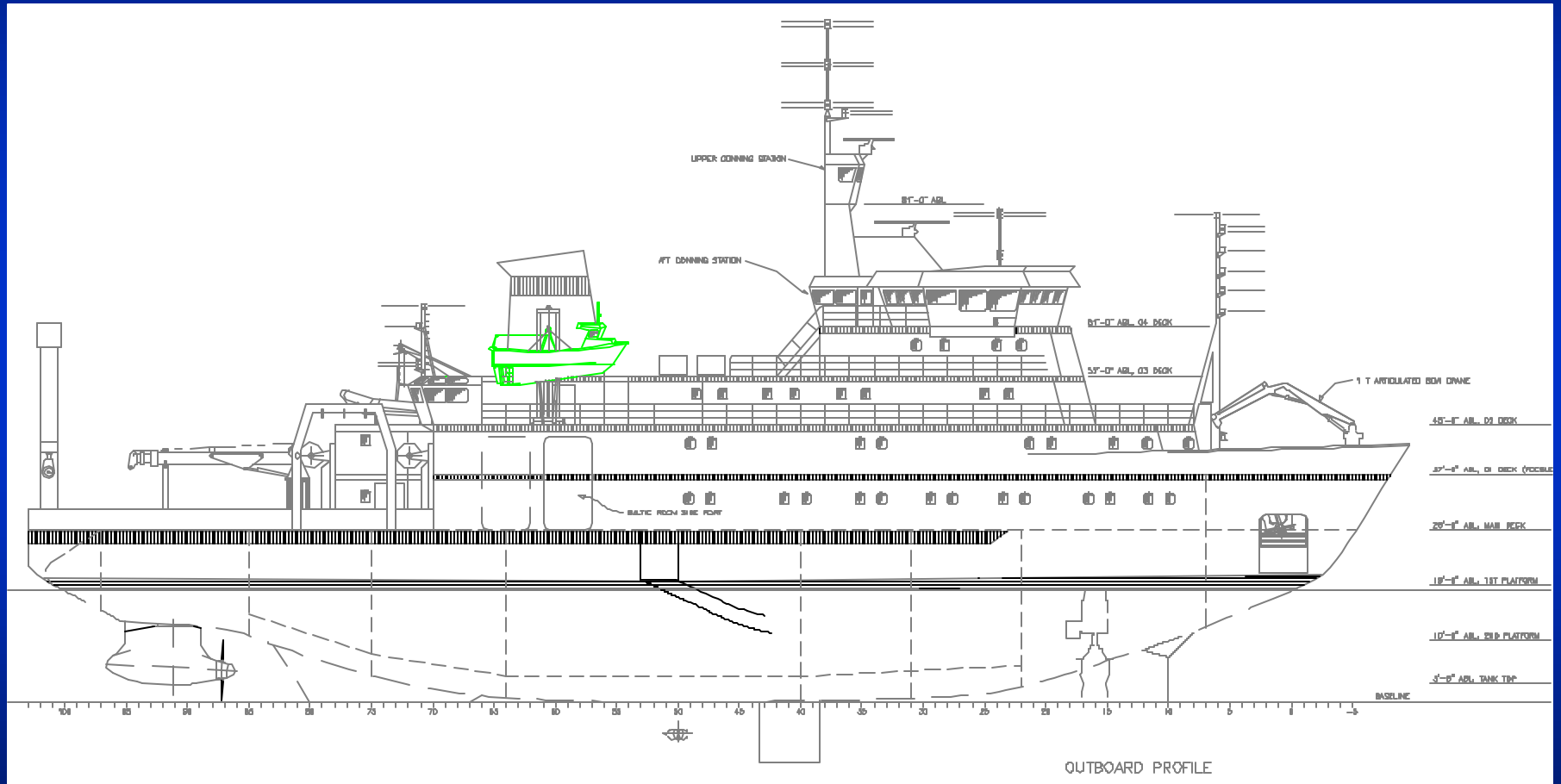


# Alaska Region Research Vessel

## RVTEC 2002



# Alpha Helix

Antarctic Expedition 1971

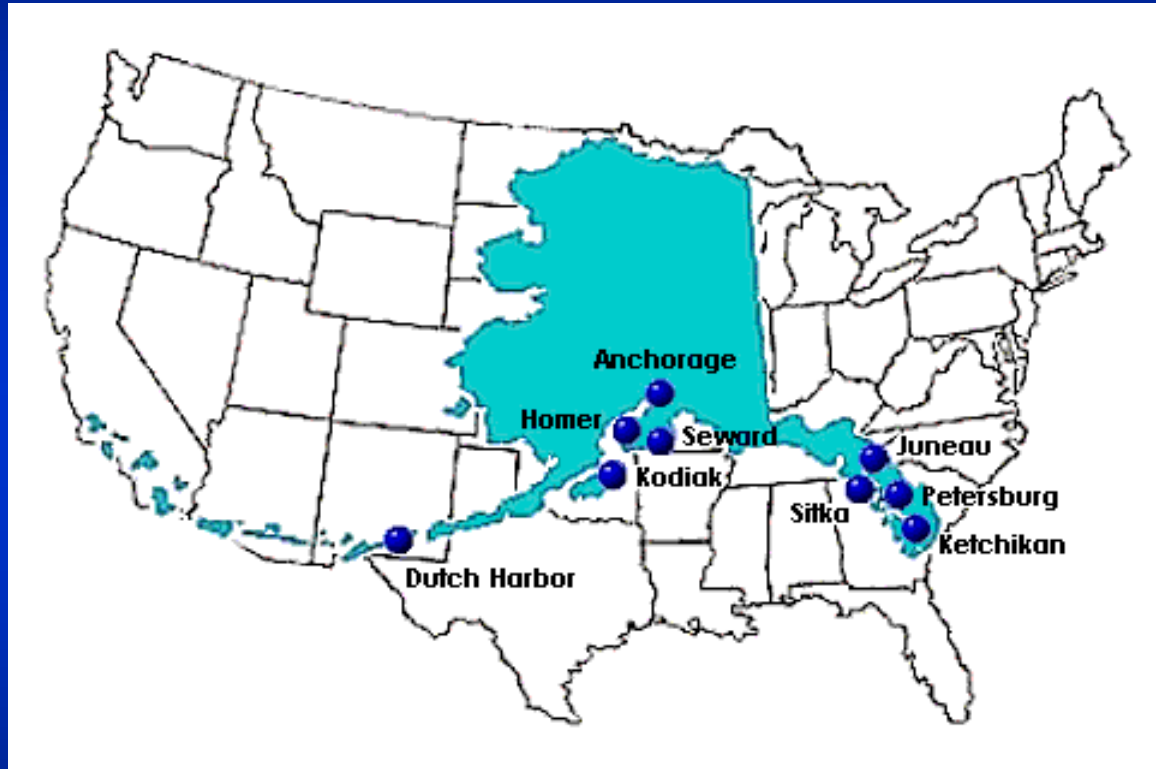


# Seward Alaska



©Ron Niebrugge

# Alaska Region



# DESIGN OBJECTIVES

- Meet Scientific Mission Requirements - Published 1999
- Larger More Capable Replacement for *R/V Alpha Helix*
- Year-round Operation in High Latitudes
- Year-round Operations in the Bering Sea



Alaska Region Research Vessel



# CURRENT STATUS

- Concept Design – Completed August 1
- Preliminary Design and Model Testing –  
3rd quarter 2001 to 2nd quarter 2002
- Contract Design – Complete by end of 2003



