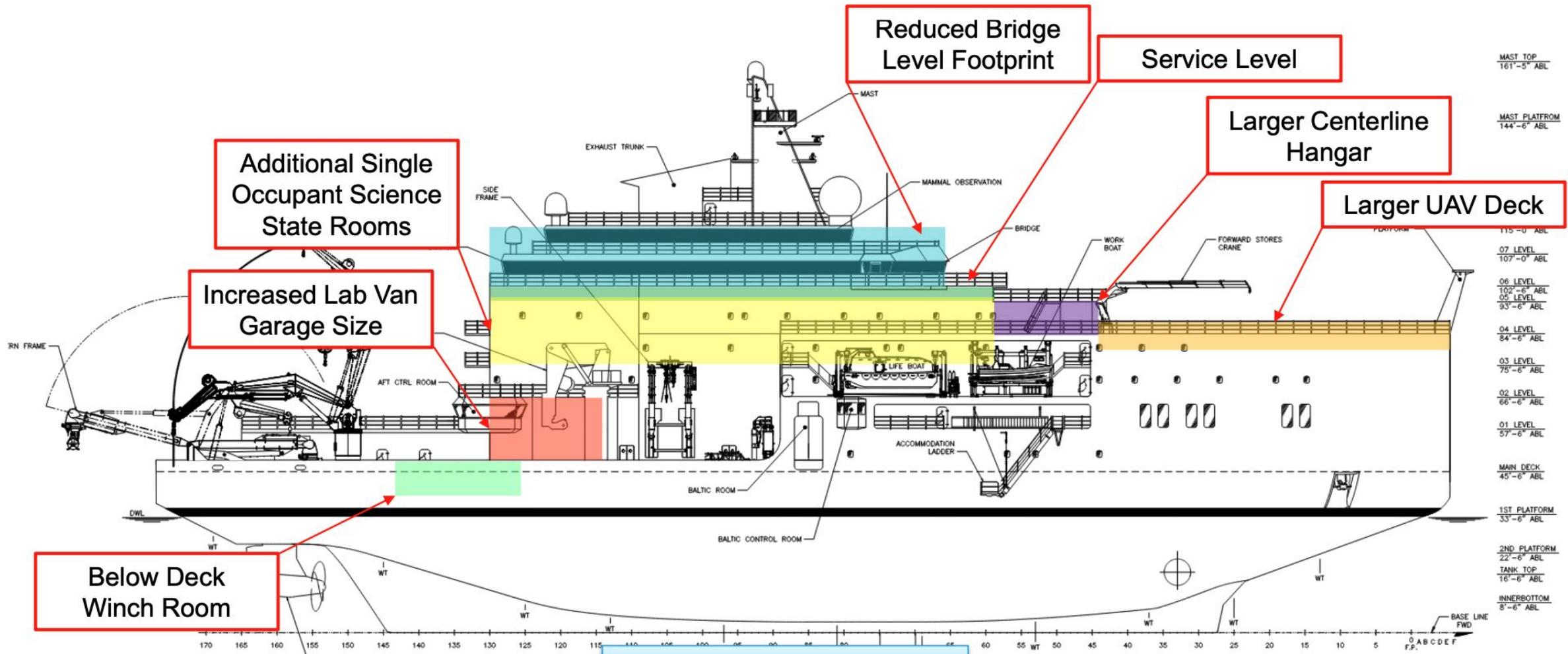
**Ice Class**  
PC3

**NIBS**

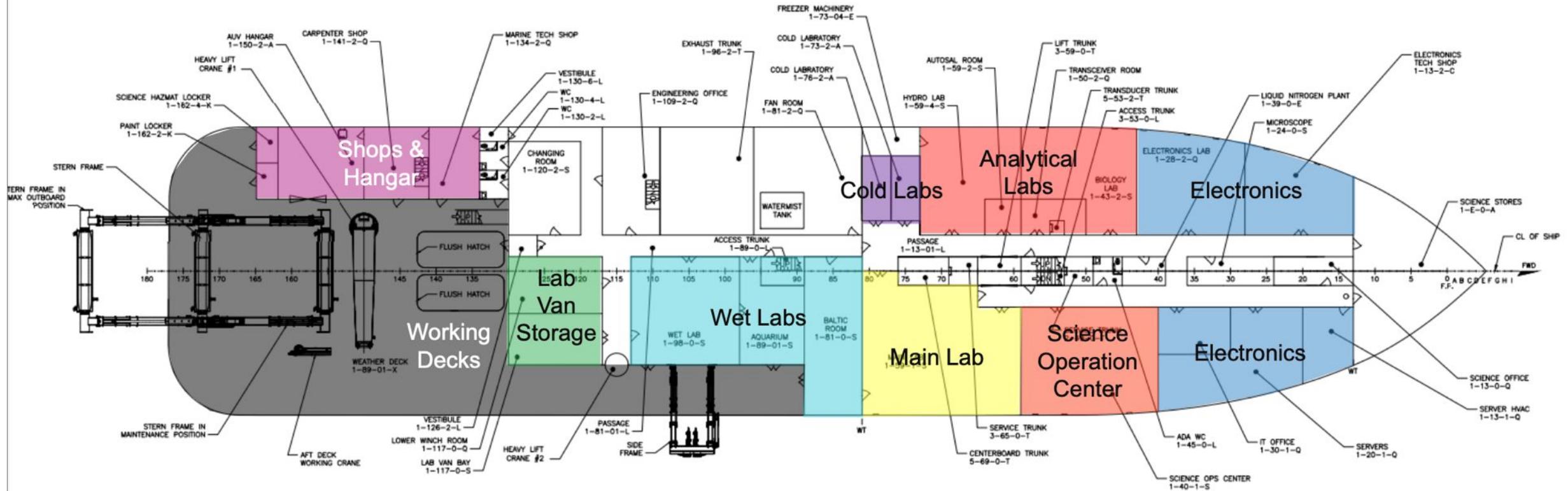
