

DIRECTORATE FOR GEOSCIENCES
OFFICE OF POLAR PROGRAMS

Antarctic Research Vessel (ARV)

International Research Ship Operators (IRSO) Meeting

Vancouver, BC, Canada 24-26 September 2024

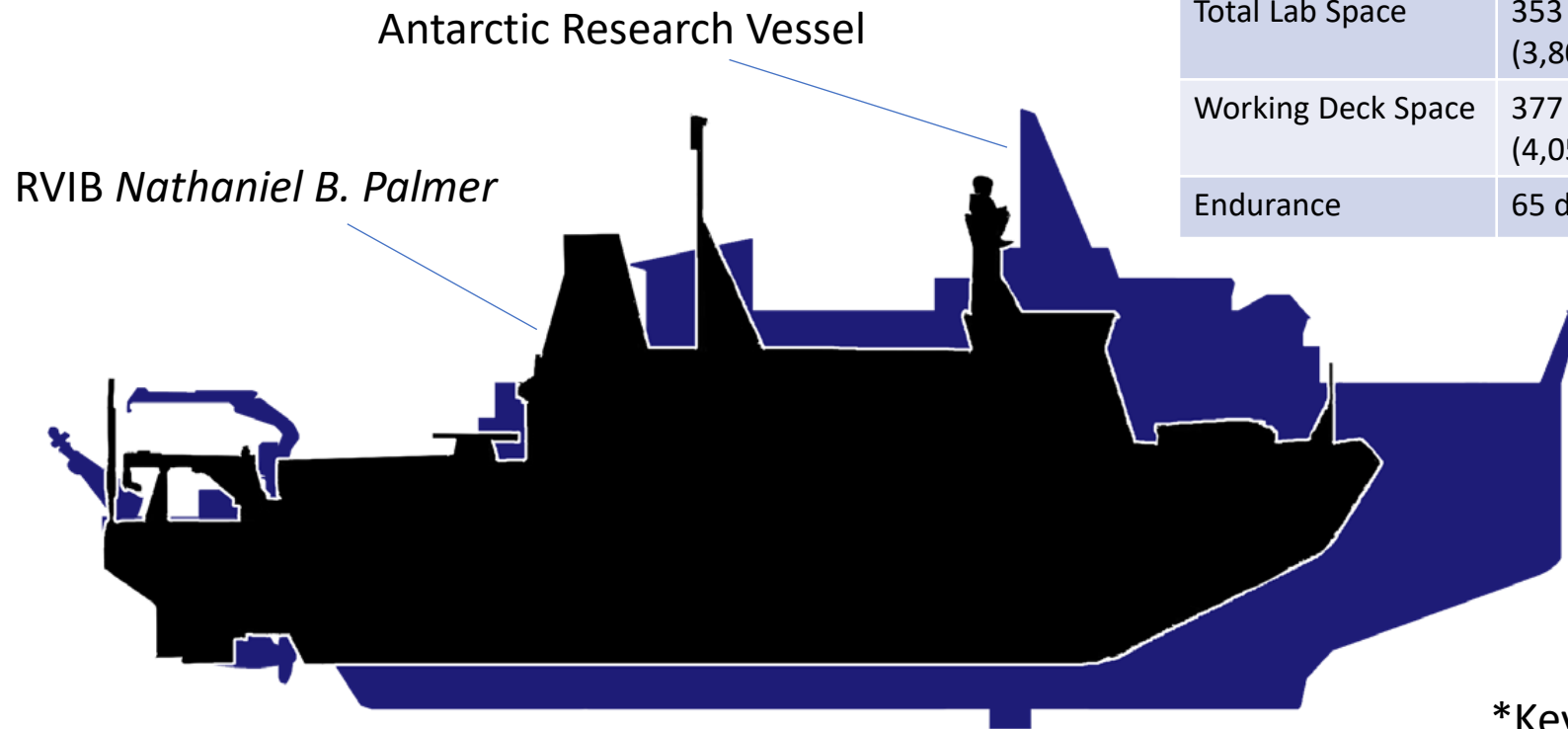
NSF ARV Team

Stephanie Short, ARV Program Lead

Tim McGovern, ARV Program Manager

Caitlin Jarecki ARV Assistant Program Manager (USN PEO Ships)