Alaska Region Research Vessel



# Outboard Profile

**High Latitude Oceanography-ICE Capable**

**-Double Bottom**

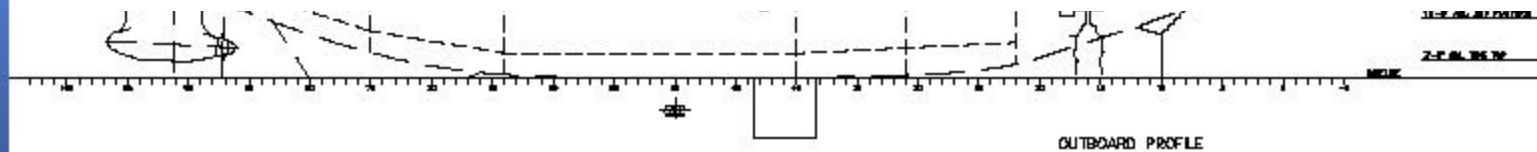
**Open Ocean Oceanography**

**-Stable**

**-Speed**

**Fisheries Oceanography**

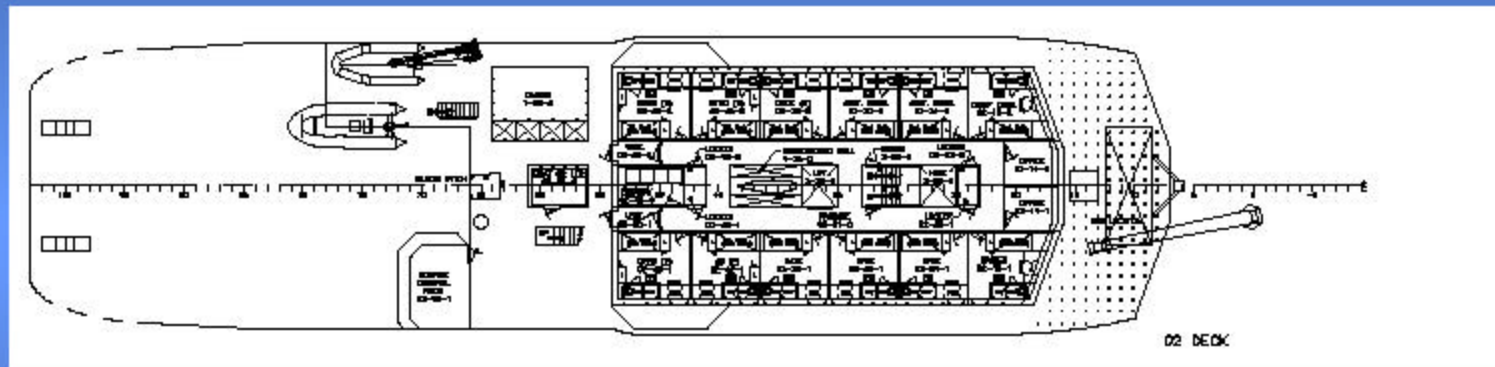
