



The Role of Satellite Technology in Arctic governance

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Kongsberg Satellite Services



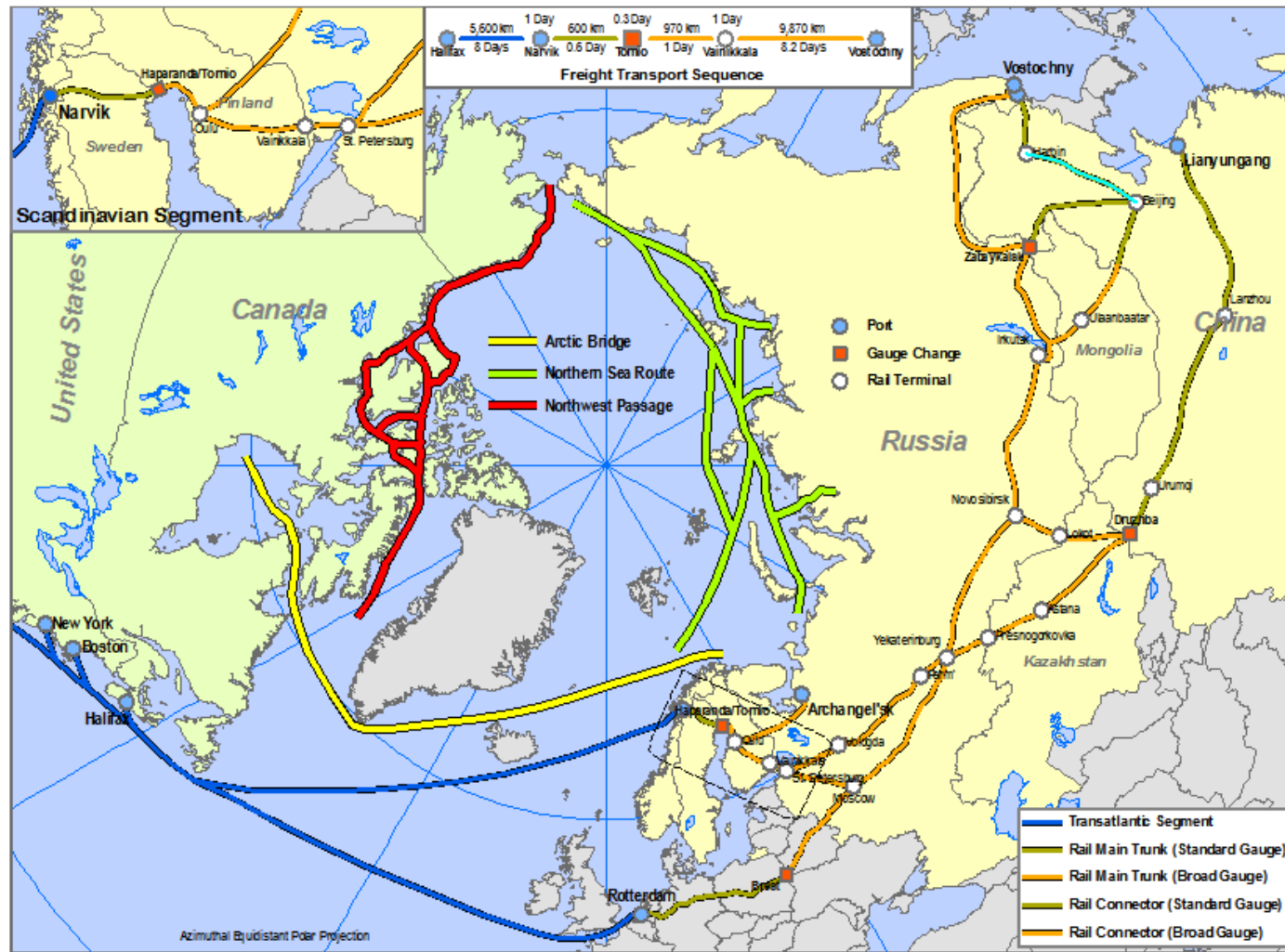
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Hammerfest



