

Polar Research with The Korean 2nd Icebreaker

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Abstract

Originally, the next-generation icebreaker research vessel was scheduled to be launched in 2027. South Korea built its first icebreaker, Araon, in 2009, establishing its capability for independent research in the Arctic and Antarctic, but it was challenging to manage explorations in both the Antarctic and Arctic with just one icebreaker. After more than 15 years since Araon's construction, there are voices calling for a new icebreaker. South Korea, through the Korea Polar Research Institute, plans to launch the 2nd polar research vessel in 2030, built by Hanwha Ocean, with a 2029 completion date, significantly enhancing polar research by extending the range to the North Pole and increasing research days. This larger, more powerful vessel will feature an LNG dual-fuel system and advanced icebreaking capabilities to handle 1.5meter thick ice, and will help establish Korea's role in the era of the Northern Sea Route. The new icebreaker research vessel is designed to have a displacement of 16,560 tons, which is double that of the existing Araon, which has a displacement of 7,507 tons. It can use both low-sulfur diesel and liquefied natural gas, enabling environmentally friendly operation. While Araon could break through 1 meter thick ice, the new icebreaker is designed to break through ice as thick as 1.5 meters.

Araon vs 2nd Icebreaker

	Araon	Next Generation IBRV
Ice-breaking Capability/Winterization	1m / 3 knots (-35°C)	1.5m / 3.3 knots (-45°C)
Space Efficiency	Fixed Research Equipment	Modular Research Equipment
Building Cost	108 Billion KRW	277 Billion KRW
Gross Tonnage	7,507	Abt. 16,560
Dimension (m)	111 x 19 x 7.5 (LxBxD)	140.8 x 25 x 13 (LxBxD)
Endurance	70 Days	75 Days
Features	-	Moon Pool, MGO-LNG Dual Fueled
Photo		

2nd Icebreaker



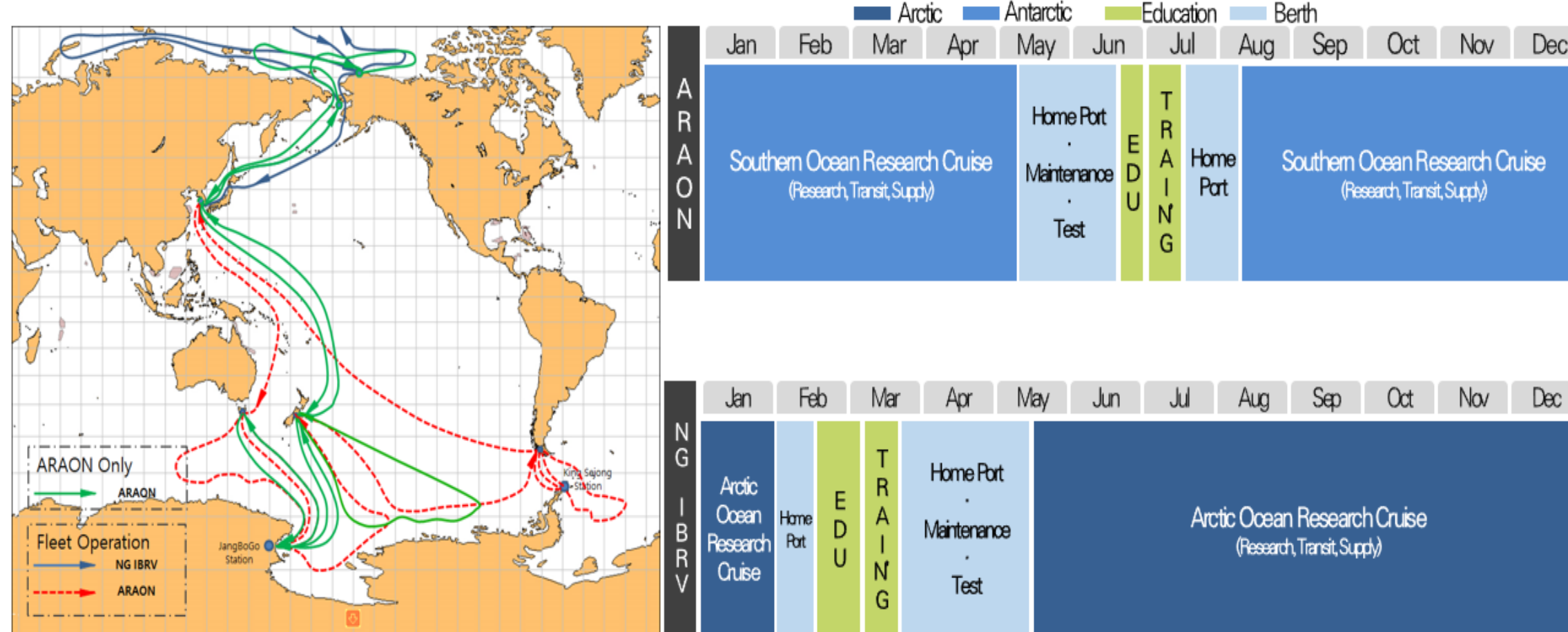
Category	Specifications
Gross Tonnage(GT)	About 16,560 Tons
Dimension(m)	140.8x25x13(LxBxD)
Characteristic	Double Acting Type, Performs Marine/Polar Research and Support
Ice-breaking Capability	Break Flat ice 1.5m thick at 3.3 knots Continuously/ KR Arctic7 or Equivalent
Polar Class	PC3
Winterization	Winterization E2(-45°C)
Engine	LNG-Low Sulphur MGO Dual Fuel Engine (6.7MW x 2 sets, 4.3MW x 2 sets) 4sets, Total 22MW
Fuel	MGO(Low Sulphur) 70%, LNG 30%
LNG Tank	Pressurized Tank(Type-C), Can be stored for 60 days or above
Propulsion	Independent Electric Motor Driven Azimuth Thruster 7.5MW x 2 sets
Research Facility	Moon Pool(4mx3.2m), Modular Research Facility, 55 kinds of Research Equipment
Speed	Cruising : 13 knots, Max. : 18.24 knots
Dynamic Positioning	DPS2
Endurance	20,000NM / 75days(Based on Transit 50%, Research 40%, Icebreaking 10%)
Accommodation	100(34 Crew, 66 Scientist)
Cargo/Helicopter	26TEU(Max. 52TEU) / Helipad : Can Operate Ka-27 Class, Hanger : AS-350 Class x 2
Noise/Vibration	ISO 25283-5, KR NVH-N3/V2
Underwater Radiated Noise	DNV-GL Silence-R or KR URN-R