**-ICES Quiet**



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# 02 Deck

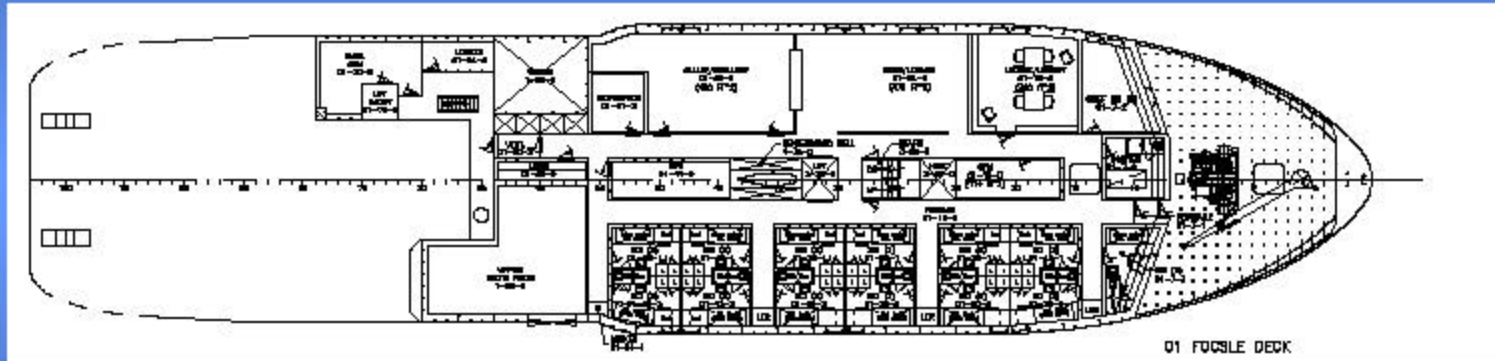


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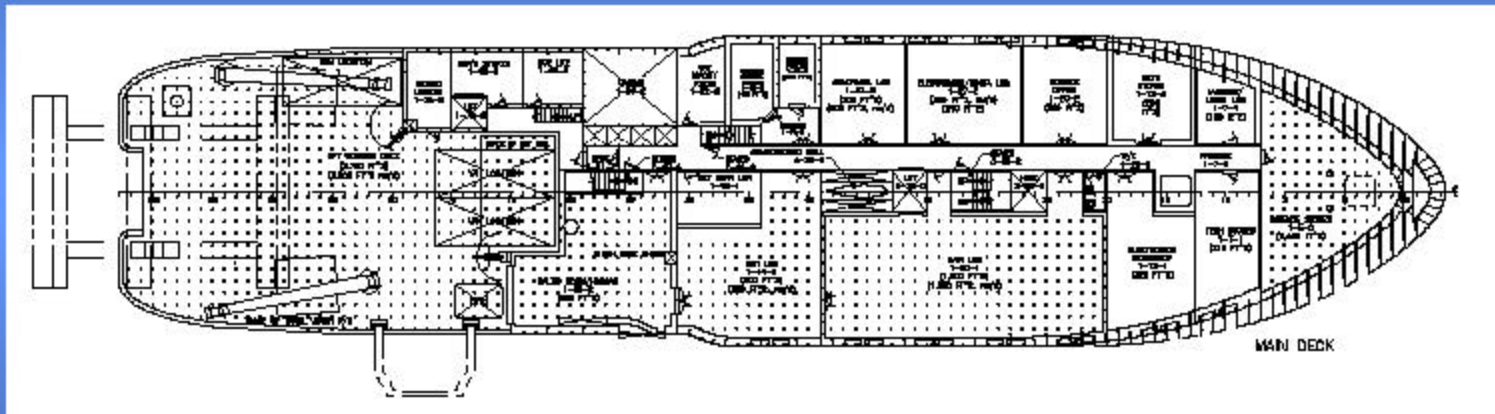
# 01 Deck (Fo'c'sle)



