



# Inuit Society using Earth Observation Based Services

from a Floe Edge Service perspective



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# Overview

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- ❖ Context
- ❖ Information Gathering and Needs
- ❖ Use of EO based services and issues
- ❖ Summary of challenges for Space Technologies



# Context

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1. The Inuit in Canada's north are spread across 53 communities.
2. The four Inuit regions encompass more than 40% of Canada's landmass. (4 M sq km)
3. The environmental changes from the changing climate is amplified in the Arctic.
4. The Inuit livelihood and the environment are closely coupled.



# Needs and Challenges Gathering

- Interaction with primary contact in each community over floe edge service for 6 year duration.
- Community workshops on the floe edge
- Nunavut sea ice and weather traditional knowledge workshops
- Work with social scientists capturing traditional knowledge on Inuit use and occupancy of sea ice, as well as Climate change and Inuit of Canada

# Workshops



Photo credit: M. Kapfer



Photo credit: G. Laidler



Photo credit: G. Laidler



Photo credit: G. Laidler



# Northerner Needs

## Sea Ice, the Human Context

- ❖ Almost all Nunavut, Nunavik, and Nunatsiavut communities are on the coast. All communities on the NWT islands are coastal and a few along the mainland coast.
- ❖ Sea ice is their transportation corridor providing access to communities and hunting grounds on other islands, or along the coast. Distances of 2000 km is not uncommon.
- ❖ Sea ice is dynamic and like weather, changes daily
- ❖ Travel is becoming more dangerous, sea ice is thinner
- ❖ Information required for:
  - ❖ safety,
  - ❖ route planning (efficacy), and
  - ❖ pinpoint destination



# Northerner Needs

## Sea Ice, the Wildlife Context

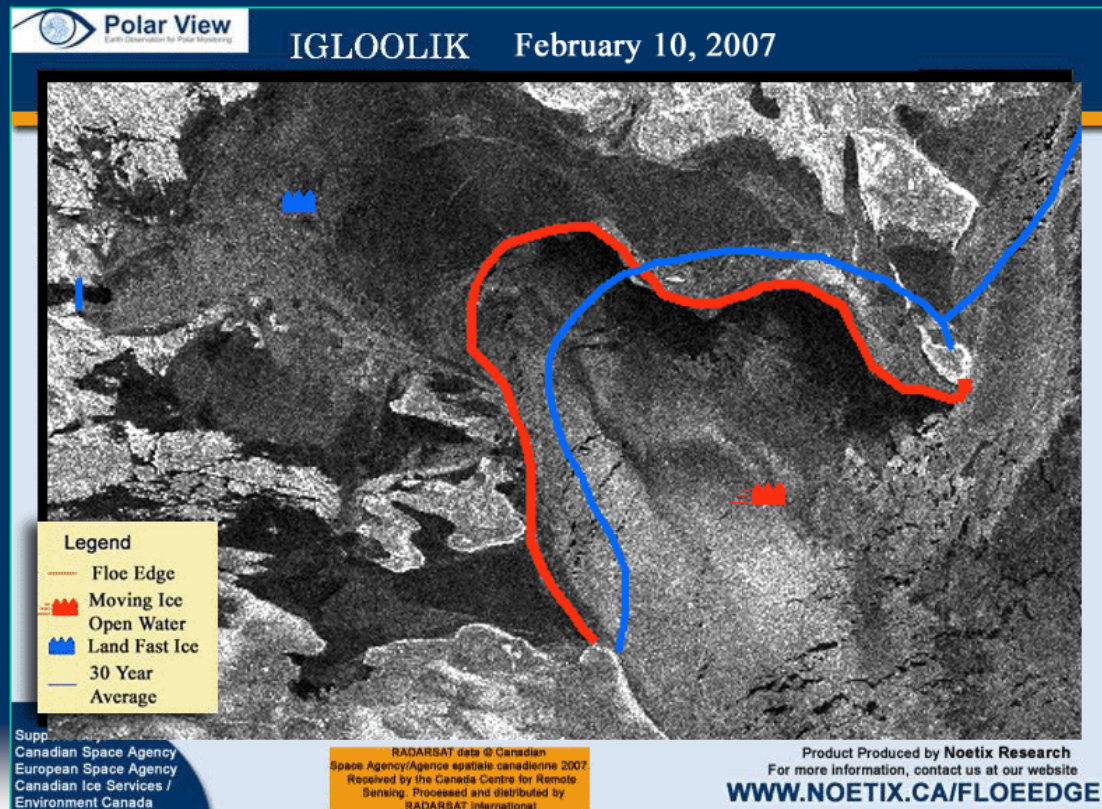
- ❖ Food is 3-10 x more expensive than in the south, traditional country food remains a staple.
- ❖ Floe edge is rich in nutrients, critical for food chain and attracts marine life
  - Whales feed on the crustaceans, fish
  - Walrus prefer floes with open water
  - Thin ice, floes, and leads preferred for seals
- ❖ Traditional hunting grounds on land often require crossing straits and other waterways





