

Building Ice-Capable Research ships

Adventures in Polar Oceanography

19 November 2012

Richard F. Pittenger

Rear Admiral USN (Ret)

Woods Hole Oceanographic Institution

Early Exploration driven by national interests, scientific curiosity



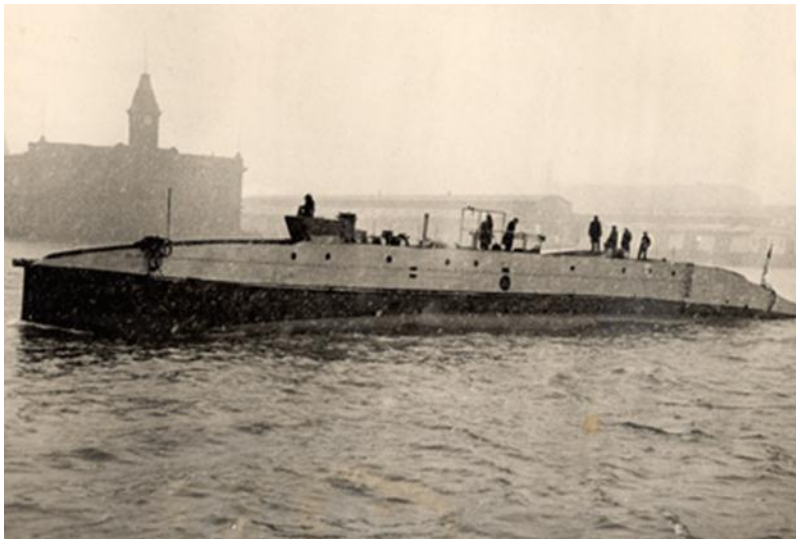
Endurance (Shackleton)



Vincennes (Wilkes)



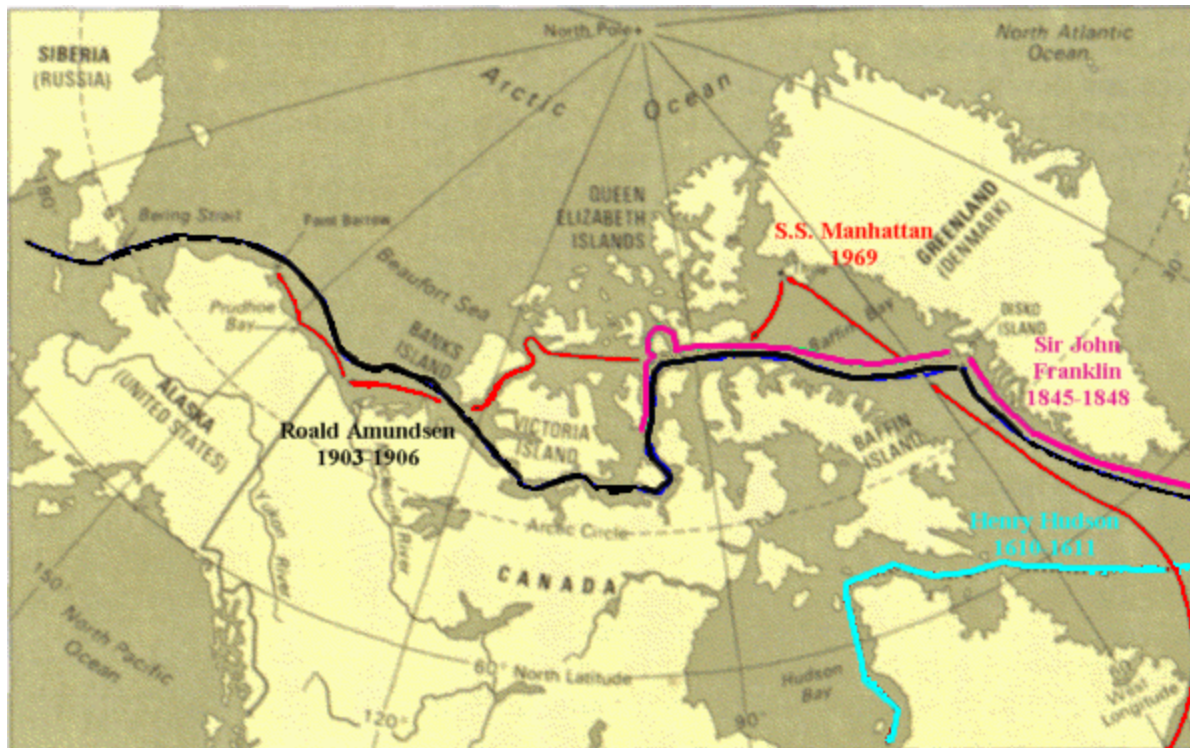
Fram (Amundsen,
Nansen, Sverdrup)