Alaska Region Research Vessel



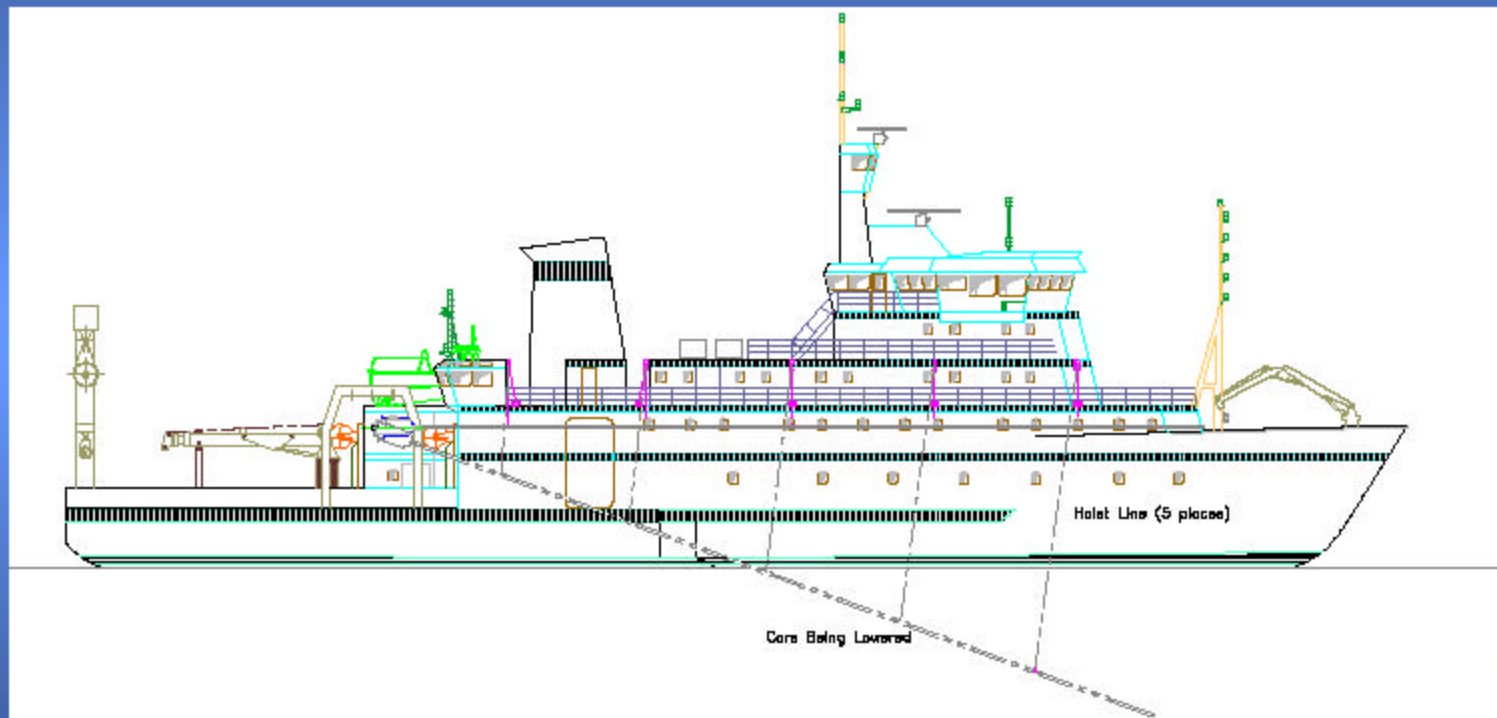
# Main Deck Arrangement



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# Long Coring Arrangement



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# MAJOR DESIGN CHALLENGES

- High power density will require noise and vibration treatments for a high habitability standard.
- Use of twin azimuthing propulsion units, either Azipods or Z-drives, combined with ice capable hull geometry precludes meeting the ICES radiated noise standard for fisheries.



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# MAJOR DESIGN CHALLENGES (cont'd)

## Low open water resistance versus ice capability

- “Reamers” and ice wedge add to resistance but improve ability to work in and around ice.
- Trade-offs show added cost for ice capable features – design does include them.