**DPS 1**

**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



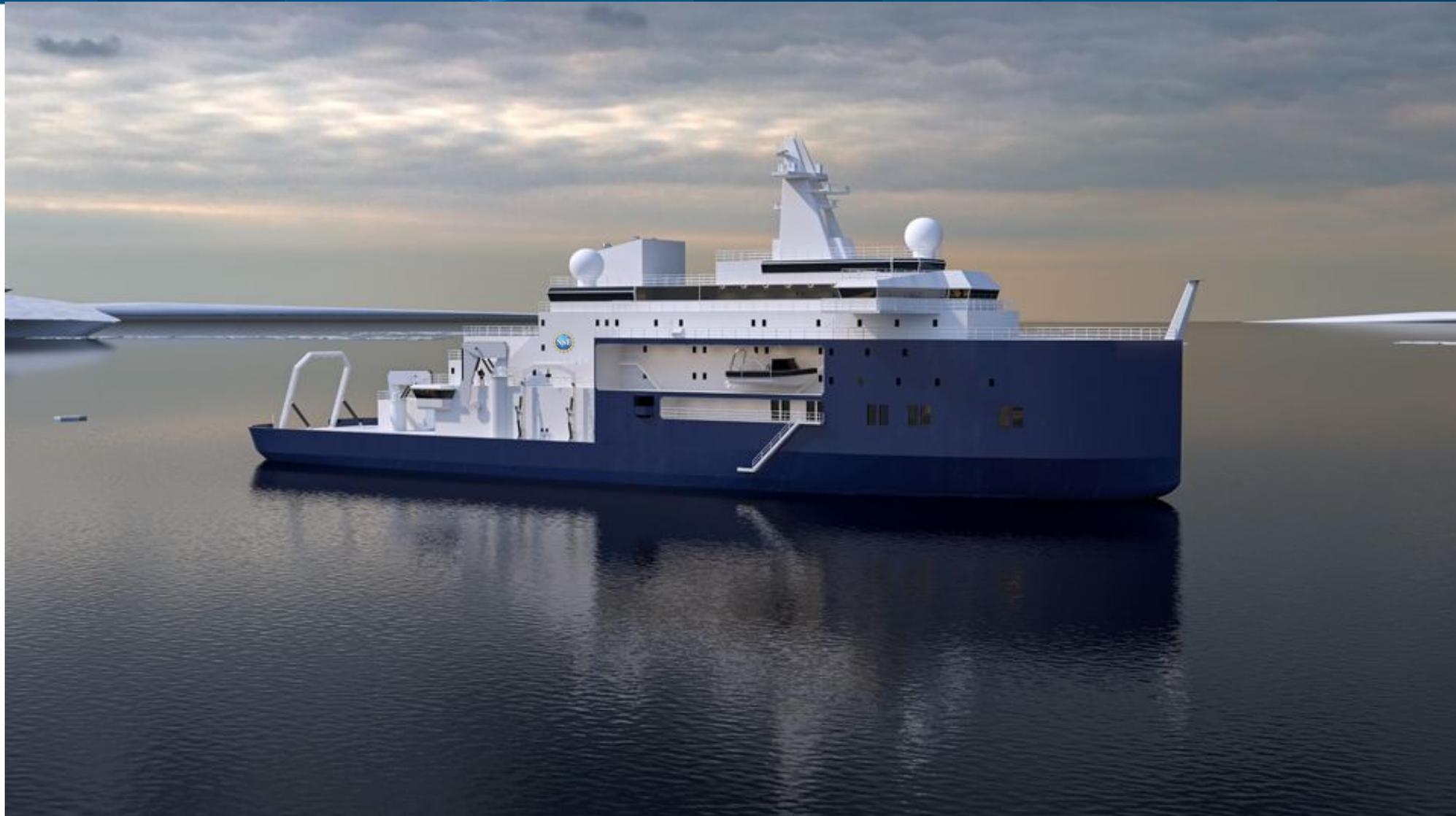
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# Preliminary Design Rendering