Nautilus



Wilkes in Antarctica



The Northwest Passage



Wind Class and Glacier Operation Deep Freeze



R.E. Byrd
“Little America”

8/9/65

33 P

332

REVISED

MEMORANDUM OF AGREEMENT

BETWEEN

THE DEPARTMENT OF THE NAVY

AND

THE DEPARTMENT OF THE TREASURY

ON

THE OPERATION OF ICEBREAKERS

Please Return
to 334.
(CDR STEEL)

THIS SOUNDS LIKE A
CGCG (COAST GUARD
CAN GAME)

1. Purpose. The purpose of this agreement is to revise the Navy-Coast Guard agreement on operations of icebreakers, and to provide for the permanent transfer to the Coast Guard, at the earliest practicable date, but not later than 1 November 1966, of jurisdiction, control over, and responsibility for operating and manning the five U. S. Navy icebreakers in high latitudes to fulfill U. S. Navy mission requirements.

2. Introduction. These special type ships are required to perform the following mission and tasks.

Mission: To ensure passage of ships through ice fields and sea ice in support of bases and operations in high latitudes.

Tasks:

- a. To ensure services of ice reconnaissance including operation and support of helicopters.
- b. To perform limited air control for ice reconnaissance and search and rescue missions.
- c. To provide limited self-defense against low performance aircraft and light surface attack.
- d. To conduct oceanographic, geographic and other scientific programs in polar regions that are inaccessible to conventional ships.