Mike Prince, ARV Project Manager



	<i>Nathaniel B. Palmer</i>	Antarctic Research Vessel	
Length	94M (309 ft)	111M (365 ft)	Bigger
Sci/Tech Berthing	45	55*	More scientists
Total Lab Space	353 M ² (3,805 ft ²)	418 M ² (4,497 ft ²)	More lab space
Working Deck Space	377 M ² (4,054 ft ²)	669 M ² (7,197 ft ²)	More deck space
Endurance	65 days	90 days*	Longer endurance

**AND greater icebreaking capability
≥ 1.4M (4.5 ft) @ 3 kts (Polar Class 3)***

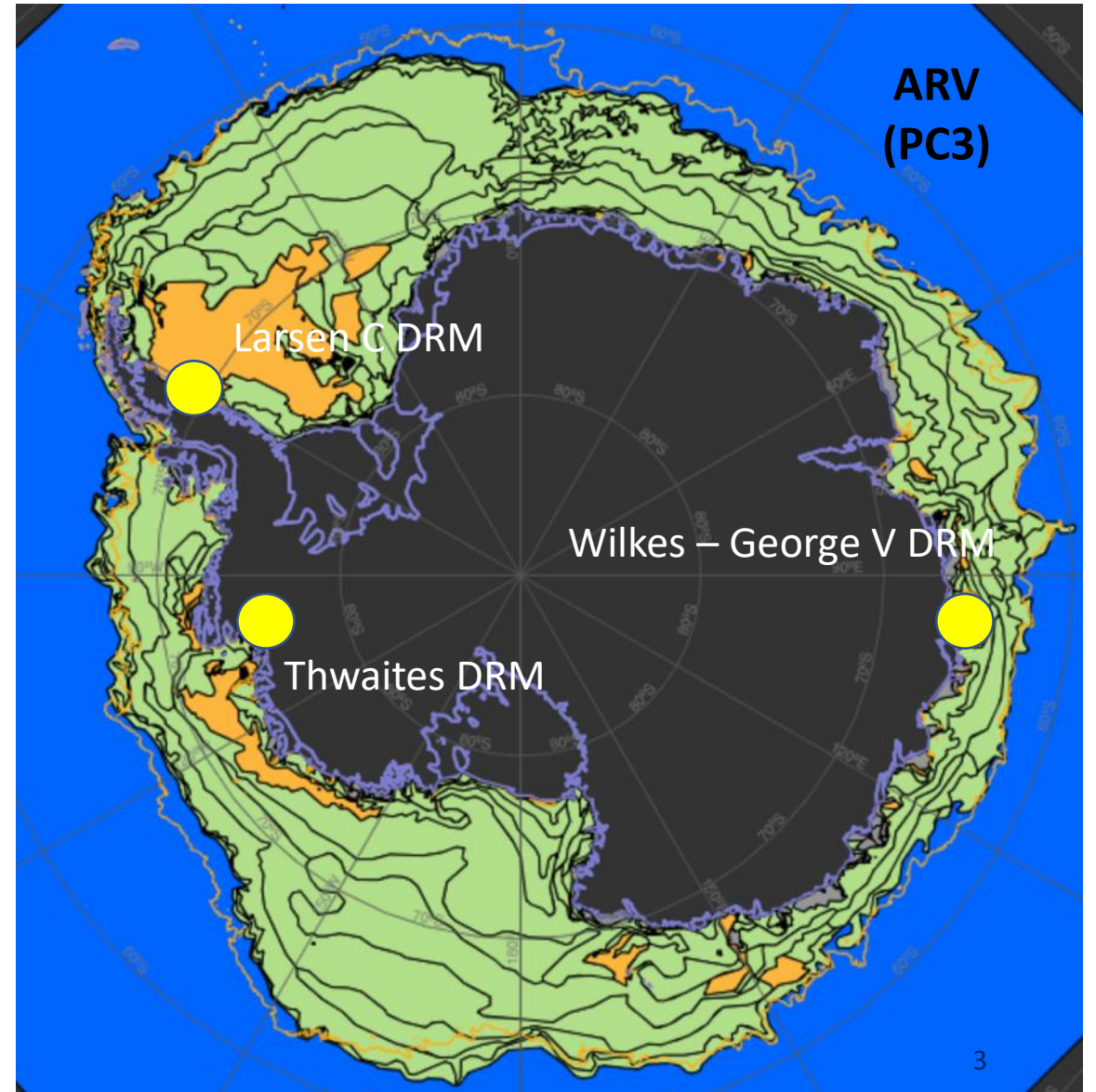
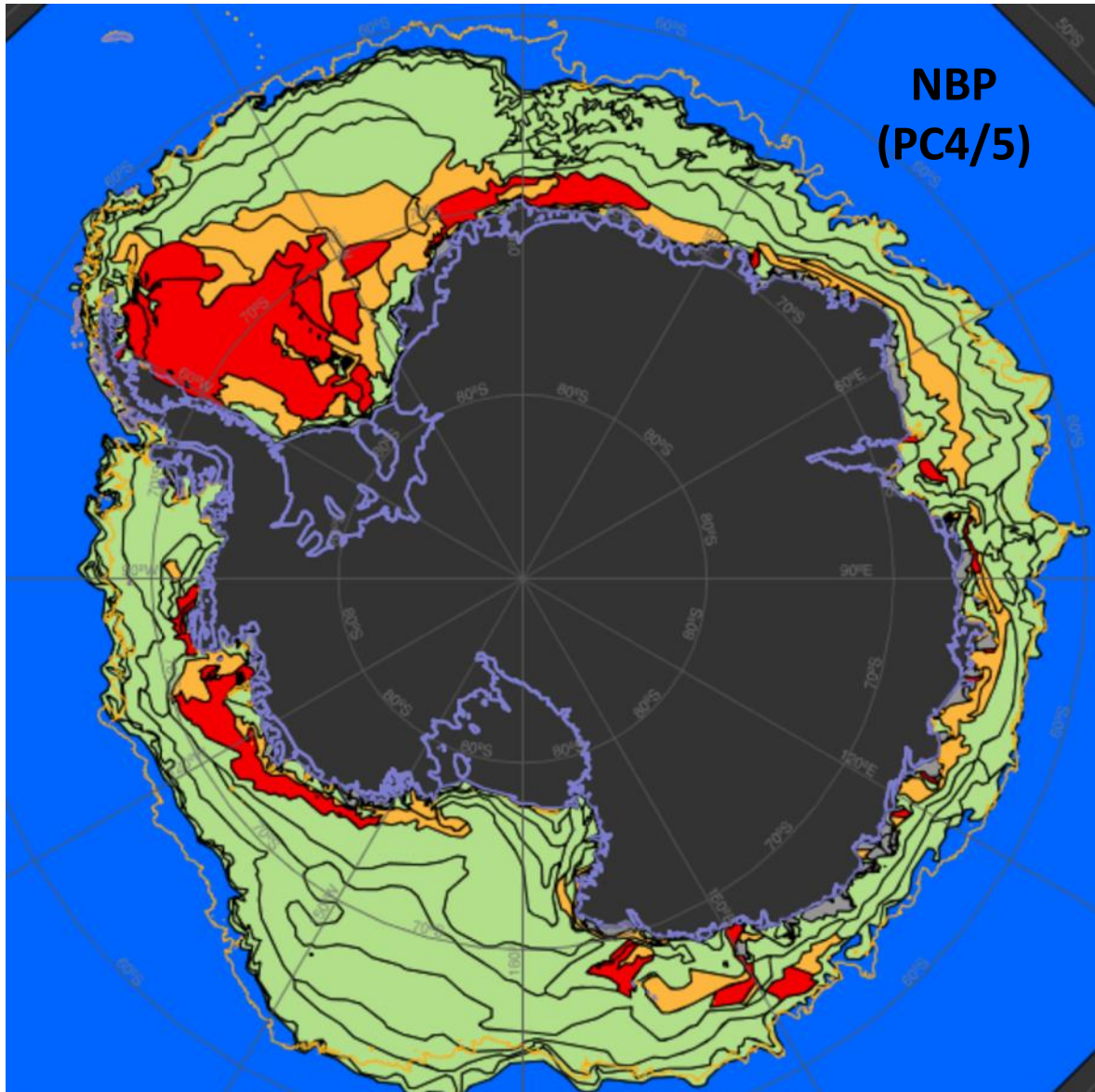
*Key Performance Parameter (KPP)
Current Design & Hull Form meets all KPPs

