Uncertainties, Scenarios & Wild Cards: AMSA and Plausible Futures for Arctic Ocean Use

The Changing Arctic ~ Kingston Conference on International Security

Kingston, ON ~ 15 June 2011

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Chair, AMSA (2005-09)
Arctic Council ~ Intergovernmental Forum
AMSA Lead Countries for PAME ~ Canada, Finland & USA
AMSA Focus ~ Marine Safety & Marine Environmental Protection
13 Major Workshops & 14 Town Hall Meetings

Key Challenge ~ Many Non-Arctic Stakeholders

2004 – 2009
Table of Contents

• Executive Summary with Recommendations

• Arctic Marine Geography Climate & Sea Ice

• History

• Governance

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• Human Dimensions

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Enhancing Arctic Marine Safety

Protecting Arctic People and the Environment

Building the Arctic Marine Infrastructure

AMSA RECOMMENDATIONS ~ THEMES
AMSA Recommendation from the Arctic States
~ IIIB. Arctic Marine Traffic System

~ “Comprehensive system to improve monitoring & tracking”
~ Near, real-time data shared among the Arctic States
~ Vessel ID, tracks, data fusion & analyses, detection of any anomalies
AMSA 2009:

• Baseline Assessment

• Arctic Council Policy Document
  ~ Negotiated Text Approved 29 April 2009 ~

• Strategic Guide

www.pame.is
Scenarios

Scenarios are tools for helping us to take a long view in a world of great uncertainty. They present plausible, alternative images instead of extrapolating current trends from the present. In practice, scenarios resemble a set of stories, written or spoken, built around carefully constructed plots.

Peter Schwartz
Global Business Network
Challenges to Using Scenarios in AMSA:

• Arctic Council: 8 Arctic States + Permanent Participants + Observers

• Arctic Council Constraints ~ No Involvement in:
  – Military-Security Affairs
  – Whaling (Mandate of IWC)
  – Fisheries Management

• Remote Geographic Region – Dominated by the Arctic Ocean

• Mix ~ Globalization + Climate Change + Geopolitics + Science & Technology
Key Questions for the AMSA Team:

What are the key drivers for future Arctic marine activity?

Which drivers are the most influential?
**Scenario Creation Process**

- **30,000 feet**
  - Brainstorming Factors and Forces
    - Brainstorming Factors and Forces that could impact the Future of Arctic Marine Navigation over the next 40 years

- **20,000 feet**
  - Most Important & Uncertain
    - Prioritizing, and defining, the Most Important and Uncertain Factors and Forces

- **10,000 feet**
  - Scenario Framework
    - Creating Scenario Frameworks… and Deciding upon One
    - Developing the Scenario Stories
    - Considering Regional Implications
20 Key AMSA Uncertainties

- Stable legal climate
- Radical change in global trade dynamics
- Climate change is more disruptive sooner
- Safety of other routes
- Socio-economic impact of global weather changes
- Oil prices (55-60 to 100-150 USD?)
- ***Major Arctic shipping disaster***
  - Limited windows of operation (economics)
- New Ice Age ~ Gulf Stream stops
- Maritime Insurance Industry

- China and Japan become Arctic maritime nations
- Transit fees
- Conflict between indigenous & commercial use
- Arctic enforcers (police force)
- Escalation of Arctic maritime disputes
  - Shift to nuclear energy
  - New resource discovery
- World trade patterns
- Catastrophic loss of Suez or Panama Canals
- Global agreements on construction rules and standards.
“Stricken cruise ship off Antarctica evacuated” MSNBC- 11/23/07
Groundings ~
Canadian Arctic
Aug-Sept 2010
Scenario Matrices

- **Indigenous Welfare** (lower / higher priority)
  - crossed with
- **Resource Exploitation** (uncertain / certain)

- **New Resource Development** (strong / weak demand)
  - crossed with
- **Maritime Disasters** (min / max impact)

- **Climate Change** (cool / hot)
  - crossed with
- **Level of Trade** (min / max)

- **Indigenous People** (embrace / resist development)
  - crossed with
- **Rise of Asia** (hard military / soft commercial)

- **Legal Regime** (unstable, unresolved / stable, resolved)
  - crossed with
- **Value of Natural Resources** (low, volatile / high, stable)

- **New Resource Development** (weak, restricted / strong, regulated)
  - crossed with
- **Legal Regimes** (unilateral / international)
Scenarios on the Future of Arctic Marine Navigation in 2050

**Arctic Race**
High demand and unstable governance set the stage for a “no holds barred” rush for Arctic wealth and resources.

**Arctic Saga**
High demand and stable governance lead to a healthy rate of development, includes concern for preservation of Arctic ecosystems & cultures.

**Polar Lows**
Low demand and unstable governance bring a murky and under-developed future for the Arctic.

**Polar Preserve**
Low demand & stable governance slow development in the region while introducing an extensive eco-preserve with stringent “no-shipping zones”.

AMSA/GBN Scenarios Workshops ~ April & July 2007
The Future of Arctic Marine Navigation in 2050
‘Wild Card’ Issues:
Uncertainties for Arctic Marine Use
‘Wild Card’ Issue 1 ~ Multiple Ocean Use Management & Enforcement

Bowhead Whale Migrations & Arctic Marine Operations

Possible Arctic Shipping Routes
Bering Strait Region shipping by vessel type:
1 May – 6 September 2010
New northern passages could significantly boost levels of low-lying ozone as ship exhausts pump pollutants into the pristine environment.