# Floe Edge Service

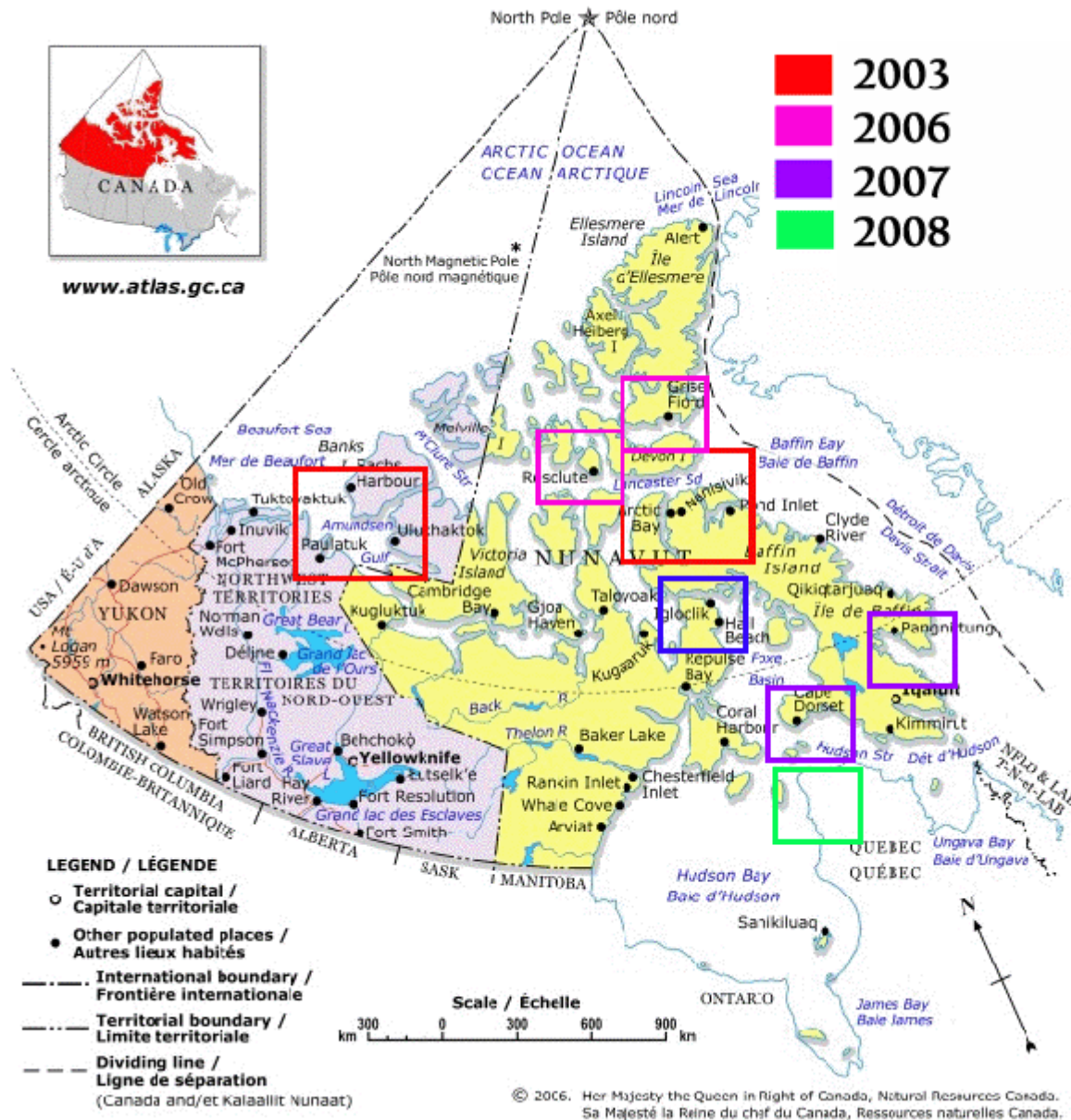
Provide northern communities a product showing **current** information on **local** sea ice conditions, notably the floe edge.