PC3 & Icebreaking KPP

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



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Model Test Results Showing Ice Management



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

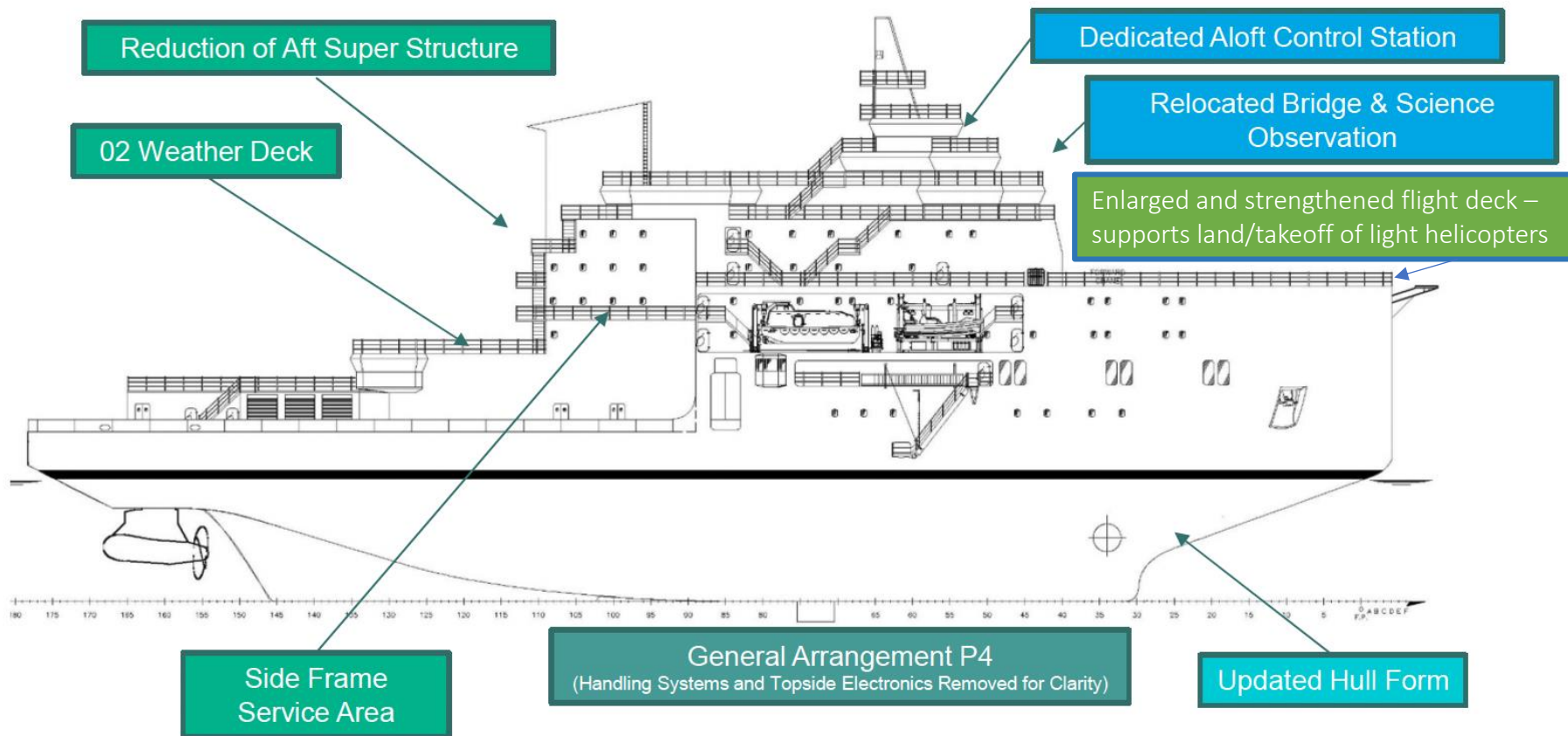


R/V Sikuliaq creating pool
in Ice with thrusters



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

Preliminary Design Rendering



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Preliminary Design Rendering



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Preliminary Design Rendering



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Science Community Engagement



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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. Kristin O'Brien, UAF; GEO AC Rep

Past Members

- Dr. Carlos Moffatt, Univ of Delaware
- Dr. Deborah Steinberg, VIMS
- Dr. Patricia Quinn, NOAA/PMEL
- Dr. Clare Reimers, OSU
- Dr. Bruce Appelgate, UCSD/Scripps

** Seeking nominations for 4 new members*



future.usap.gov/arv

New Antarctic Research Vessel (ARV)

Planning for the Next Generation of Oceanographic Research Vessel