1890 – early adopters of new technology

Narvik: a node in the global transport network



Example of Polar Operations



Svalsat 78° North



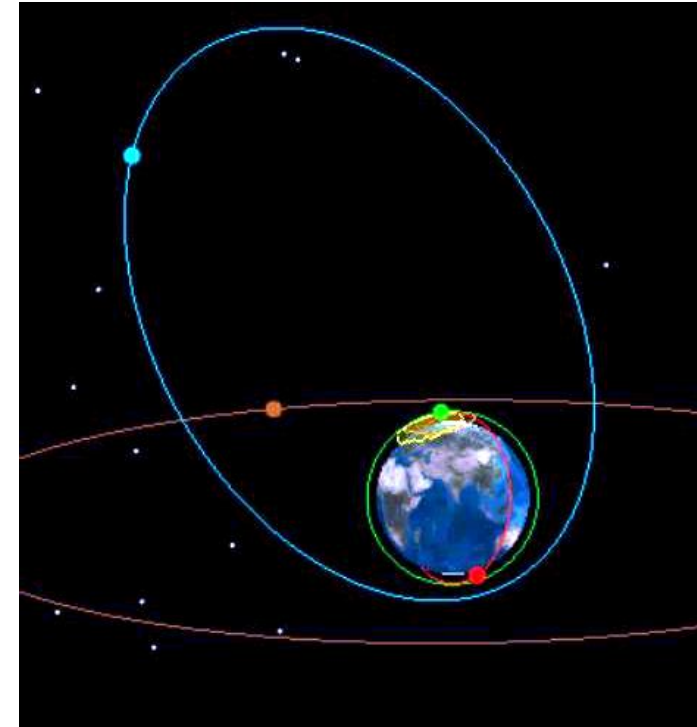
Trollsat 72° South



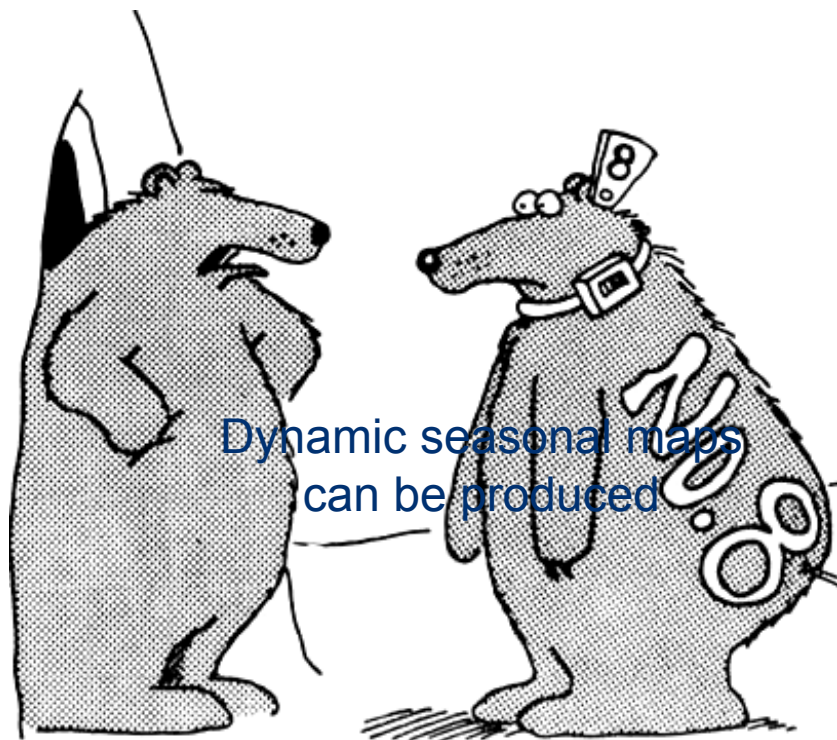
Tromsø 69° North

Satellite Technology

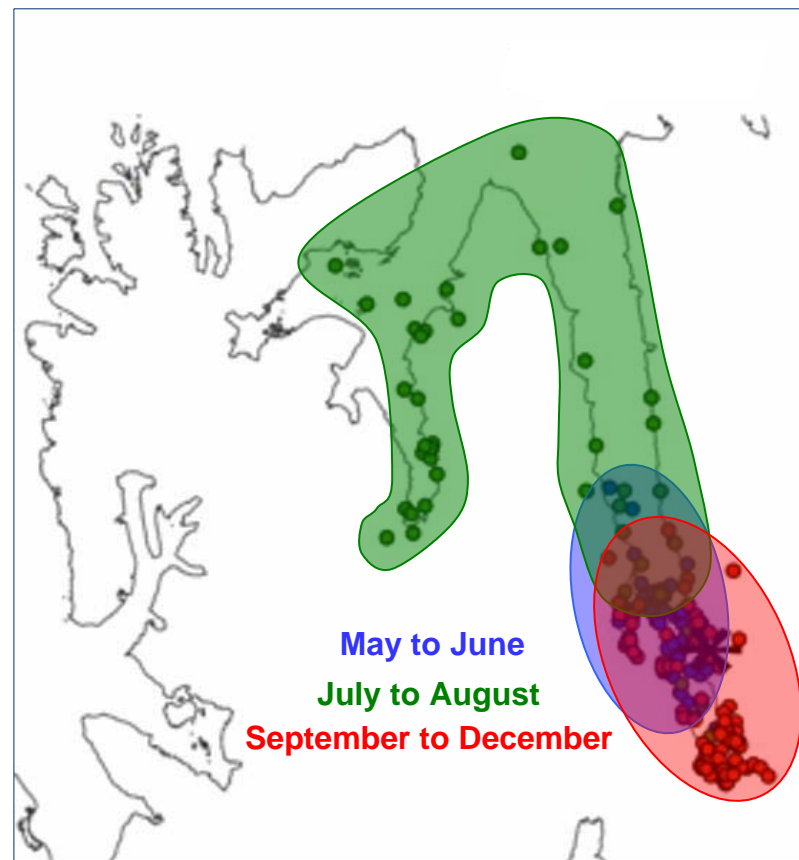
- Imaging
 - Synthetic Aperture Radar
 - Optical
- GNSS (Global Navigation Satellite Systems)
 - Tracking animals, people and assets
 - GPS (United States)
 - Galileo (European)
- Communications
 - Iridium
- Future
 - Molinya orbits
 - Pseudo-geostationary satellite series
 - Meteorolgical observations (eg. Better information about power lows)
 - Telecommunications
 - Satellite-based AIS (Automatic Identification of Ships)