Phases of Arctic Activity

Overview

Pre-20th Century

- Exploration, science
- Empire building

World War II

- Ice breakers for access to Russia, natural resources

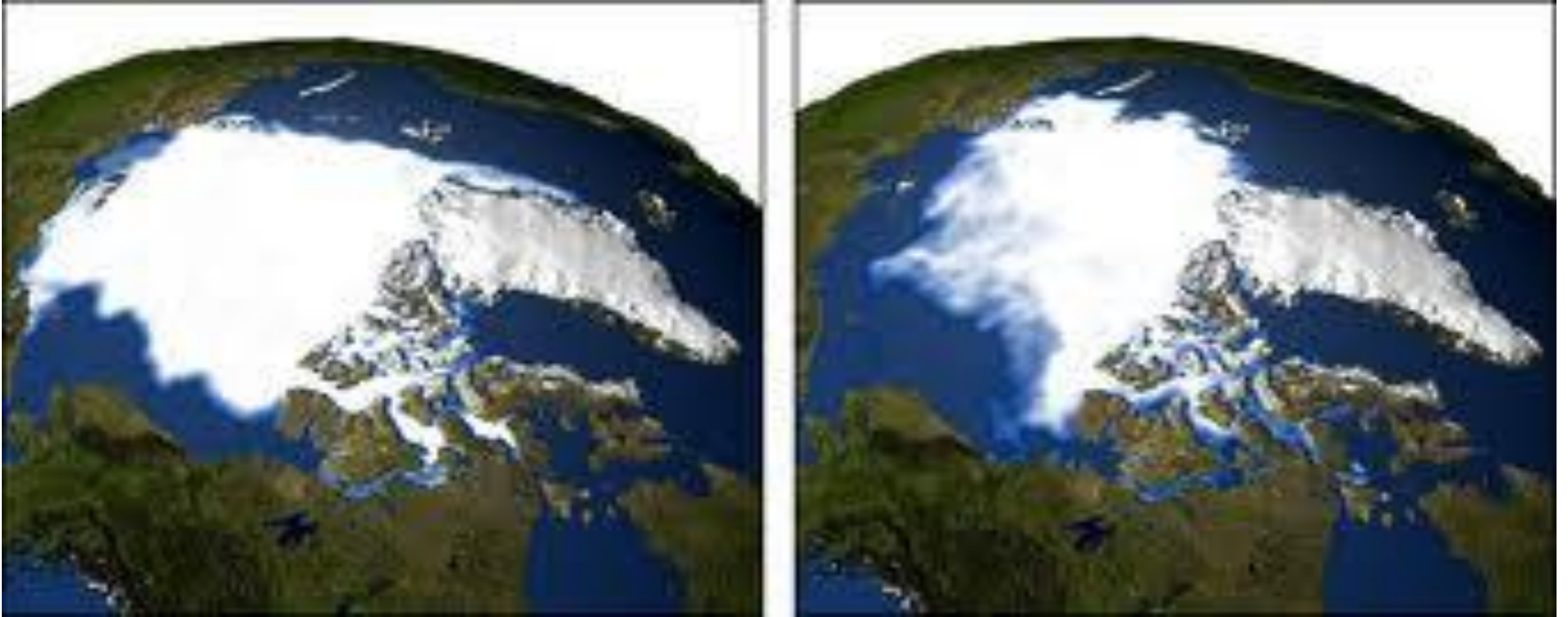
Cold War

- Arctic, the province of submarines (nuclear power)
- Navy divests itself of ice-breakers
- ONR funds Arctic research relevant to submarine warfare; ASW
- Ice breaker fleet ages and grows smaller
- Soviet Union builds large infrastructure to exploit natural resources