Ship Design

Current Science Mission
Key performance parameters, operational characteristics and science mission requirements found here.

[Science Mission Requirements \(PDF\)](#)

Placemat
The ARV Preliminary Design Placemat is a draft document that lists overall hull dimensions, installed equipment, and other key design parameters.

DIMENSIONS	
Length, Overall	343.0 ft
Length, BP	323.3 ft
Beam, Overall	73.0 ft
Beam, W/C	72.0 ft
Depth, FLD, Low Low	29.0 ft
Depth, Full Load	39.0 ft
Depth, Lightship	77.0 ft

PERFORMANCE	
Open Water	11 kt / 124 OZ
Crude	9.4 kt
Sea	4.0 kt
Continuance 3 kt	1.0 hr
Continuance 4 kt	1.0 hr
Turning radius	17,000 feet

ACCOMMODATIONS	
Ships Crew	29
Deck	13
Engineering	9
Stowaway	9
NSF Science Party	2
ADA Accessible Scientists	50
Wastewater (days)	307 / 400

PROVISIONS	
Freeze	90 days
Chill	45 days
Day	90 days

AVIATION	
UAV Launch/Recovery	150 lbs
UAV Storage	500 lbs
UAV Workshop	100 sq ft

COMMUNICATIONS	
HF Transmitter and Receiver	1
C-Band SATCOM	1
UHF SATCOM	1
GNSS/DGPS	1
INS/MARSAT F	1

AUXILIARY SYSTEMS	
A/C Plant	1
Fire Suppression	1
Refrigeration	1
Fuel Cargo Capacity	40,000 gal