- Power has been increased 15% from concept design to improve ice capability and open water speed capability.



Alaska Region Research Vessel



# MAJOR DESIGN CHALLENGES (cont'd)

## Seakeeping versus Ice Capability

- Trade-offs indicate ice capability features enhance seakeeping ability.
- Simple bilge keels not practical in ice operations.
- “Centerboard” will be used for transducer mounts and to act as roll damper.



Alaska Region Research Vessel



# MAJOR DESIGN CHALLENGES (cont'd)

## Range and Endurance versus Vessel Size and Cost

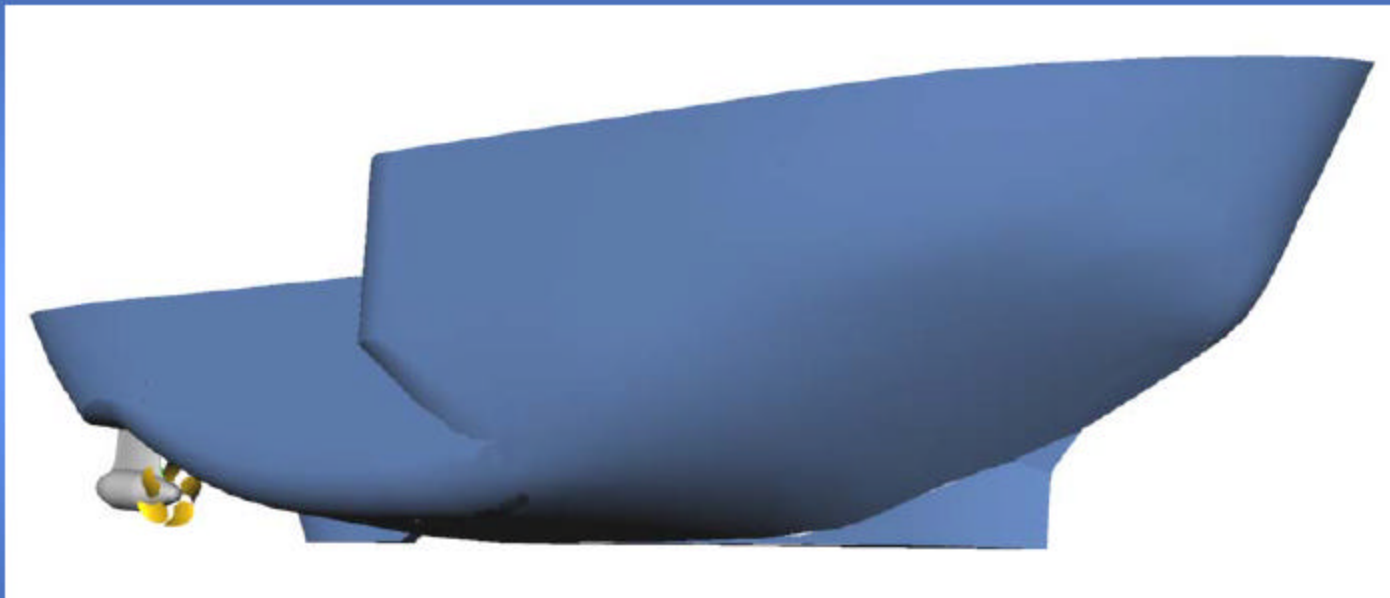
- Endurance drives vessel size.
- Vessel to meet CASPPR requirement for double hull in way of tanks carrying polluting fluids (fuel, lube oil, etc.)
- Ship length overall 226 feet (69 m) – needed to meet SMR mission profile and regulatory ice class requirements.
- SMR originally requested ship <200 feet (61 m).