Post Cold War

- ONR funding near zero
- NSF funding slowly increased
- Climate Change denial

New Imperative

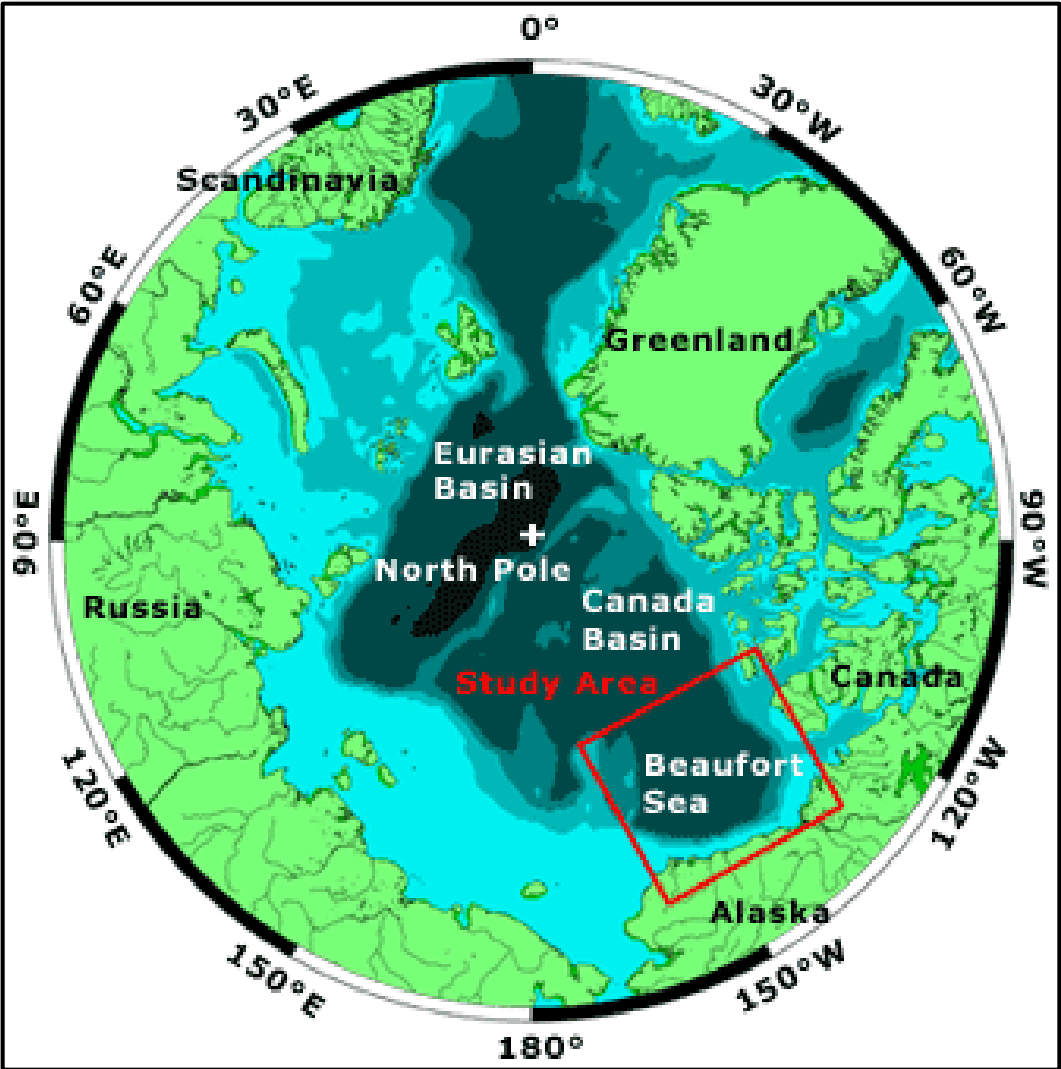


The ice is melting.

Arctic Research
continues with the one
ice-breaker, loaners,
subs and ice-camps



Beaufort Gyre Mooring Systems



Sermilik Fjord August 2009



Global Warming Could Have a Chilling Effect on the Military

by Rick

ARRV

http://www.orbit.nesdis.noaa.gov/star/documents/2007IceSymp/FinalArcticReport_2001.pdf

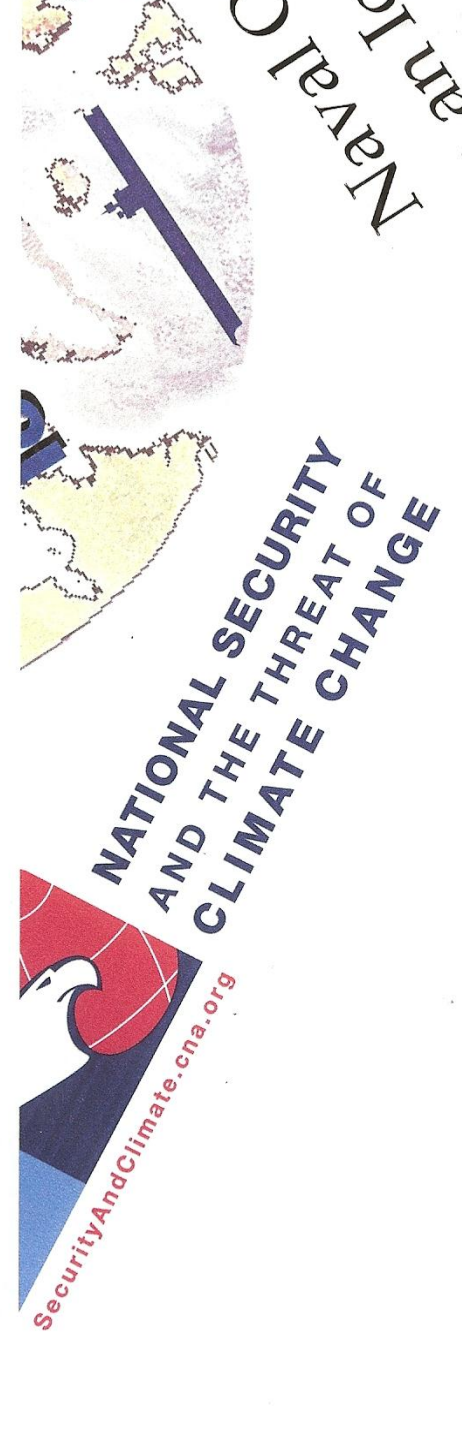
<http://www.ndu.edu/CTNSP/docUpload/d/DH33.pdf>