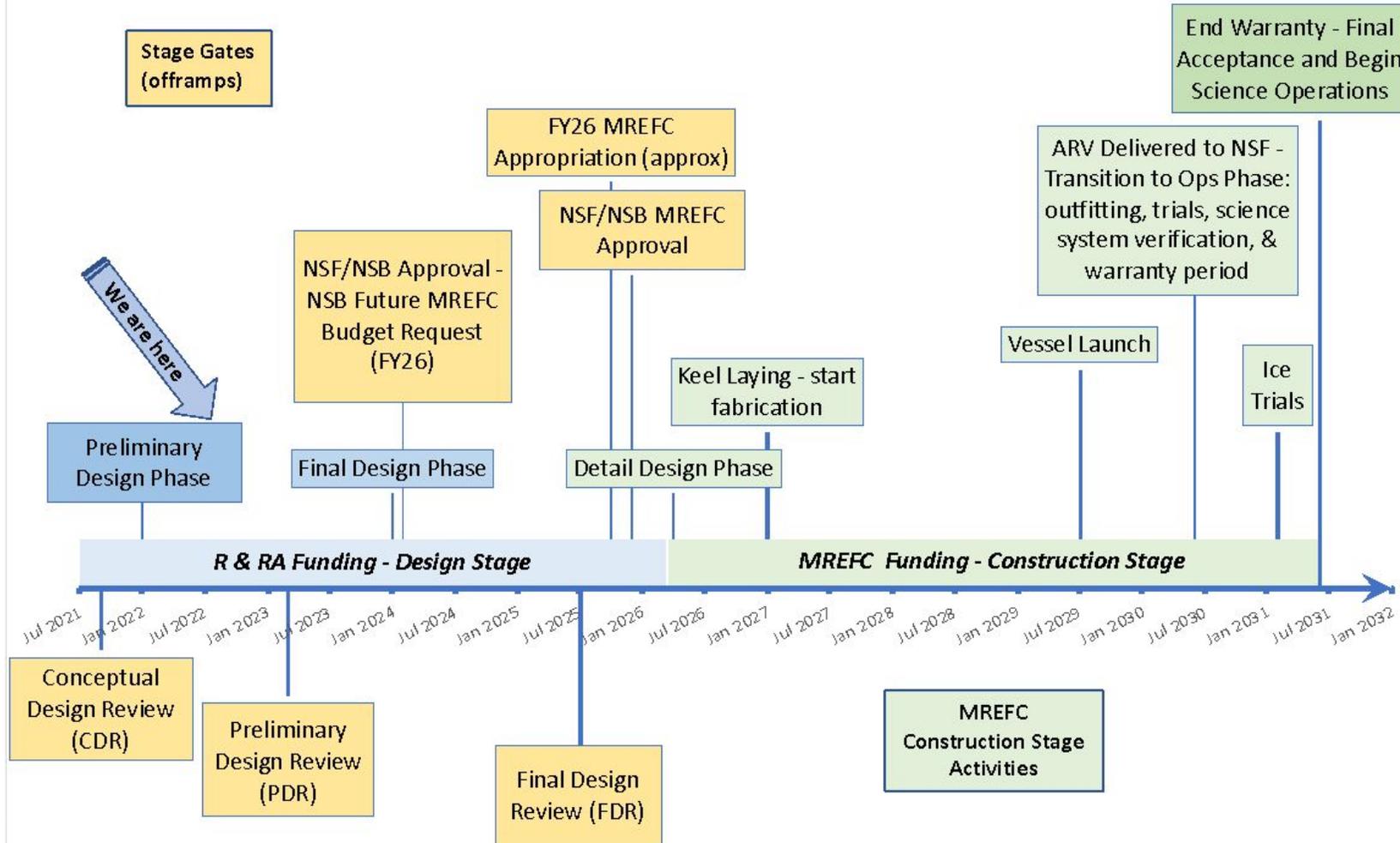
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# ARV Schedule



