Agenda

- History
- Mission Need
- Strategy
- Status of USCG Heavy and Medium Icebreakers
- Major Icebreakers of the World
- Process/Status of New Acquisition
- Operational Requirements Document Integrated Product Team
- International Collaboration
- Differences Between 1970s Icebreaking and Today
- Presidential Announcement
- Summary
- Q&A
History

1900

1885

1936-1941

1946

1955-56

1960s

1999/2000

1980s

WWII

USCG/USN

Wind class &
MACKINAW

for re-supply

USS Bear

CGC Eastwind

Security

Discovery

CGC Healy

Future Trend

Multimission:
Enforcement, Security, and Science

1900

Discovery

1936-1941

USCG initiated intensive study of heavy icebreaker design

1946

Operation High Jump – Admiral Byrd’s Antarctic expedition

1955-56

First Operation Deep Freeze - permanent U.S. presence on Antarctica

1960s

Alaskan north slope oil discovered – polar icebreakers receive national interest

1999/2000

USCGC HEALY: Planned in 80s, funded 90s, operational in 2000 to support Arctic Research

1980s

Older icebreakers decommissioned - by 1989 only POLAR STAR & POLAR SEA remain

2006-2009

PSTAR in caretaker status

2010-2013

PSTAR reactivation

1950’s

DEW stations built - required icebreakers to USCG – 8 icebreakers

1965-66

USN transfers all icebreakers to USCG – 8 icebreakers

Late 1970s

POLAR STAR & POLAR SEA built

1999/2000

USCGC HEALY: Planned in 80s, funded 90s, operational in 2000 to support Arctic Research

Discovery

Enforcement

USS Bear

CGC Eastwind
Mission Need

- Changing environment
- Increased economic and security interests
- Increased human activity in the polar regions
- Icebreakers support 9 of 11 CG Missions

Icebreaker Missions

- Search & Rescue
- Marine Safety
- Aids to Navigation
- Ice Operations
- Marine Environmental Protection
- Living Marine Resources
- Illegal Drug Interdiction
- Undocumented Migrant Interdiction
- Other Law Enforcement (Protect EEZ)
- Ports, Waterways, and Coastal Security
- Defense Readiness

Probability of the presence of at least one undiscovered oil and/or gas field with recoverable resources > 50 million barrels of oil equivalent

Arctic Sea Ice Volume Anomaly and Trend from PIOMAS

Probability: Estimated

USGS Fact Sheet 2008
Arctic Strategy

- Advance national security interests
- Pursue responsible Arctic Region stewardship
- Strengthen international cooperation
## Status of USCG Heavy and Medium Icebreakers

<table>
<thead>
<tr>
<th>Platform</th>
<th>Year Commissioned</th>
<th>Design Service Life</th>
<th>Estimated End of Service Life&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Icebreaking Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLAR STAR</td>
<td>1976</td>
<td>30</td>
<td>2020-23</td>
<td>6ft@3kts / 21 ft back &amp; ram</td>
</tr>
<tr>
<td>POLAR SEA</td>
<td>1978</td>
<td>30</td>
<td>2013</td>
<td>6ft@3kts / 21 ft back &amp; ram</td>
</tr>
<tr>
<td>HEALY</td>
<td>2000</td>
<td>30</td>
<td>2030</td>
<td>4.5 ft @ 3kts / 8 ft back &amp; ram</td>
</tr>
</tbody>
</table>

<sup>1</sup> Dates include additional service life provided by Service Life Extension Projects.
# Major Icebreakers of the World

