



Science Community Input for the Antarctic Research Vessel



Vessel design characteristics (*key performance parameters)	R/V Nathaniel B. Palmer	2006 Antarctic Research Vessel Oversight Committee (ARVOC) Polar Research Icebreaker Study	2012 UNOLS Polar Research Vessel (PRV) Final Report	2016 NSF Research Vessel Icebreaker RFI	2019 OPP Advisory Committee Ad Hoc Subcommittee Survey & Recommendation	New 2020-2022 ARV Design
CRITICAL CHARACTERISTICS						
*IACS Polar Class	~PC5/PC4	~PC3	~PC3	PC3	PC4/PC3	PC3
*Icebreaking	~3' ice @ 3 kts single hull	4.5' ice @ 3 kts	4.5' ice @ 3 kts Double hull	4.5' ice @ 3 kts Double hull	3 - 4.5' ice @ 3 kts > 90 days	4.5' ice @ 3 kts Double hull
*Endurance	65 days	80 days	90 days	70-90 days	70-90 days	≥ 90 days
*Science/Technical Personnel	39-45	50	45 science	45 - 55	45 - 55	≥ 55
Range	15,000 nm	20,000 nm	25,000 nm	17,000 nm	17,000 nm	17,000 nm
IMO Polar Code Compliance	"grandfathered"					Full Compliance
GENERAL SPECIFICATIONS						
Length	308'	393'	380'	328'		345'
Beam	60'		75'			69'
Displacement	6,800 LT	13,900 LT	~11,000 LT			~10,500 LT
Transit Speed	≥ 10 kts open water		12 kts open water	11 kts ice-free water	≥ 11 kts open water	≥ 11 kts open water
Main Propulsion	variable pitch prop				Z-drives	Azimuthal drives
Propulsion Horsepower	~9.5MW (12,720 HP)	22,400 HP	~16.8 MW (22,400 HP)			11 MW (14,500 HP)
Dynamic Positioning	DPO				DPS-0 - DPS-1	DP-1
Anti-roll Systems	2 pair				Passive or active, SS5	Active U-Tube, SS5
Green Technologies	None		Yes		Yes	Hybrid Electric
SCIENCE OUTFITTING						
Lab Area	4,380 ft2			5,700 - 6,500 ft2	5,700 - 6,500 ft2	≥ 5,900 ft2
Working Deck	4,000 ft2			4,500 - 5,500 ft2	4,500 - 5,500 ft2	≥ 6,100 ft2
Deck Heating System	main deck					Main/UAV decks
On-deck Incubators	Yes		Yes		Yes	Yes
Science Foremast	None				Yes	Yes
Science Reefers/Climate Control	2 walk-in freezers		Built-in		2 spaces, 1 science walk-in freezer	2 walk-in cold rooms
Transducers	Deep water multibeam, ADCPs, bioacoustic, sub-bottom		Deep and shallow water multibeam, ADCPs, bioacoustic, sub-bottom		Deep, mid & shallow multibeam systems; ADCPs, USBL, bioacoustic	Deep and mid-water multibeam, ADCPs, bioacoustic, sub-bottom
Centerboard		Box Keel	Box Keel		Drop Keel & Box Keel	Drop Keel & Box Keel
Underwater Radiated Noise			"acoustically quiet"			Modified ICES 2009
Vans/Containers	7 cargo, 7 science	5-6	5-6	15-20	>15 (20-24)	≥ 15 science, 20-24 total
Science Workboat	One 20' RHIB				1-2: 20' RHIBS 1: 30' Instrumented Landing craft	Two 20'-30' RHIBS One 30' Instrumented Survey Boat & One 25-30' Landing Craft
ADA Compliance	None		Limited		As feasible	Yes, as feasible
SCIENCE WINCHES/WIRE						
Hydro winches	Two - 10km		Two - 10km		Two - 10km	One 10km
CTD winches	10km		10km		10km	One 10km
Oceanographic winches	10km		10km		12km	Two Traction 7km - 12km
LOAD HANDLING SYSTEMS						
CTD Lars					Yes, in Baltic Room	20k SWL in Baltic Room
Stern A-frame	20 tons				Yes, 180deg range	40k SWL, 180 deg range
Side Frame	20 tons				Yes	40k SWL Stbd Side
GEOPHYSICAL SYSTEMS						
Coring Capability	24m JPC	50m - 80m JPC			30m - 50m JPC	30m - 50m Piston Core
Seismic Capable	Yes, multi-channel				Yes	Yes, multi-channel
CRANES						
Foredeck	5,000lbs capacity				20,000lbs capacity	20,000lbs capacity
Midship	None				4,000lbs capacity	4,000lbs capacity
Aft Deck	50,000lbs capacity				50,000lbs capacity	One @ 25k lbs & One @ 62k lbs capacity in port; 20k & 30k lbs in SS5
WORKSPACES						
Unmanned Aerial Vehicles (UAV)	None					Yes
Electronics Shop (ET)	Yes				Yes	Yes
Autonomous Underwater Vehicles (AUV)	None					Yes
Marine Technician Shop (MT)	Yes					Yes
DESIGN COMPROMISES						
Moonpool	72", unused	~3m x 4m	4m x 4m; dry pumped		4m x 4m; dry pumped	Eliminated by NSF
Helicopter Support	Yes		Bell 412, Sikorsky S-70 or USCG HH60		Two Bell 412, Sikorsky S-70 or USCG HH60	VERTREP Only (vertical replenishment)