www.atlas.gc.ca



# Users – Floe Edge

## Users (250 accounts)

- Hunters
- Federal agencies
- Conservation officers
- Tourism and media
- Community schools





Photo credit: J. Qaspik



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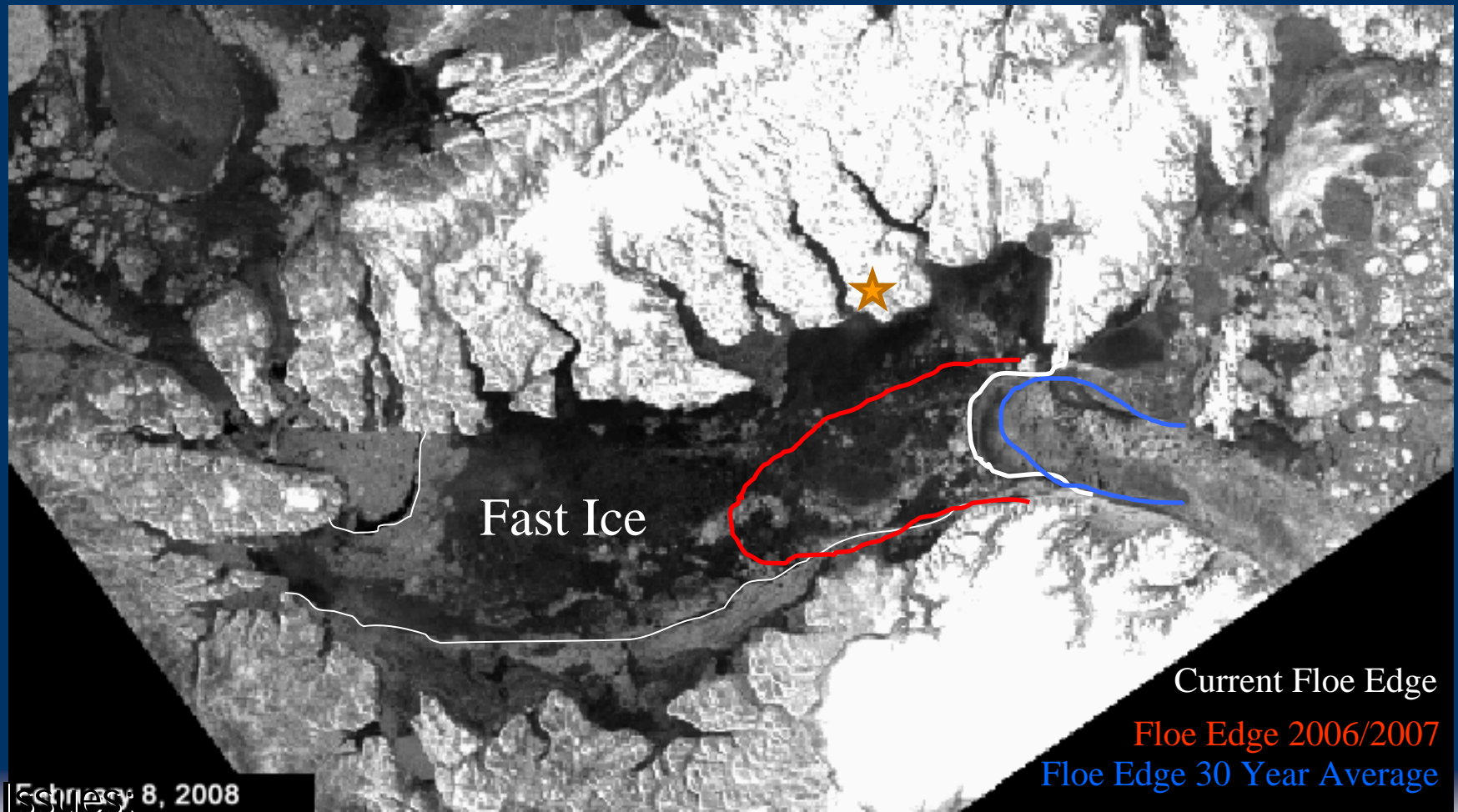