GNSS data

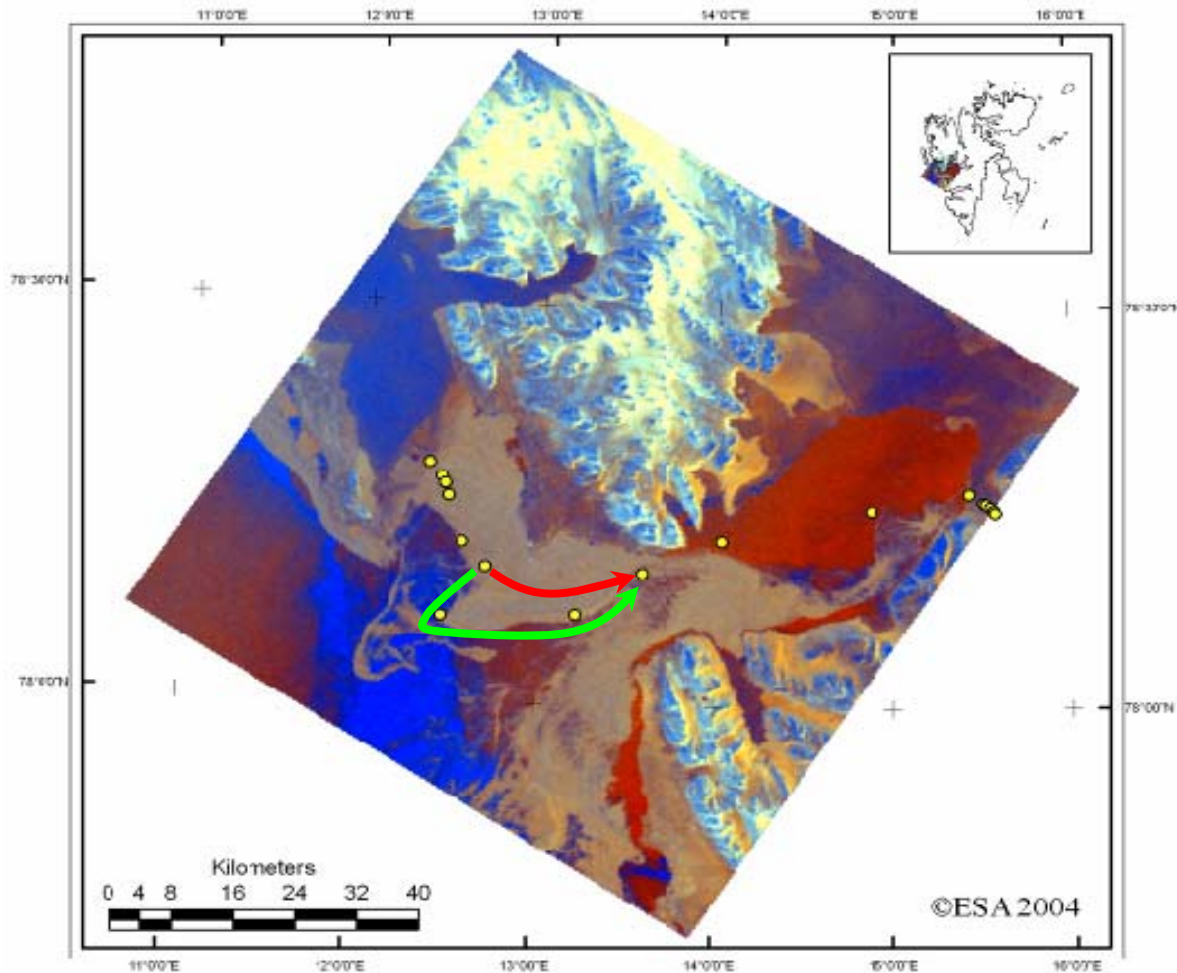


Have you been playing with the scientists again?