<http://www.cna.org/reports/climate>

...the cannons to Boston, McCullough wrote, was "a feat of remarkable daring and difficulty and, ironically, only because of the severity of the winter, as the guns had been frozen on sleds."

...marked the incipient years of the Revolutionary War, Washington crossed the Delaware River in December to surprise the Hessians at the Battle of Red Bank. A famous painting depicts Washington's men crossing the frozen Delaware, which rarely freezes in winter. Washington's men endured their ordeal in the confidence of their army.

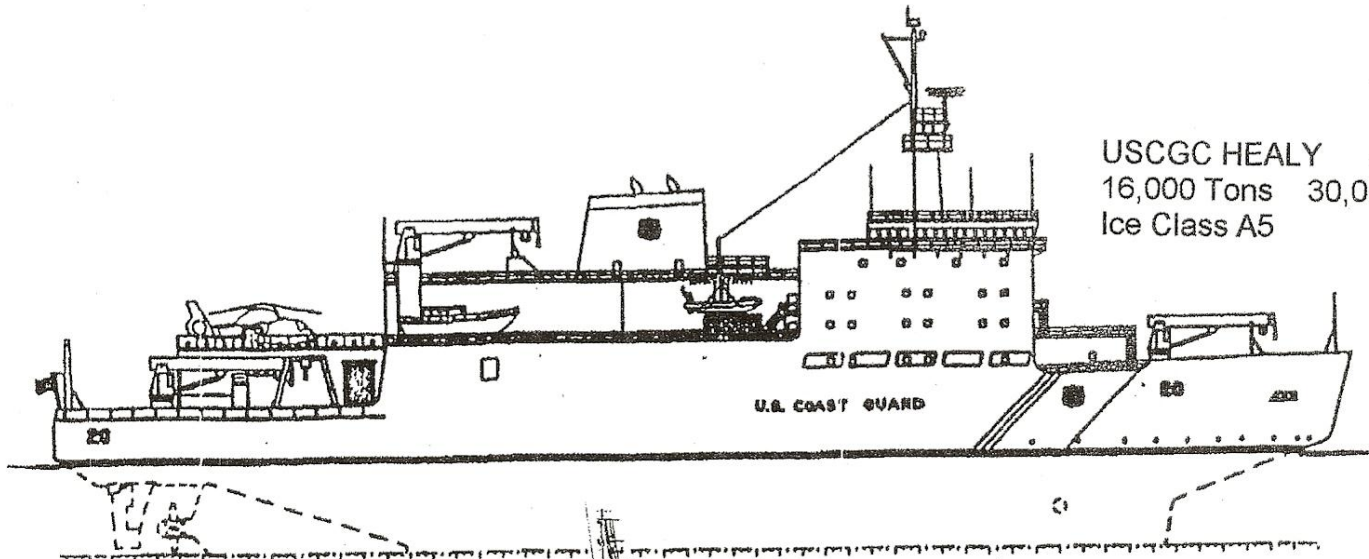
...1776 era that Thomas Paine wrote, "These are times that try men's souls; the long winter has past, the spring is past, the summer has passed, and the fall is past, and the year is past, and we are yet in the wilderness; and the enemy is still with us, and the patriot will, in this crisis,"