Emissions of nitrogen oxides and carbon monoxide from ships could triple ozone levels, making them comparable to those in industrialized regions today.

New pathway to pollution in Arctic

ONE of the bonuses of global warming is the potential for new shipping routes to open up through the Arctic as ice retreats, shortening journeys by many thousands of miles. There is a downside, however. New northern passages could significantly boost levels of low-lying ozone as ship exhausts pump pollutants into the pristine environment.

Climate models indicate that the northern passages—the north-east coast of Siberia, northern Alaska and around the Canadian archipelago—may be open to shipping during the summer months from around 2050 onwards. Claire Granier, from the University of Pierre and Marie Curie in Paris, France, and her colleagues calculated the likely ozone emissions associated with such a scenario, assuming that the routes would be accessible for six months of the year.

Emissions of nitrogen oxides and carbon monoxide from ships could triple ozone levels, making them comparable to those in industrialized regions today (Geophysical Research Letters, DOI: 10.1029/2006GL026180).

“The Arctic is a very sensitive region and these very high ozone levels are likely to have a serious impact on plant life,” says Ulrike Niemeier, a co-author from the Max Planck Institute for Meteorology in Hamburg, Germany.
Today’s Maritime Arctic (200 NM Exclusive Economic Zone) - Hypothetical - Future Maritime Arctic (After UNCLOS Article 76)

The ILULISSAT Declaration

- Conference of 5 Coastal States Bordering on the Arctic Ocean (Canada, Denmark & Greenland, Norway, Russia, USA)
  - 27-29 May 2008 ~ Ilulissat, Greenland
- LOS/UNCLOS Provides ‘Solid Foundation’
- ‘We therefore see no need to develop a new comprehensive international legal regime to govern the Arctic Ocean.’

‘Wild Card’ Issue 4 ~ Continuing UNCLOS Challenge
Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle

- 13% Undiscovered Oil
- 30% Undiscovered Natural Gas
- 20% Undiscovered Natural Gas Liquids

http://pubs.usgs.gov/fs/2008/3049/

‘Wild Card’ Issue 5A ~ New Resource Discoveries
Probability of Presence of Undiscovered Oil and/or Gas Fields

Coastal Seas

‘Wild Card’ Issue 5 B~ New Resource Discoveries
Future Convoy Requirements?

Icebreaking (Double Acting) Container Ship
Norilskiy Nickel in the Kara Sea
March 2006
Объем транспортировки – 12 млн. т сырой нефти в год.
Навигационный период – 365 дней.
Порт назначения – порты Европы и Северной Америки.

Танкер усиленного ледового класса дедвейтом 70 646,6 тонн.
Толщина льда 1,25 – 1,8 м.
Средняя продолжительность ледового периода – 213 дней.
‘Wild Card’ Issue 8: Arctic Marine Tourism Growth
‘Wild Card’ Issue 9 ~ Summer Northeast Passage
2009 Voyages of Beluga Fraternity & Beluga Foresight
Beluga NSR-NEP Voyages Summer 2009

© Kirill Berzin vesseltracker.com
Icebreaker Transits to the North Pole & Trans-Arctic Voyages (1977-2010):

- 83 Transits to the North Pole (70 Russia, 6 Sweden, 3 USA, 2 Germany, 1 Canada, 1 Norway)
- Single Non-summer NP Voyage (Sibir Voyage May-June 1987)
- 39 Ship Transits to the NP in 2004-2010

‘Wild Card’ Issue 10:
‘Clear Evidence of Central Arctic Ocean Navigation’

25 May 1987 ~ North Pole
Soviet Nuclear Icebreaker Sibir
‘A Walk Around the World!’
Today’s Arctic Commercial Marine Use

- Hard Minerals
- Marine Tourism
- Key Fisheries
- Oil & Gas
- Summer Sealift
- Exploration/Science

High Grade Iron Ore??

Zinc & Coal
Nickel & Copper

Arctic Ocean Marine Routes
Arctic Marine Shipping Assessment of the Arctic Council (2005-2006)
- Northern Sea Route
- Northwest Passage
- Key Marine Routes
- Notable Icebreaker Voyages:
  - Arktika, August 1977
  - Sovetskiy Soyuz, August 1991
  - Polar Sea and Louis S. St-Laurent, July and August 1994

Sea Ice, 16 September 2002

by Mapping Solutions, Anchorage 2005 for L. Brigham, USARCl
AMSA Scenarios ~ Successes

• Facilitated New & Unconstrained Thinking
• Identified Major Drivers & Key Uncertainties
• Educated Arctic Council Customers - Arctic Ministers & Many Stakeholders
• Identified Linkages to the Global System
Future Arctic Marine Transport Modes
Future Arctic Marine Transport Modes

Churchill to Murmansk Route
Future Arctic Marine Transport Modes

Churchill to Murmansk Route
The Maritime Arctic of the Future?

Improving Coastal Access

2011 to 2050+

Summer 2020?
Summer 2040?
Year-round 2020?
2011 to 2050+

Imposing Coastal Access

by Mapping Solutions, Anchorage 2005
for L. Brigham, USARC