For Illustration purposes only
GPs data: ©Norwegian Polar Institute

Optimal Route

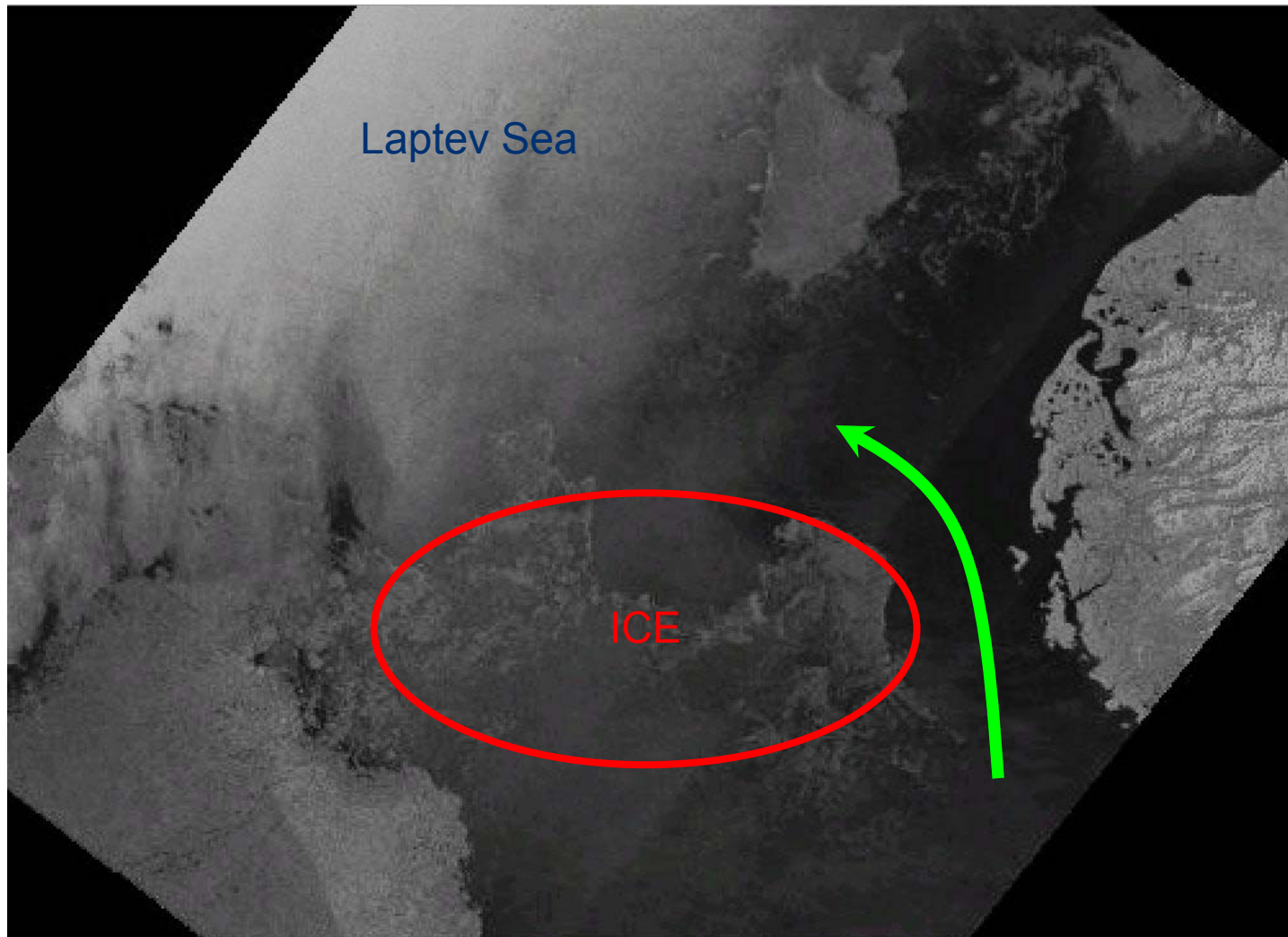


Planned direct route
through the ice
6 hours