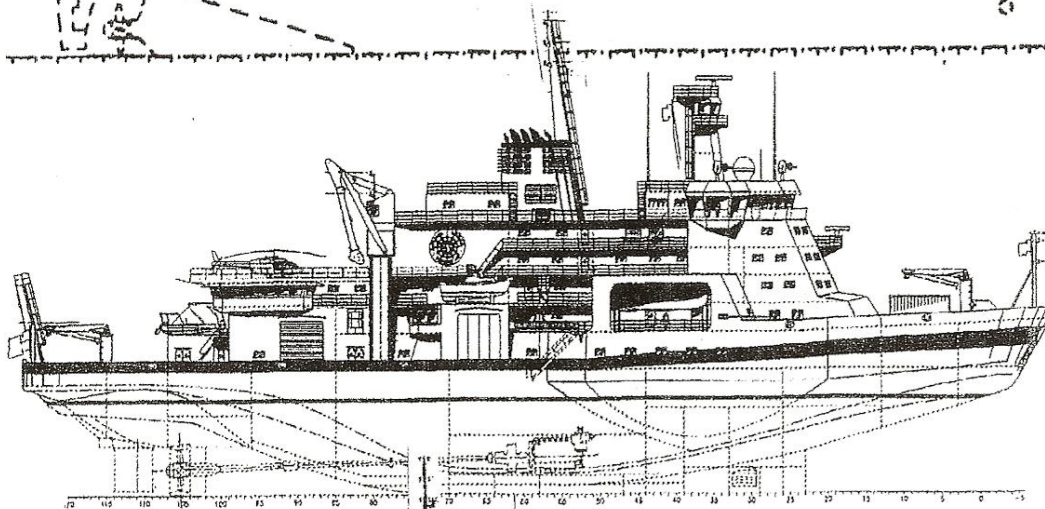
Toward an Arctic Research Vessel

Numerous attempts

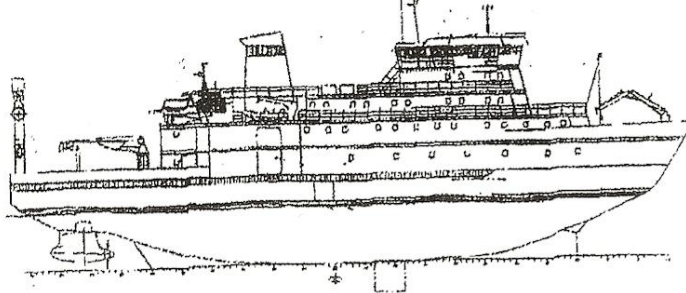
1980s	Several designs by WHOI, URI
1990	FOFCC report recommended an ice capable R/V <ul style="list-style-type: none">• GAO shoots it down
1990	UAF concept design PRV 218'
1992	UAF / UNOLS preliminary design 340' <ul style="list-style-type: none">• Turned down by NSF
2000	UAF / WHOI - HLRV 226'
2001	UAF / WHOI preliminary design ARRV 236'
2007	Contract Design Sikuliaq 254' (261' at launch)
2012	Sikuliaq launched
2014	In Service



USCGC HEALY 420-ft
 16,000 Tons 30,000 SHP
 Ice Class A5



ARV (1994) 340-ft
 11,500 Tons 14,000 SHP
 Ice Class A3



ARRV (2002) 226-ft
 2,800 Tons 5,000 SHP
 Ice Class A1



261 ft Length
52 Beam
18' 9" Draft
3665 Displacement
5750 Propulsion

Endurance 45 days
Hotel 60 days
Range 9000 NM
Crew 22
Science 24



R/V Sikuliaq

Image courtesy of The Glosten Associates

“Real” Climate Change or Not, the Arctic is changing (rapidly)

- INVITES exploitation: oil, other minerals, fish, border and jurisdiction conflicts
- U.S. a leader in Arctic science
- The U.S. is not ready with infrastructure
 - One mid-power ice breaker
 - One ice-capable R/V (next year)
 - Aircraft?
 - Shore facilities?
 - UNCLOS not ratified

August 2010



August 2009



Jul, Sept 2008



Sep 2010