Iceberg Monitoring Within the North American Ice Service

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Outline

I. Mission overview
   - International Ice Patrol
   - North American Ice Service

II. Joint mission execution
   - Reconnaissance
   - Products
   - Benefits

III. NAIS initiatives
   - Future Customer Needs
   - Future Area of Responsibility
   - Future of Mission Execution
Mission History
Do Modern Ships Hit Icebergs?
International Ice Patrol Mission: monitor iceberg danger near the Grand Banks of Newfoundland and provide the iceberg limit to the maritime community.
North American Ice Service Mission: leverage the strengths of each service to monitor and provide the highest quality, timely, and accurate ice analysis, in order to meet the needs of the maritime interests of the United States and Canadian governments.
NAIS Joint Reconnaissance Strategy

A No sea ice – satellite surveillance once per month.

With sea ice – no surveillance, no dedicated flights.

B Limit is here or further north – fly once per month.

Limit to the south – no flights.

Satellite surveillance as available.

C Limit here – fly every 7-14 days.

Limit further south – fly once per month.

Satellite surveillance as available.

D & E Limit here – fly every 5-10 days.
Benefits of Joint Mission Execution

- Reduced redundancy
  reduced chart production ~33%
  consolidated text products

- Improved efficiency
  continuity of operations
  reconnaissance coordination/strategy

- Improved service to mariners
  seamless products, distribution, reporting
  met IMO standard
NAIS Initiatives

2013+:

- Refine NAIS reconnaissance strategy
- Iceberg Analysis and Prediction System replacement
- Continue NAIS model operational evaluation
- Continue satellite/UAV evaluation
- Develop ECDIS product
Future Customer Needs?

**Transatlantic Mariners:** Iceberg Limit with density remains sufficient

**Subpolar Mariners:** Iceberg Limit with density sufficient or will individual iceberg positions be desired/feasible?
Annual Average LAKI Area and Total Accumulated East Coast Regional Sea Ice Coverage vs. Year (1983 - 2012)
Icebergs South of 48 N and Total Accumulated East Coast Regional Sea Ice Coverage vs. Year (1983 - 2012)
Number of Icebergs Estimated to have Passed South of 48 N

- Icebergs South of 48 N
- Five Year Running Average
Future Area of Responsibility?
Future of Mission Execution?

**Immediate Future (2014)**
Execute NAIS reconnaissance strategy

**Near Future (2015-2020)**
Incorporate commercial reconnaissance to supplement USCG for IIP
Incorporate satellite and other data sources

**Eventual Future (~2020+)**
Rely primarily on satellite and other data sources
(such as AIS, ELINT, LRIT, VMS)
Space-Borne Reconnaissance

- **Challenges:**
  - Access
  - Cost
  - Coverage
  - Discrimination
  - Resolution

- **IIP/CIS studies in 2011**
- **NAIS evaluation in 2012**
  - Radarsat-2 - C-CORE
  - TerraSar X - NIC
  - Underflight - IIP

- Missed Detection
- Correlation
- False Positives
Summary

- Icebergs remain a danger to mariners within the NAIS area of responsibility.

- The iceberg population south of 48N has historically exhibited significant interannual variability that is expected to continue.

- NAIS customer needs may require more detailed information and/or an expanded area of responsibility in the future.

- NAIS mission execution will depend on funding, resources, and evolving technology.

- Moving to satellite and other data sources requires development of infrastructure and expertise for required data fusion.
Questions?