Operating Plan

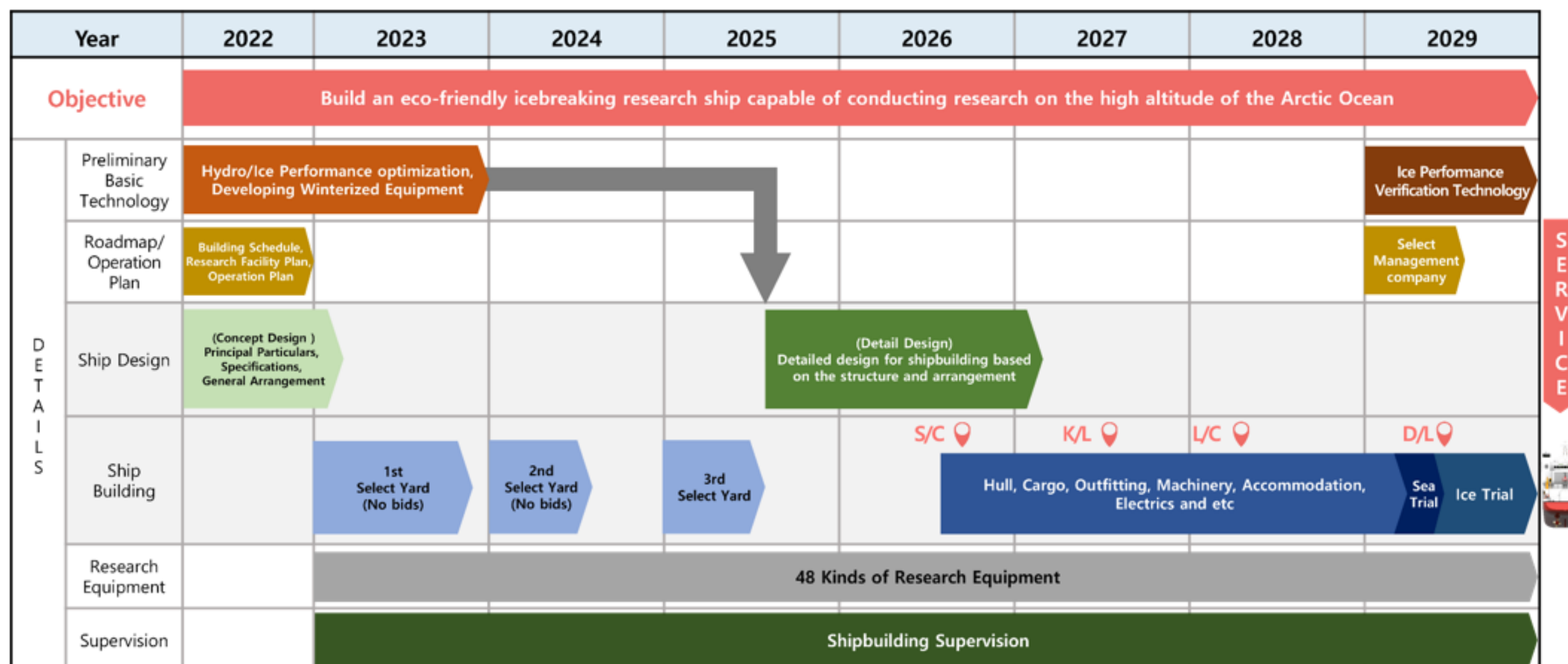


With decreased redundant transit, research cruise days will increase by up to 192 days

- The current 85 days of research and navigation per year will be increased to 277 days (Arctic: 35 days → 156 days, Antarctic: 50 days → 121 days)



Project Roadmap



- ✓ Shipyard Design (Detailed and Production Design): Until February 2027
- ✓ Vessel Delivery: June 2029
- ✓ Ice Trial: Until December 2029
- ✓ Commissioning: January 2030

Research Facility and Equipment

Modularize

(winch, seismic compressor)

Container Modularized Equipment

New Research Equipment

ROV, Autosonde, Troll

Moon Pool

International Cooperation

KOPRI has expanded the research area by building the 2nd icebreaker following the IBRV ARAON. Many collaborative research projects proceeded with the international groups.