Alaska Region Research Vessel



# Preliminary Hull Geometry

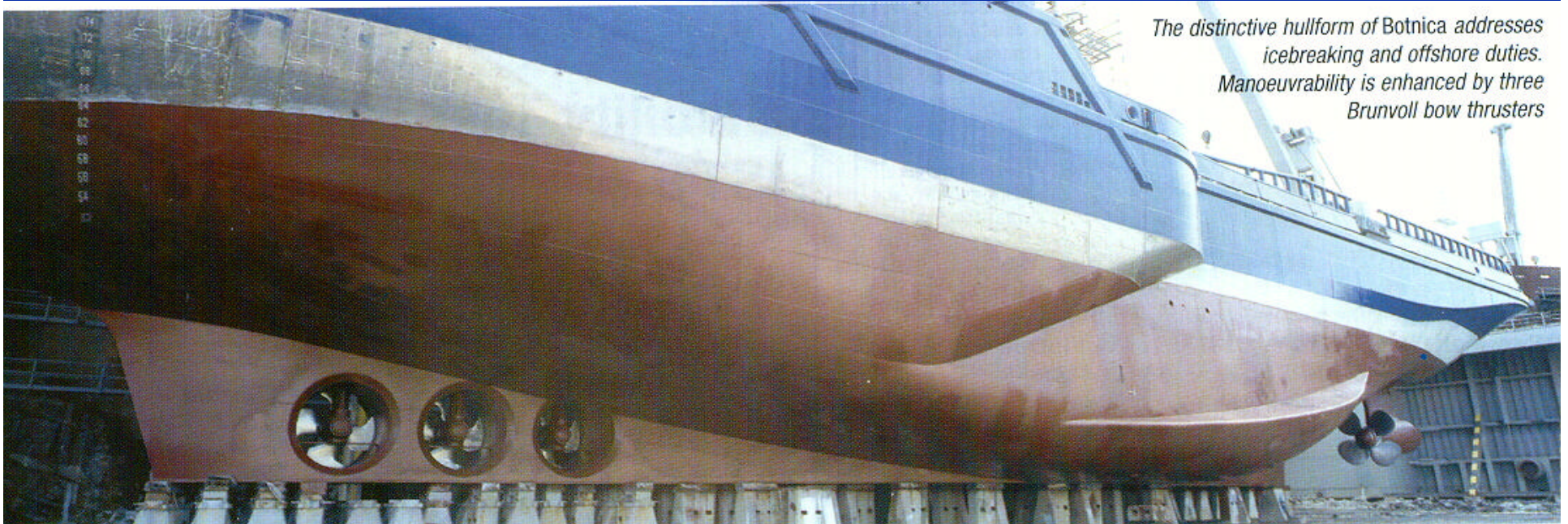


Alaska Region Research Vessel





# Botnica



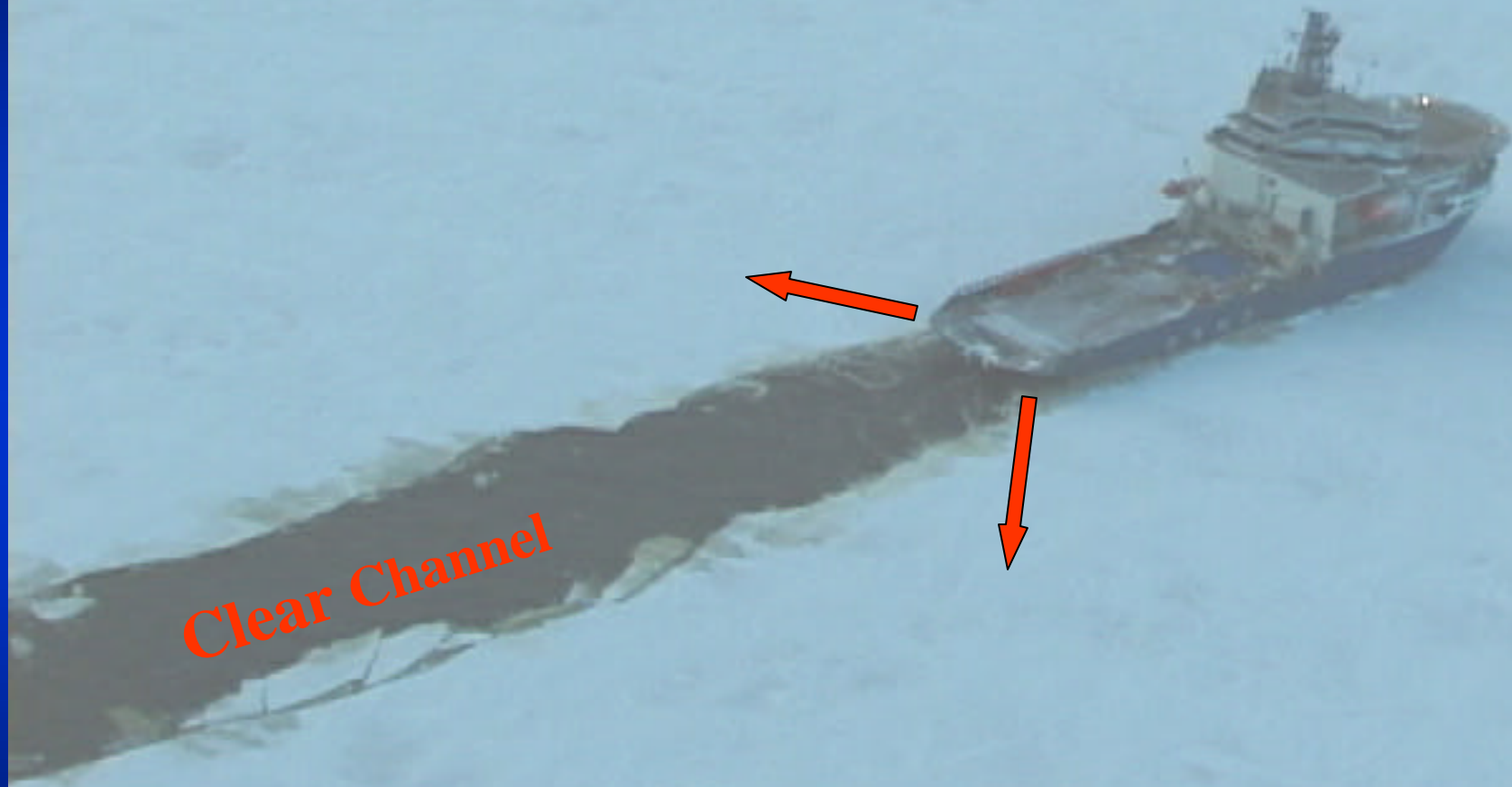
*The distinctive hullform of Botnica addresses icebreaking and offshore duties. Manoeuvrability is enhanced by three Brunvoll bow thrusters*