Actual route
around the ice
3 hours

The view from above
- halved the journey time

The open Northern Sea Route 6th September 2008



Open water \neq navigable route

M/V Explorer



Antarctic Peninsula 22nd November 2007

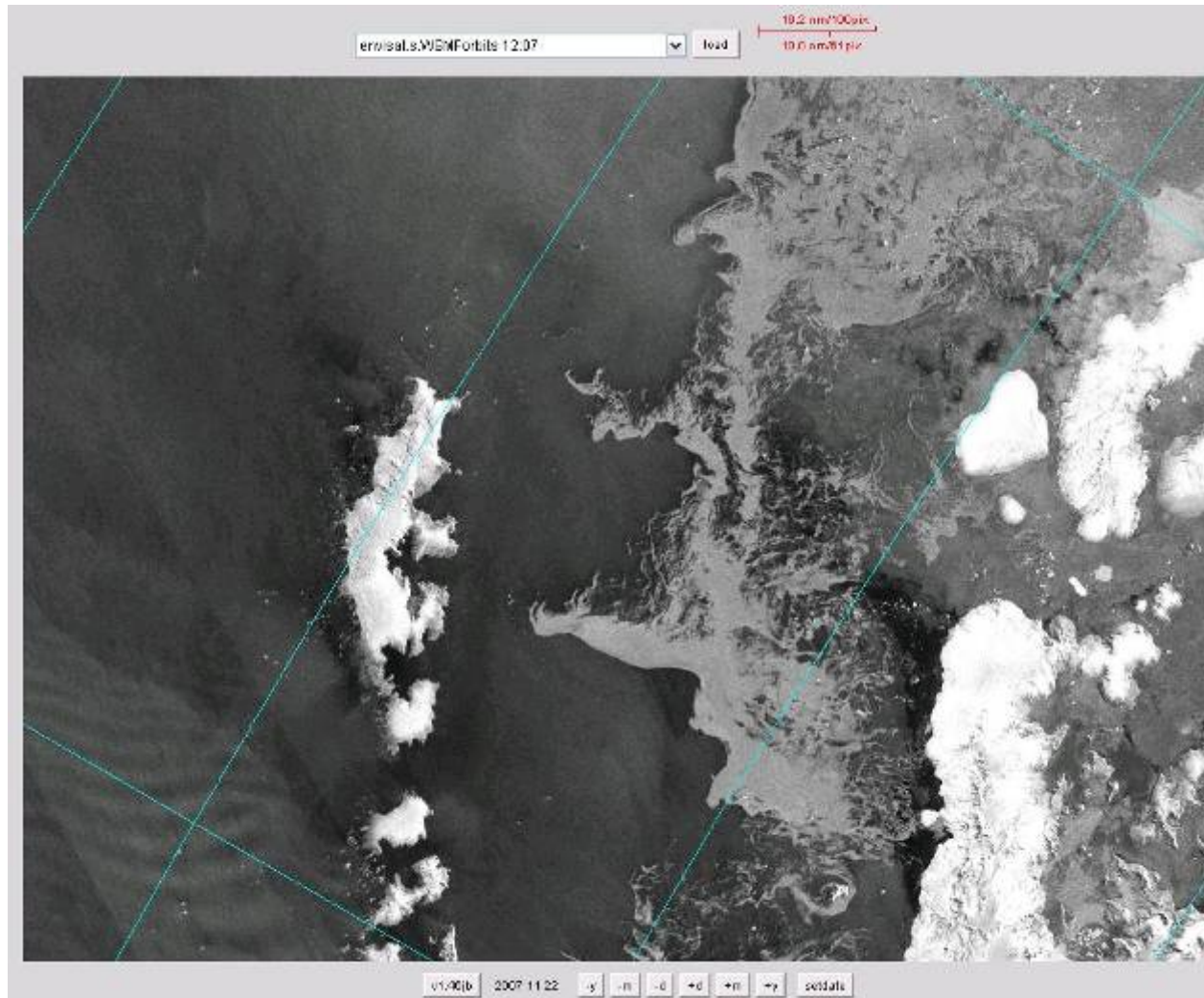
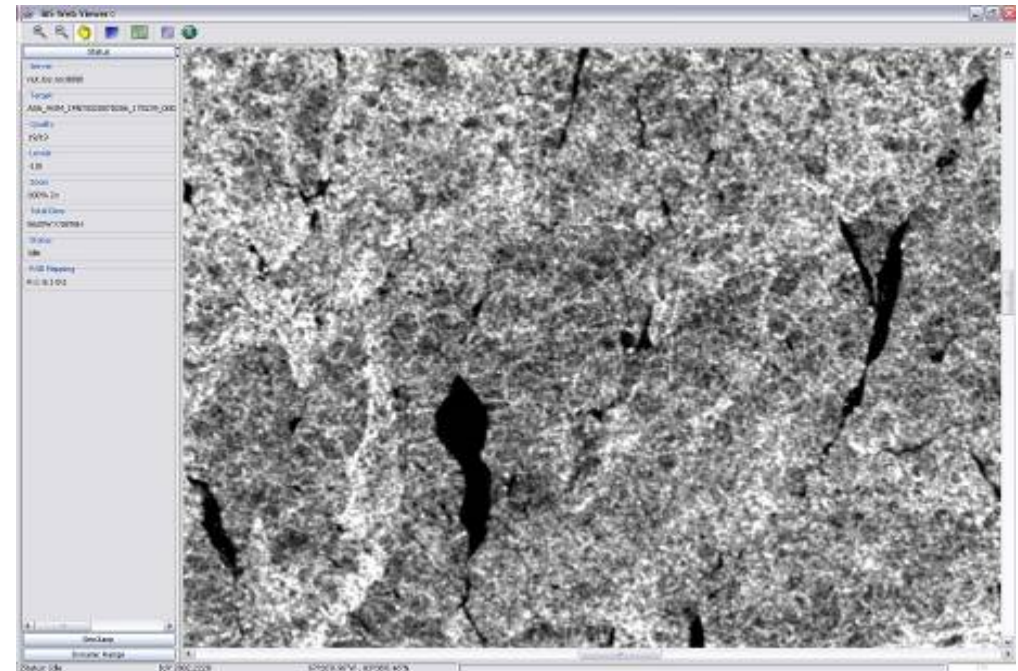
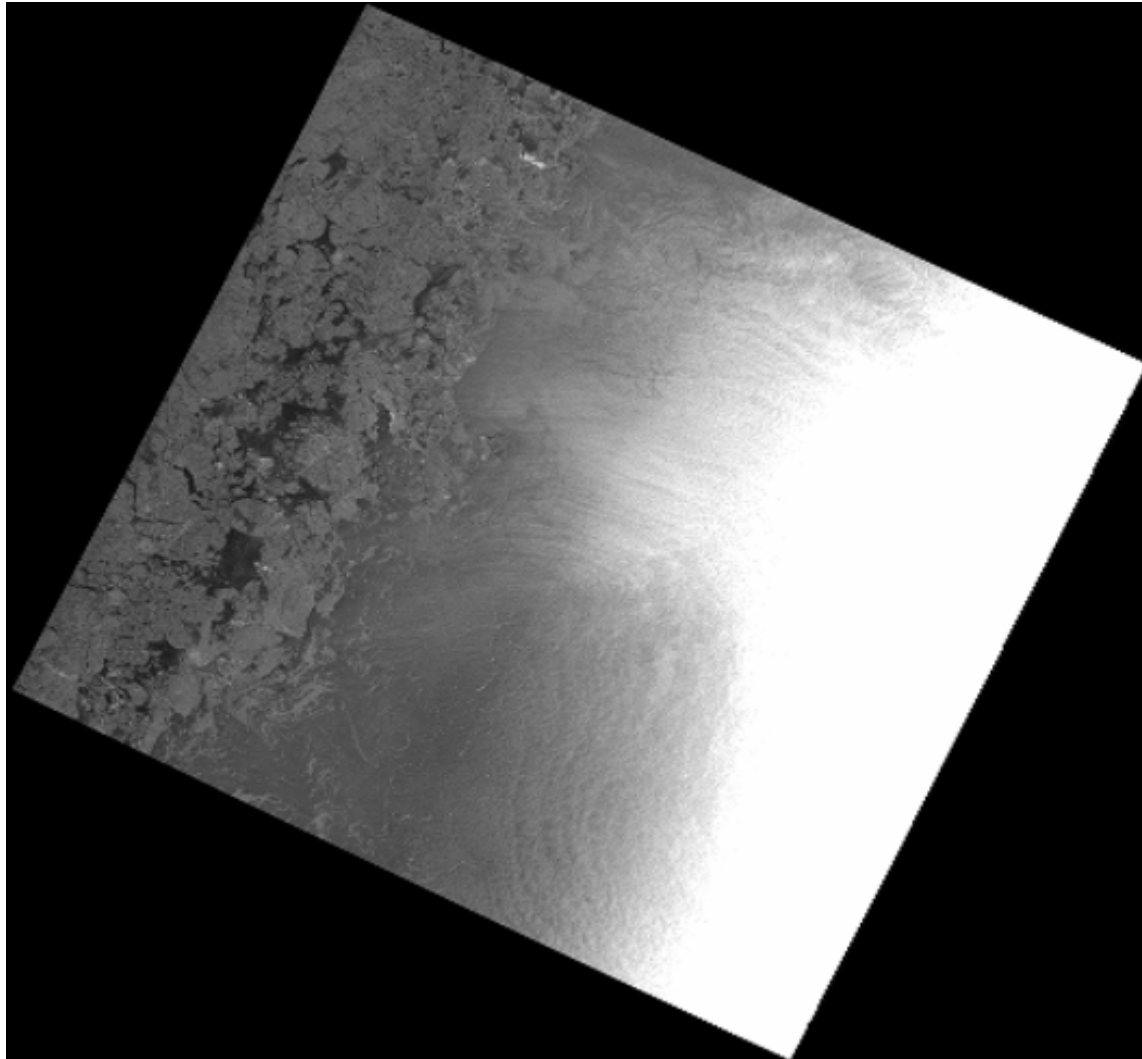