Photo credit: J. Qaspik





# Use of EO based Floe Edge service



- 24 hrs of darkness (Oct-Feb)

- Rough ice not navigatable
- Floe edge is dynamic

February 14, 2007

Fast



Mobile

Fast

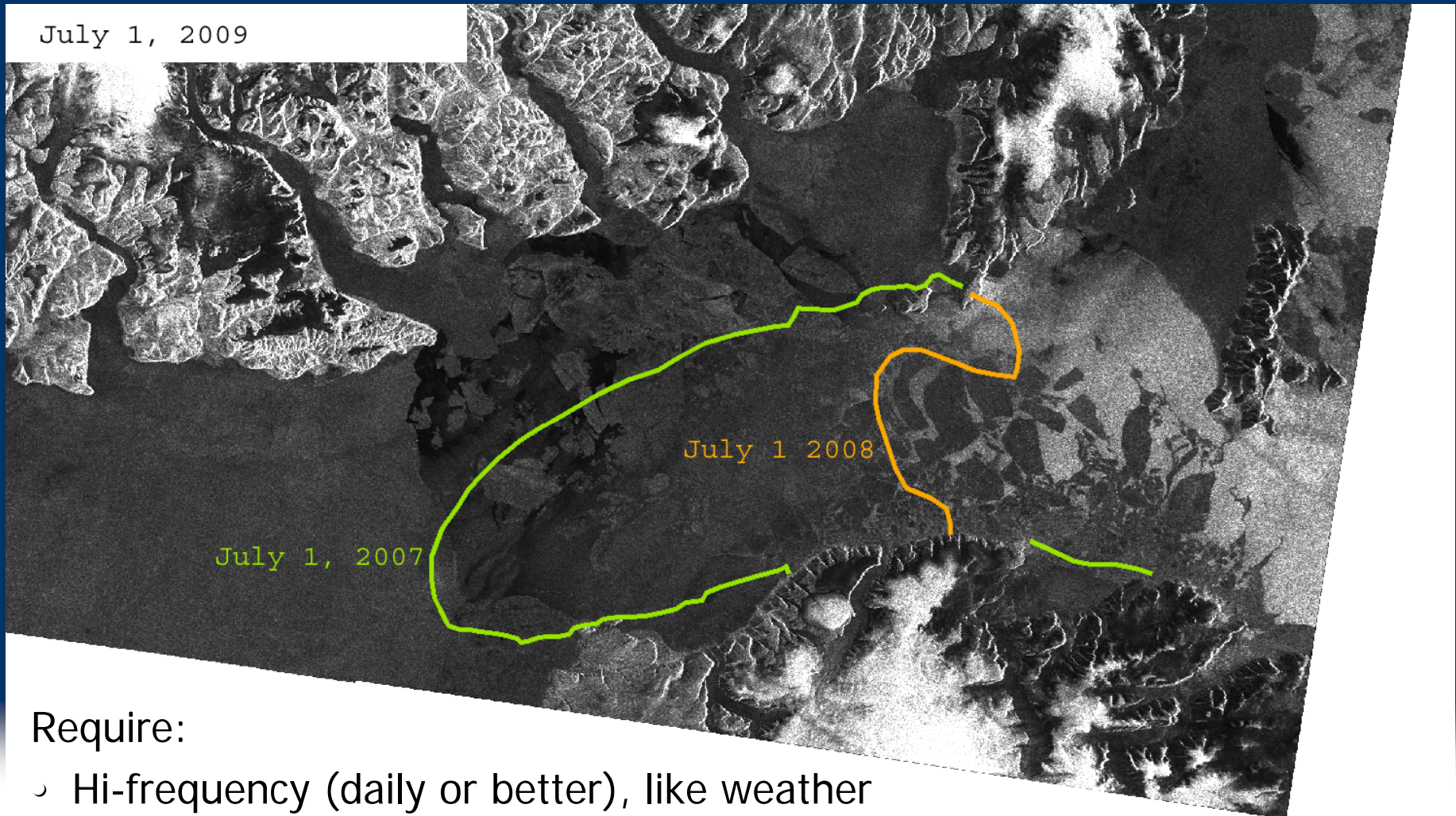
RADARSAT data © Canadian  
Space Agency/Agence spatiale canadienne 2007.  
Received by the Canada Centre for Remote  
Sensing. Processed and distributed by  
RADARSAT International