ARV Project Timeline  
Rev - November 2022 - Preliminary Design Phase

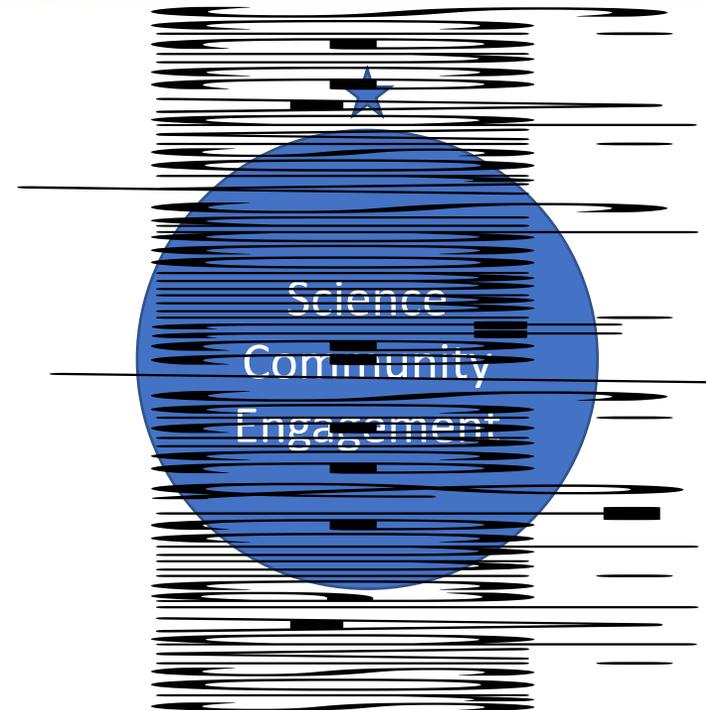


## Science & Technical Advisors (STAs)

2-10 individuals

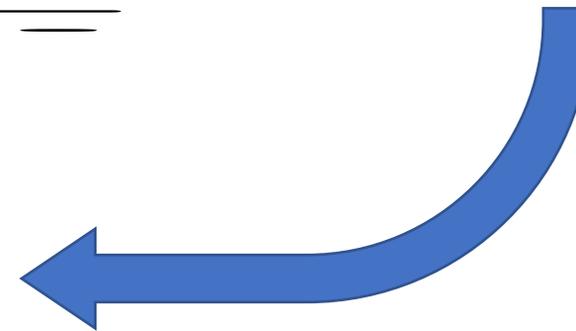
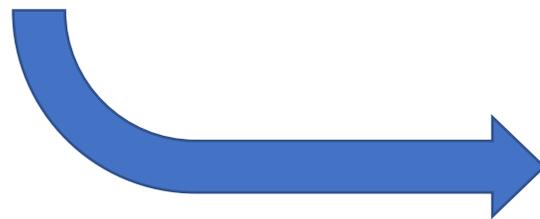
Broad range of scientific & technical backgrounds, including:

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



## Science Advisory Subcommittee (SASC)

- Dr. Bruce Appelgate, UCSD/Scripps
- Ms. Alice Doyle, UNOLS
- Dr. Amy Leventer, Colgate University
- Dr. Carlos Moffatt, Univ of Delaware
- Dr. Patricia Quinn, NOAA/PMEL; AC\*
- Dr. Clare Reimers, OSU
- Dr. Deborah Steinberg, VIMS



## New Antarctic Research Vessel

Planning for the Next Generation of Oceanographic Research Vessels

What's New?

JUL 22, 2021

### New Antarctic Research Vessel

Advanced Icebreaking Research Vessel Development Beginning

[Read More](#)



## New Antarctic Research Vessel

Planning for the Next Generation of Oceanographic Research Vessels

### 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 performance parameter document for the ARV. It lists overall hull dimensions, internal

DIMENSIONS	
Length, Overall	345 ft
Length, BP	325.5 ft
Beam, Overall	73.5 ft
Beam, W/L	72 ft
Draft, FLD, Load Line	28 ft
Draft, Full Load	28 ft
Draft, Lightship	17 ft

PERFORMANCE	
Open Water	11 kt T / 12 kt O
Cruise	11 kt T / 12 kt O
Quiet	8.5 kt
Ice	
Continuous 3 kt	4.5 ft
Continuous 6 kt	1.6 ft
Turning out	4.5 ft
Range	17,000 nm

ACCOMMODATIONS	
Ships' Crew	29
Deck	15
Engineering	9
Stowage	5
NSF Science Party	15
ADA Accessible	2
Scientists	30
Waterwater (days)	20T / 40O

PROVISIONS	
Freeze	90 days
Chill	45 days
Dry	90 days

AVIATION	
UAV Launch/Recovery	150 lbs
UAV Hangar	No IP-5
UAV Workshop	

COMMUNICATIONS & COX	
HF	100 W
VHF	100 W
UHF	100 W
GPS	100 W
INMARSAT F	

Design placemat of the new Antarctic Research Vessel  
Credit: NSF, Leidos Inc.