Image Anywhere - Access in the field

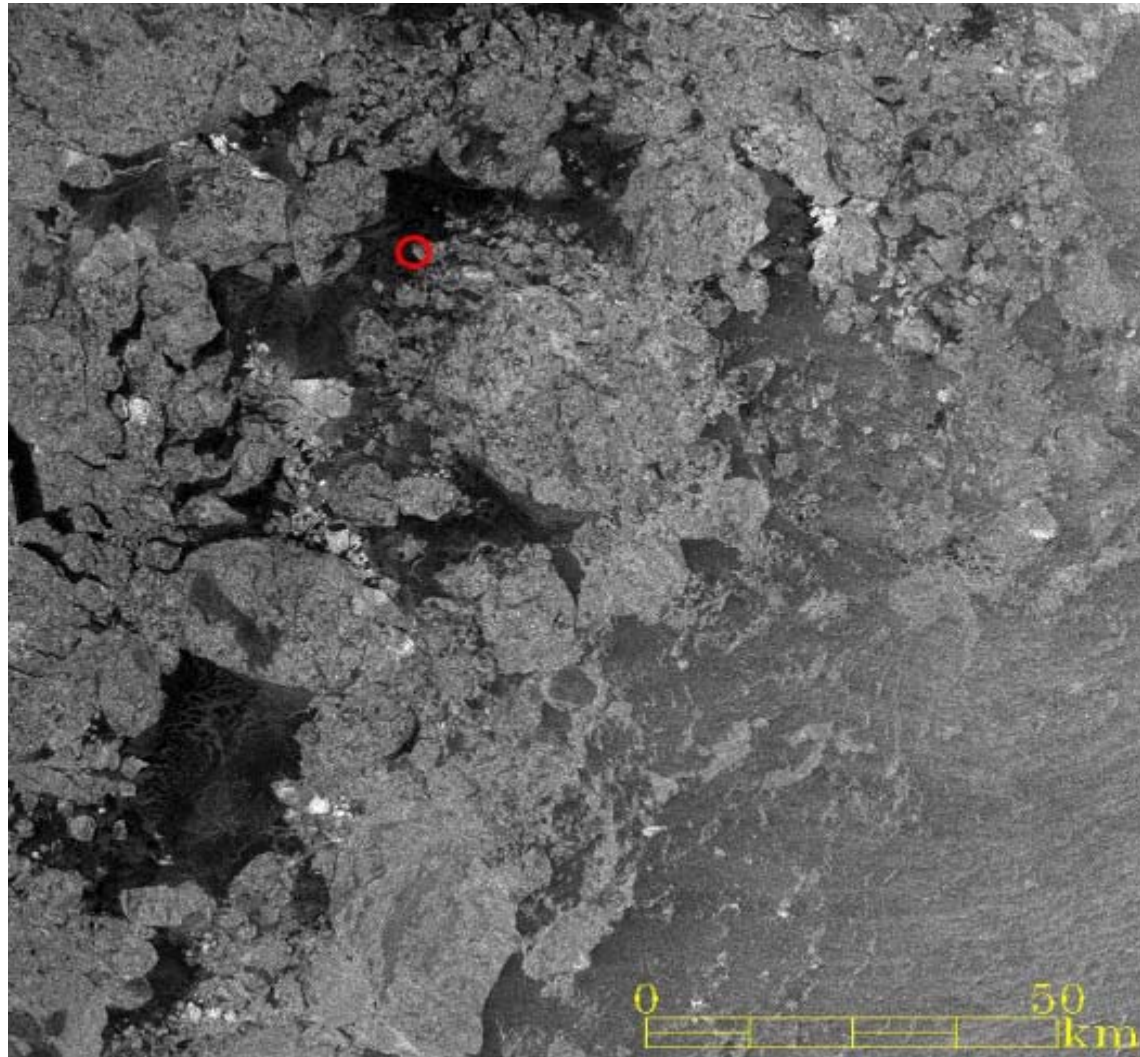
- Based on JPEG 2000 technology
- High resolution images and maps can be viewed anywhere in the world.
- Technology can operate regardless of communication capacity
 - e.g. iridium phone
- Allows tactical decisions to be made with best available information