0 15 30 60 Kilometers





# Ice Break-Up Inter-annual Variability and Rapid Change



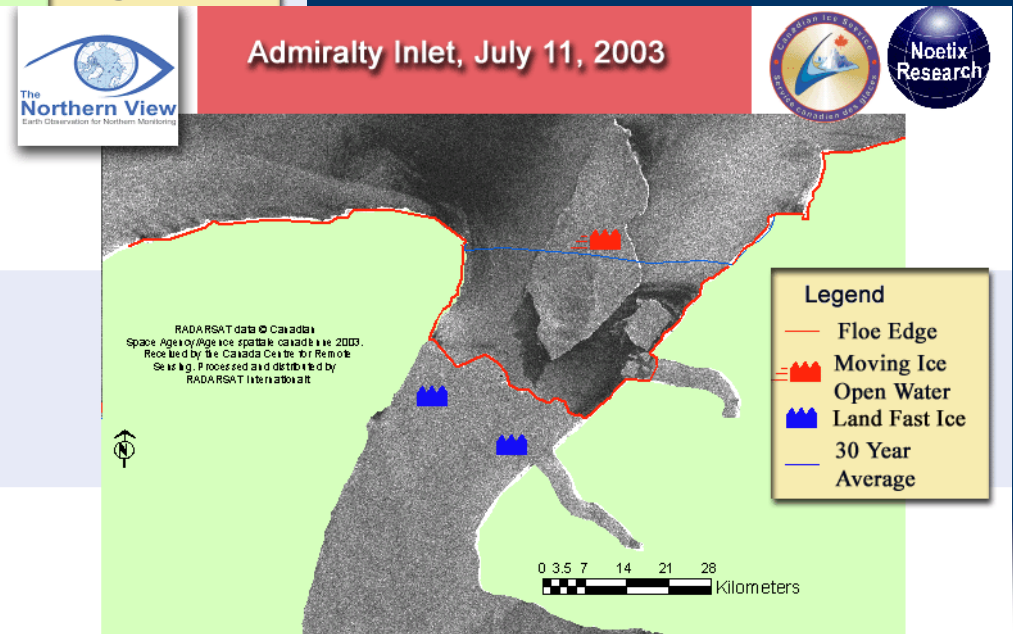
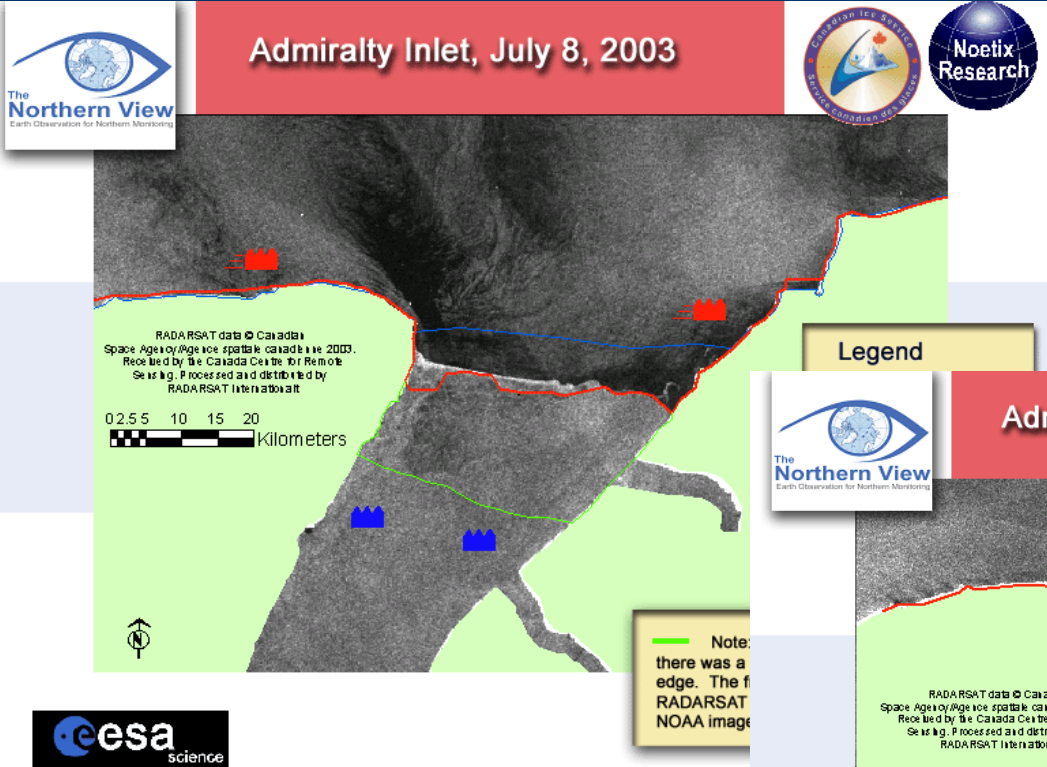
Require:

