Supplemental Slides

How do Polar icebreakers work?
Why are operations in Arctic/Antarctic hazardous?
Are USCG polar icebreakers multi-mission vessels?
Polar Class WAGB 399’ Capabilities

- Traditional sloping bow
- Reinforced/thick hull
- Round hull
- High power/weight ratio
- Redundant propulsion systems for fuel efficiency and reliability in polar regions (very complex)

- Variety of diesel-electric & turbine engine configurations w/ 3 shafts
- Large, single rudder
- Capacity for two HH-65 helos & support eqpmt.
- Science support facilities & eqpmt.
- Fuel tanks are ballast tanks
- INMARSAT/IRIDIUM high latitude communications

Heavy Polar Icebreaker

Most powerful non-nuclear icebreakers in the world
Design of the Polar-class

- Operational requirements dictated a 1970’s state-of-the-art, complex propulsion plant
USCGC HEALY – Research Polar Icebreaker

- HEALY designed to be multi-mission capable with focus on Arctic polar research capability
- Fixed pitch propellers (more durable)
- Integrated diesel-electric propulsion & power supply system. (less complex, easier to maintain)
- Two unsupported rudders, two shafts
- Separate ballast & fuel tanks
- State of the art science oceanographic, meteorological & biological equipment and spaces
- Automated for minimal permanent Manning
- Cranes - 5 hydraulically operated, 100% coverage of working decks
- Accommodations for two HH-65 aircraft
- Dynamic positioning system
- Integrated Bridge System for minimal Manning
- INMARSAT/IRIDIUM high latitude communications

Light/Medium Polar Icebreaker
U.S. statutes/policies that govern USCG polar icebreakers

- **General Title 14 authorities for all USCG missions:** Search & Rescue, Enforcement of Laws and Treaties, Marine Safety etc.
- **General Title 10 authorities pertaining to support for National Security – 1965 Johnson Administration decision to move all polar icebreaker responsibilities to USCG.**
- **14 USC 2** – CG is tasked with developing, maintaining, and operating icebreaking facilities for the US.
- **14 USC 93** – Authorizes maintenance of icebreaking facilities
- **14 USC 94** – Authorizes conduct of oceanographic research
- **14 USC 141** – Utilization of CG personnel and facilities in assisting other federal and state agencies, including icebreaking
- **15 USC 4101** – Arctic Research and Policy Act of 1984
- **16 USC 2431** – Antarctic Marine Living Resources Convention
- **1990 Presidential Memo** – affirmed CG’s need for three icebreakers, NSF one ice strengthened vessel
- **1996 PDD 26 (U.S. position on Arctic & Antarctic policy)** – Safety, Security, Stewardship
Existing U.S. polar icebreaker policy

- 1990 Presidential Memo stated: “as the polar regions grow in environmental [and economic] importance, so must the United States have the capability to protect its interests and project its presence in this arena, not only as an Arctic nation with self-interests, but as a world power concerned with a broad spectrum of security, scientific and international political issues”.

- The U.S. Coast Guard is the right agency to manage the U.S. polar icebreaker fleet because it can enforce all aspects of U.S. sovereignty as well as support polar research. The Coast Guard considers this still to be the overarching reason why the Coast Guard should continue to operate, maintain, and manage the nation’s polar icebreaker fleet.

National Research Council Recommendations

1. The United States should continue to **project an active and influential presence in the Arctic** to support its interests. This requires U.S. government polar icebreaker capability to assure year-round access throughout the region.

2. The United States should continue to **project an active and influential presence in the Antarctic** to support its interests. The nation should reliably control sufficient icebreaking capability to break a channel into and assure the maritime resupply of McMurdo Station.

3. The United States should **maintain leadership in polar research**. This requires icebreaking capability to provide access to the deep Arctic and the ice-covered waters of the Antarctic.

4. National interests in the polar regions require that the United States immediately program, budget, design, and **construct two new polar icebreakers to be operated by the U.S. Coast Guard**.

5. To provide continuity of U.S. icebreaking capabilities, the POLAR SEA should remain mission capable and the POLAR STAR should remain available for reactivation until the new polar icebreakers enter service.

6. The **U.S. Coast Guard should be provided sufficient operations and maintenance budget to support an increased, regular, and influential presence in the Arctic**. Other agencies should reimburse incremental costs associated with direct mission tasking.

7. Polar icebreakers are essential instruments of U.S. national policy in the changing polar regions. To assure adequate national icebreaking capability into the future, a **Presidential Decision Directive should be issued** to clearly align agency responsibilities and budgetary authorities.
Enforcement of Laws & Treaties Capability

• Alaskan EEZ living marine resource enforcement (historic ties to early Alaskan history)
• Drug Enforcement
• Commercial & Recreational Boating Safety Enforcement
• Enforce border and Customs laws
Marine Pollution Prevention/Response Capability

• Is the U.S. capability to respond to pollution incidents in the Arctic adequate?
Search & Rescue Capability

- USCG crew trained marine SAR procedures
- SAR equipment
- Aircraft increases range to 150 nm
- Typically secondary mission
Command, Control, Communications: Operations Coordination Capability

- INMARSAT
- HF
- DoD SATCOM
- IRIDIUM
- VHF
Disaster/Humanitarian Relief Support Capability

- Polar Icebreakers have capability to provide significant amount of disaster/humanitarian relief supplies and support
- Function as command and control ship to coordinate relief efforts as necessary
- American Samoa Typhoon Relief (2005)
Polar Research Capability

Acoustic Doppler Current Profiler (ADCP)
Seabeam 2112 Bottom Mapping Sonar
Sub Bottom Profilers
Bathy 2000
Knudsen 320 B/R
Pingers
Expendable Bathy Thermograph (XBT)
Expendable Oceanographic Probes
CTD
Thermosalinograph
Fluorometer
Weather Data/Balloon Launch
Buoy/Mooring launch & recovery
ROV deployment
Box coring equipment
Escort Capability

Escort other vessels to polar regions. Other vessels may be supply vessels, research vessels or drilling vessels.

Methods of Escort:
• Close escort
• Towing
• Coupled towing (notched stern)

Escorted vessels could have many other capabilities
Logistics Support Capability

Ability to transport supplies & fuel to remote polar locations

- Transport via airlift
- Transport via small boat
- Transport over the ice