## New Antarctic Research Vessel (ARV)

Planning for the Next Generation of Oceanographic Research Vessel



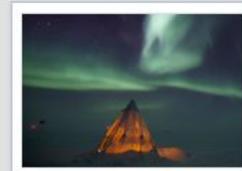
### Documents Library

#### 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](#)

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#### 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



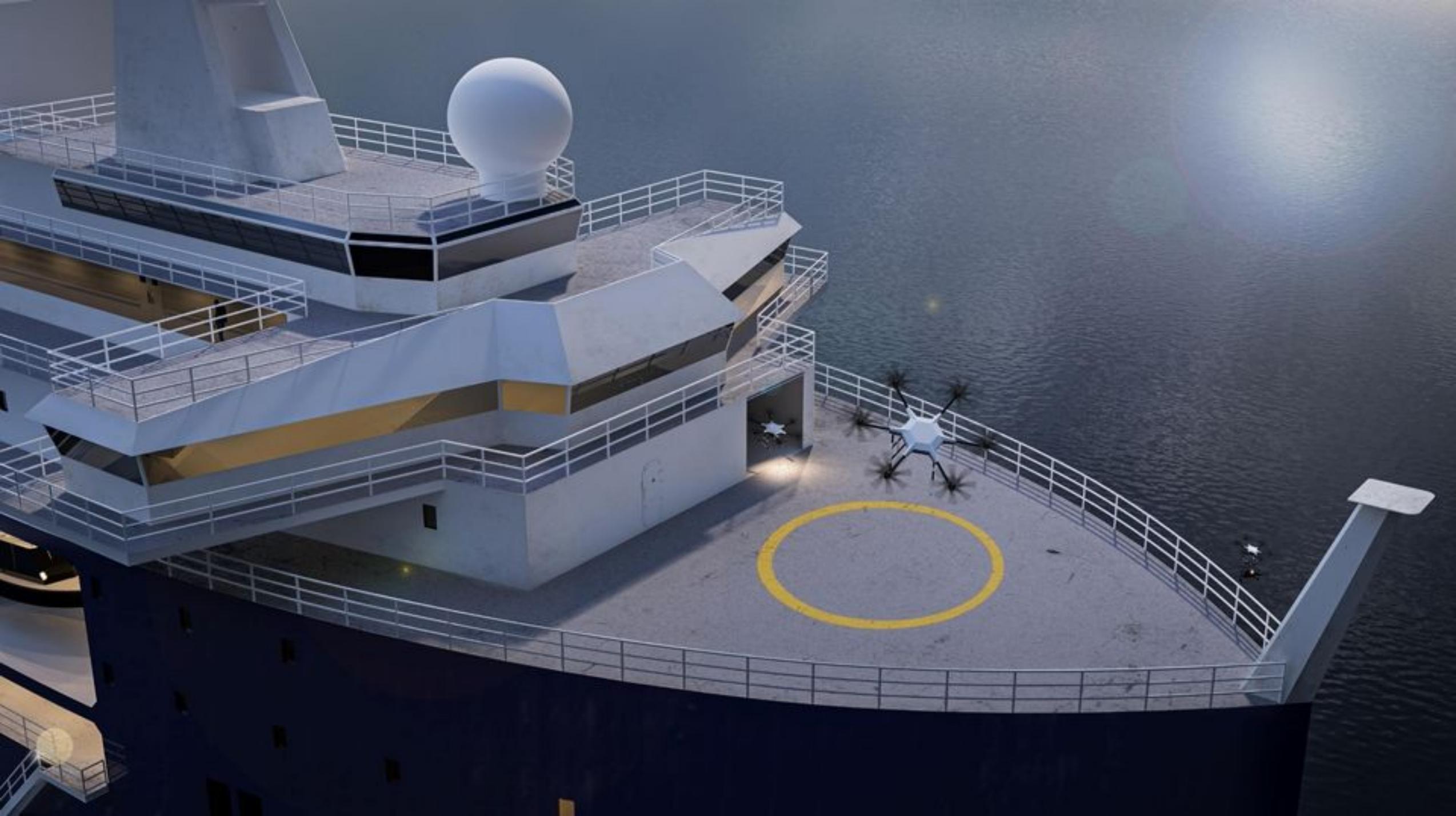
Wednesday - July 06, 2022  
Construction of New Pier at Palmer Station Now Complete

[future.usap.gov/arv](https://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?