FOR OFFICIAL USE ONLY May 18, 2022

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

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

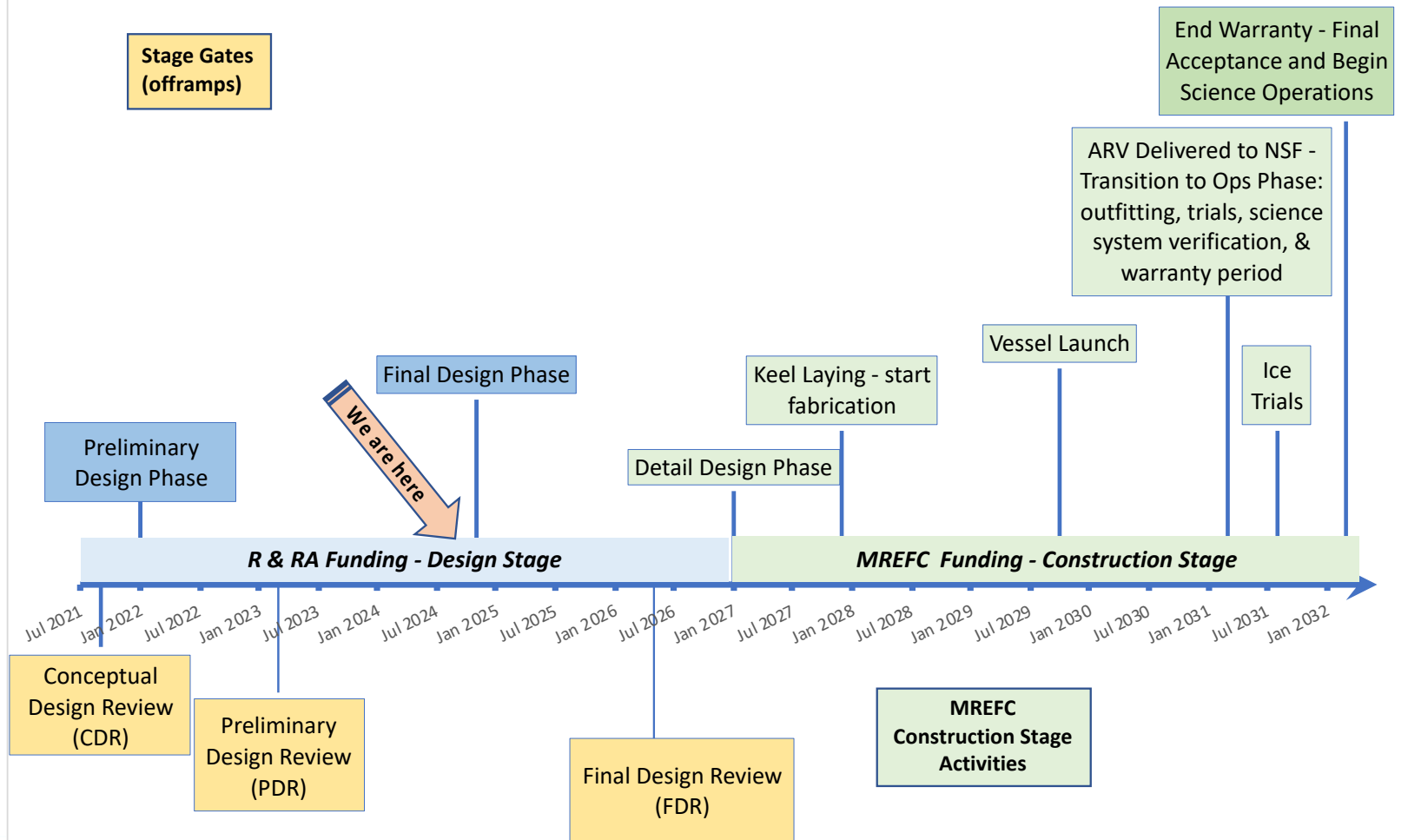
Wednesday July 6, 2022
Construction of New Pier at Palmer Station Now Complete

Current drawings and reports including SASC Reports

ARV Schedule



ARV Project Timeline - Rev - September 2024
Draft Reflecting a ~10 month delay in start of Final Design Phase to Late 2024



Next Steps:

- RFP and Selection of the Vessel Integrator to complete the project. (CY 24)
 - **RFP Closed 4/22/24**
- Final Design Phase (CY 24-26)
- Final Design Review (CY 26)
- Appropriation and Approvals to start Construction Stage (Late in CY 26)

- ❖ ~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

Questions?