## MAJOR ICEBREAKERS OF THE WORLD

<table>
<thead>
<tr>
<th>Country</th>
<th>Icebreakers</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RUSSIA</strong> (41)</td>
<td></td>
<td>5 under construction, 6 planned</td>
</tr>
<tr>
<td><strong>SWEDEN</strong> (6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FINLAND</strong> (7)</td>
<td></td>
<td>1 planned</td>
</tr>
<tr>
<td><strong>CANADA</strong> (6)</td>
<td></td>
<td>1 planned</td>
</tr>
<tr>
<td><strong>USA</strong> (5)</td>
<td></td>
<td>1 planned</td>
</tr>
<tr>
<td><strong>DENMARK</strong> (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CHINA</strong> (1)</td>
<td></td>
<td>1 planned, Xue Long (1992), Polar Support Vessel (2018)</td>
</tr>
<tr>
<td><strong>ARGENTINA</strong> (1)</td>
<td></td>
<td>1 planned, Almirante Brown (1967)</td>
</tr>
<tr>
<td><strong>AUSTRALIA</strong> (1)</td>
<td></td>
<td>1 planned, Aurora Australis (1996)</td>
</tr>
<tr>
<td><strong>CHILE</strong> (1)</td>
<td></td>
<td>1 planned, Almirante O Higgins (1967)</td>
</tr>
<tr>
<td><strong>ESTONIA</strong> (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GERMANY</strong> (1)</td>
<td></td>
<td>1 planned, Deutschland (1987), Polar Research Vessel (Extended 2019)</td>
</tr>
<tr>
<td><strong>JAPAN</strong> (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SOUTH KOREA</strong> (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SOUTH AFRICA</strong> (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LATVIA</strong> (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NORWAY</strong> (1)</td>
<td></td>
<td>1 planned</td>
</tr>
<tr>
<td><strong>UNITED KINGDOM</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Process/Status of New Acquisition

- **ADE-0 ADM (CG Specific)** Approved by Coast Guard JUL 12
- **ADE-1 ADM** Approved by Coast Guard DEC 12
- **Mission Need Statement (MNS)** Approved by DHS JUN 13
- **Concept of Operations (CONOPS)** Approved by Coast Guard SEP 13
- **Affordability Assessment (AAS)** Approved by Coast Guard NOV 13
- **Capability Development Plan (CDP)** Approved by DHS JUN 14
- **ADE-1 ADM (Entered the Analyze/Select phase)** Approved by DHS JUN 14
- **Alternatives Analysis Study Plan** Approved by Coast Guard DEC 14
- **Preliminary Operational Requirements Document (PORD)** Approved by Coast Guard JAN 15
- **Risk Management Plan** Approved by Coast Guard JUN 15

### Status: Completing acquisition documents in preparation for ADE-2A/B. Currently, finalizing the Operational Requirements Document (ORD) and Alternatives Analysis.
# Operational Requirements Document

## Integrated Product Team

<table>
<thead>
<tr>
<th>Department of State</th>
<th>National Science Foundation</th>
<th>Maritime Administration (MARAD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Navy – OPNAV Staff</td>
<td>Transportation Command (TRANSCOM)</td>
<td>US Marine Corps</td>
</tr>
<tr>
<td>US Arctic Research Commission</td>
<td>Northern Command (NORTHCOM)</td>
<td>National Oceanic &amp; Atmospheric Administration</td>
</tr>
<tr>
<td>Department of Homeland Security HQ</td>
<td>USCG (HQ, PAC, D17)</td>
<td></td>
</tr>
</tbody>
</table>
International Collaboration

- **Canadian/US MOU, dated June 2009; Polar Icebreaker Project Annex, dated FEB 2013**
  - Facilitates a collaborative approach to sharing ship design and construction concepts
- **US (DOD) and Ministry of Defense of Finland Agreement for RDT&E, dated MAY 2012; Arctic Hydrodynamics Project Agreement, dated TBD**
  - Develops new arctic hydrodynamic technologies
  - Improve ice-capable ship mobility
  - Improve seakeeping, fuel efficiency, and polar environmental compliance
Differences Between 1970s Icebreaking and Today

- Increased environmental standards
  - Emissions
  - Ballast
  - IMO Polar Code requires double hull
- Increased use of azimuthing thrusters for maneuverability and ice management
- Fixed Pitch Propellers (excessive maintenance with Controllable Pitch Propellers)
- Double acting hulls
- Oblique icebreakers
- Integrated Power Plant
- Improved hull forms for maximum efficiency in ice and open ocean transits
- Improved modeling, simulation and testing capabilities
Presidential Announcement

- Presidential Announcement, Seward AK 02 SEP 2015

- Accelerate the construction of at least one additional heavy icebreaker

- Produce a sufficient fleet to meet our economic, commercial, maritime and national security needs
Summary

- High level strategy and preliminary operational requirements – complete
- Mission demand – increasing
- Current Heavy Polar Icebreakers – beyond design service life
- Requirements definition – whole of Government approach
- International collaboration – state of the world market icebreaker
Q & A