- Hi-frequency (daily or better), like weather





# Search and Rescue : Early Warning

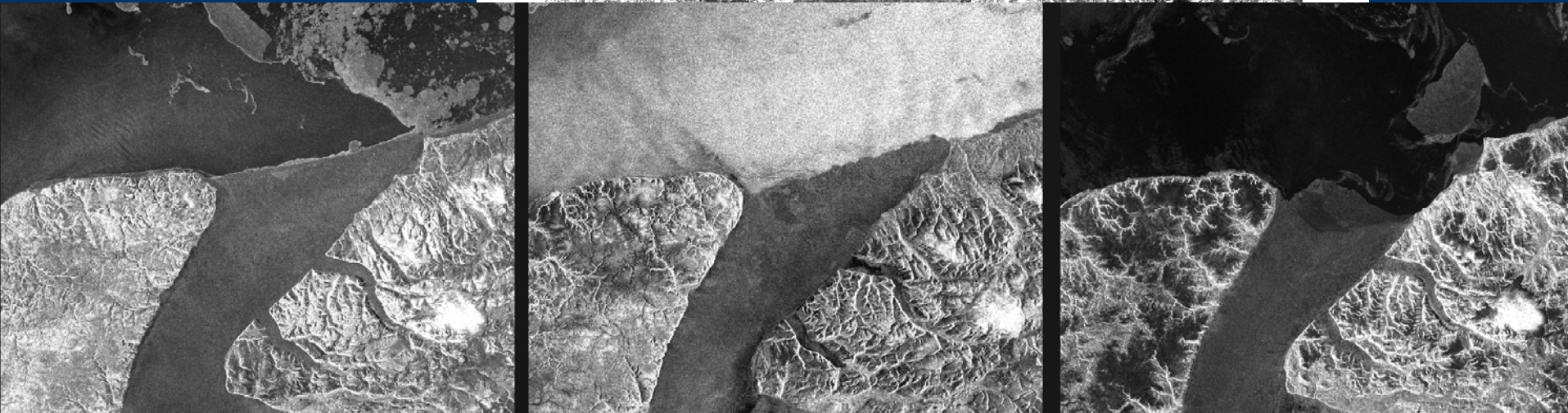
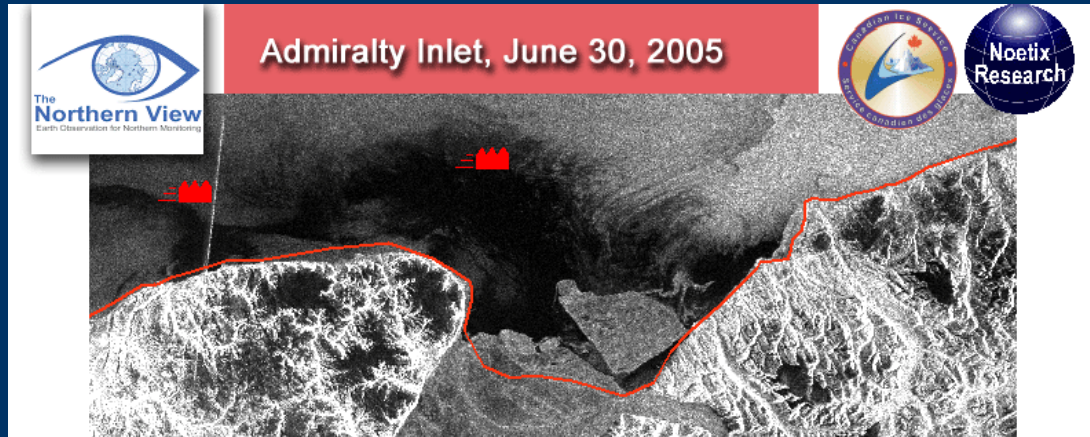


# More examples: 7, 14, 21 June 2009; June 30 2005



Lacking:

- ❖ Access to info in the field
- ❖ Local wind forecasts/currents





# Challenges

- ❖ IT infrastructure is limited in Hamlets (Internet model)
- ❖ Visualization of hardcopy products is lossy (Digital visual tech)
- ❖ Integration of Satcom-EO services-GPS in the field
  - ❖ Telecommunications outside of hamlets requires Satcom and bidirectional communications lacking
  - ❖ Harsh climate conditions (-40 C, polar winter, blizzards) combined with long travel distances push limits of technology
  - ❖ Products are large (MBs) and stress bandwidth to northern communities (optimized compression)
- ❖ Local weather forecast accuracy not at same level as in south
- ❖ Ice thickness is the most important parameter required but elusive to date



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Thank you!

[www.noetix.ca/floedge](http://www.noetix.ca/floedge)