**“Swiss Army Knife” of Ice Breaking**

## Fennica and Botnica

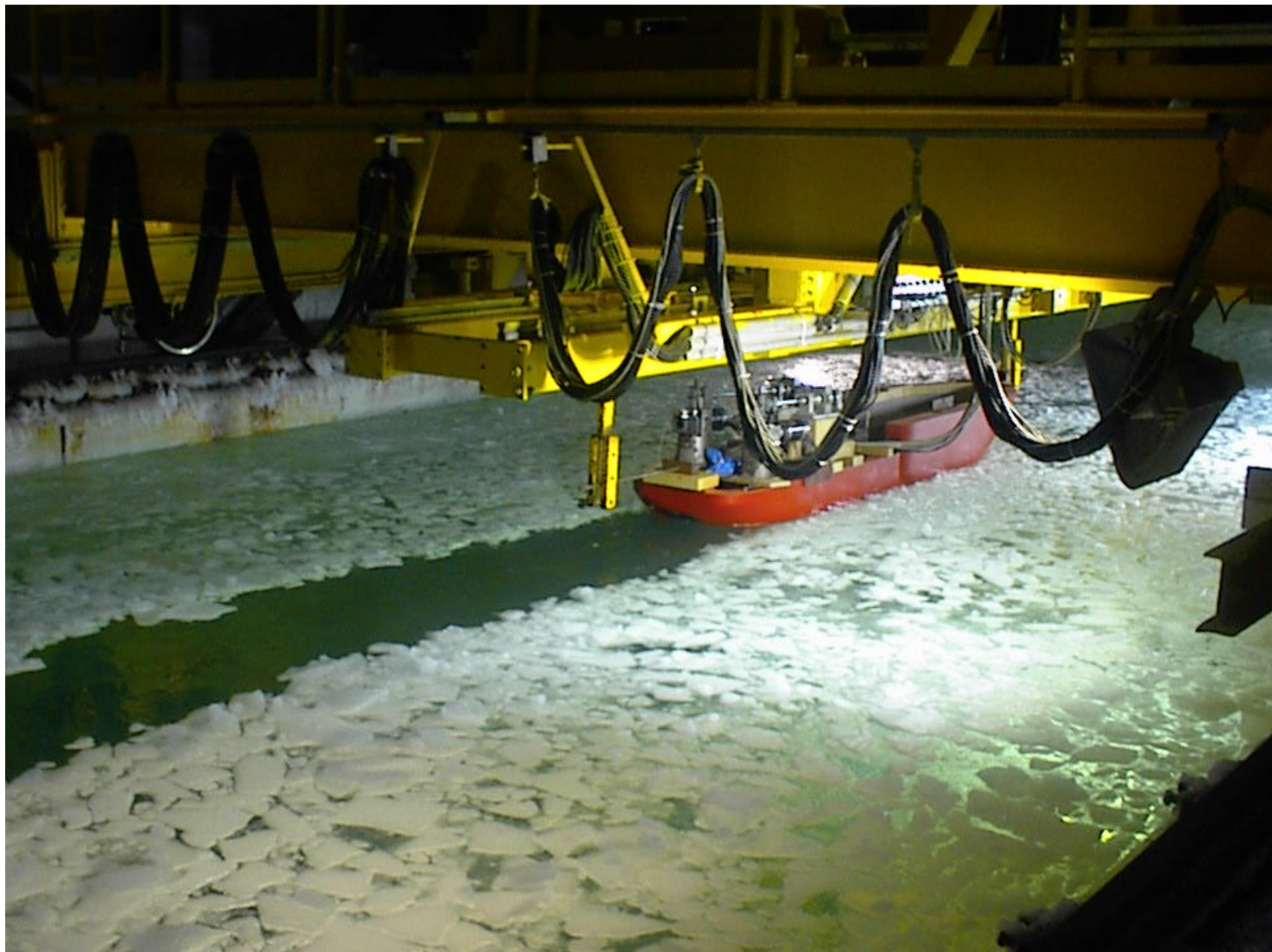


**Propellers Pointing out**



**Clear Channel**

## **Longitudinal Propellers**



# Basic Vessel Characteristics

## Dimensions

- Length, Overall ..... 226'-0"
- Length, Waterline ..... 200'-0"
- Beam, Maximum ..... 52'-0"
- Depth, Hull ..... 28'-0"
- Draft, Design Waterline ..... 18'-0"
- Freeboard, Main Deck ..... 10'-0"



Alaska Region Research Vessel



# Basic Vessel Characteristics

## Capacities - Consumables

- Fuel ..... 148,000 gal
- Potable Water ..... 6,000 gal
- SW Ballast ..... 200,000 gal
- Provisions ..... 60 days
- Holding Capacity ..... 24 hours



Alaska Region Research Vessel



# Basic Vessel Characteristics

## Capacities - Science

- Science Berths ..... 27
- Science Labs ..... 2,000 ft.<sup>2</sup>
- Deck Working Area ..... 2,700 ft.<sup>2</sup>
- Science Storage Volume ..... 8,000 ft.<sup>3</sup>
- Science Storage Load ..... 100 LT



Alaska Region Research Vessel





# Basic Vessel Characteristics

## Performance

- Speed, Max. .... 14 kts
- Speed, Cruising ..... 12 kts
- Level Ice ..... 2.5 ft
- Endurance ..... 45 days
- Installed Power ..... 5,750 hp



Alaska Region Research Vessel



# AVTEC Simulator Seward Alaska



# *MAHALO*

© 1998 Martha Jenkins