Opening Image



First zoom

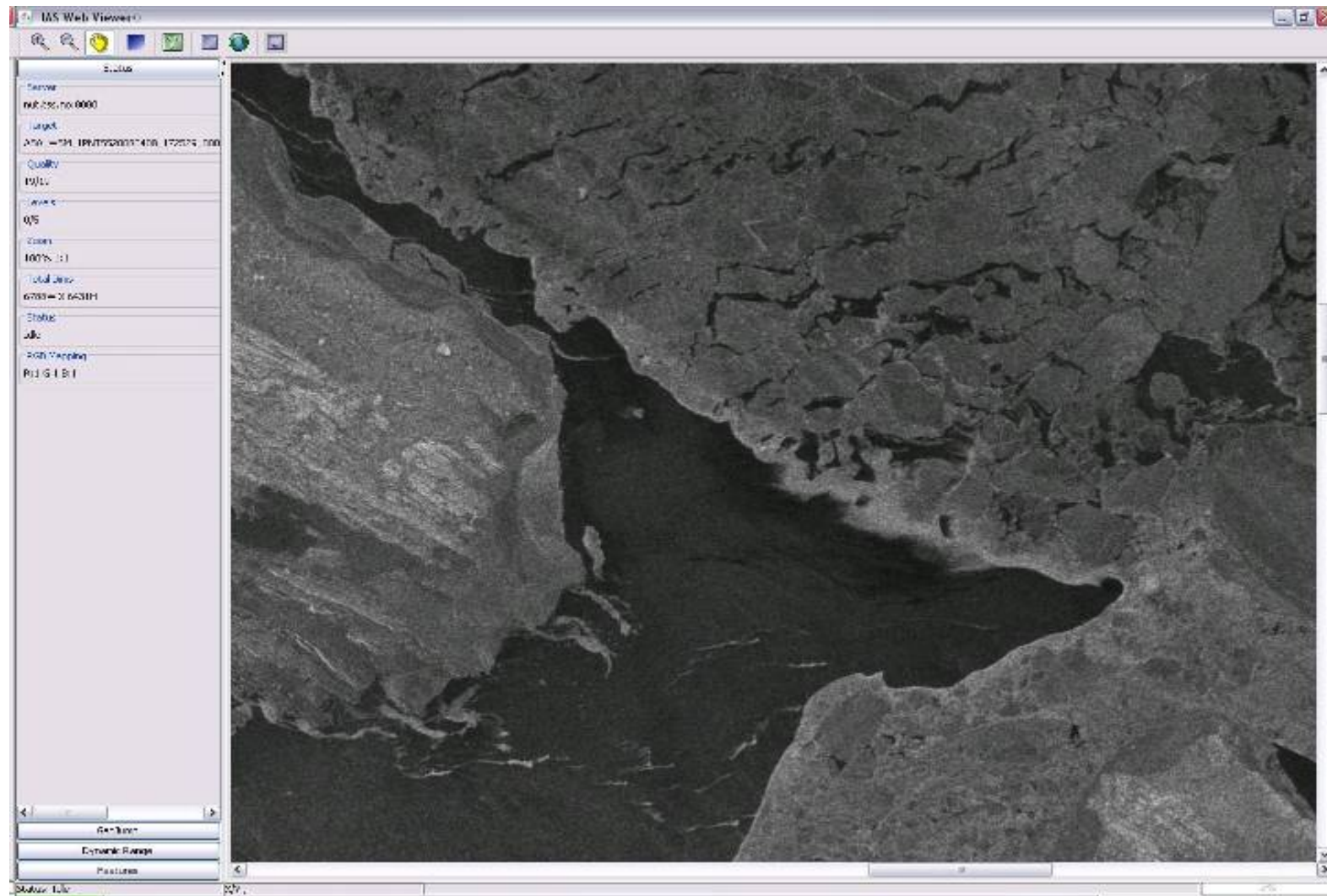




The Detail



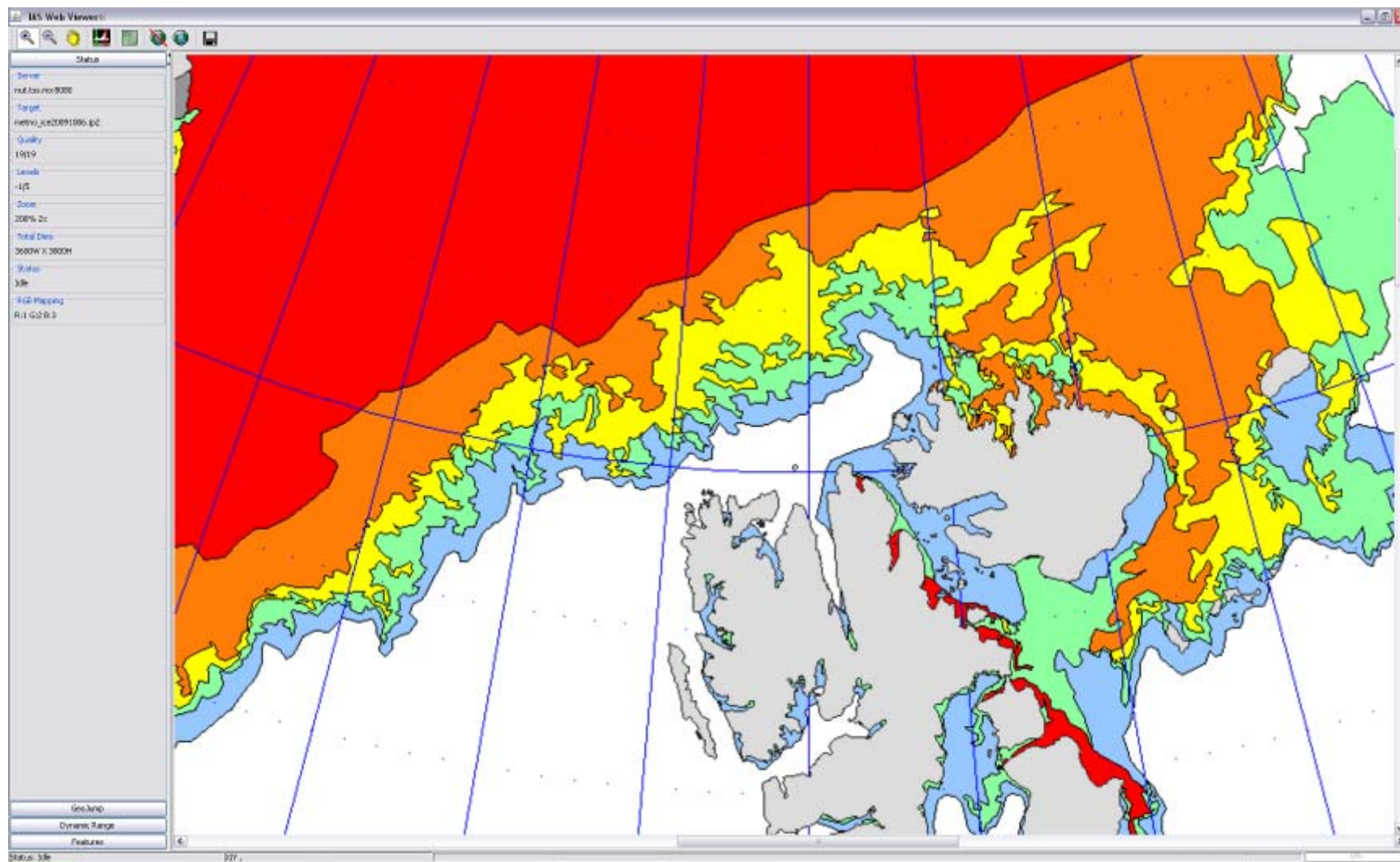
Image Anywhere: Kara Gate, 8th April 17:25 GMT



Met Norway Ice Chart: 6th October 2009



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Real time access to high resolution satellite data

Benefits

- Safety
- Saves time
 - Easiest, simplest route can be identified
 - Navigate around obstacles
- Saves money
 - Less fuel consumed
 - Less hull maintenance
 - Less time in dry-dock and therefore potential increase in number of operating days per year.


Validations during winter 2005 in the Baltic indicated a time saving potential of 20% when sailing in ice with the aid of satellite data.

Integration of environmental information



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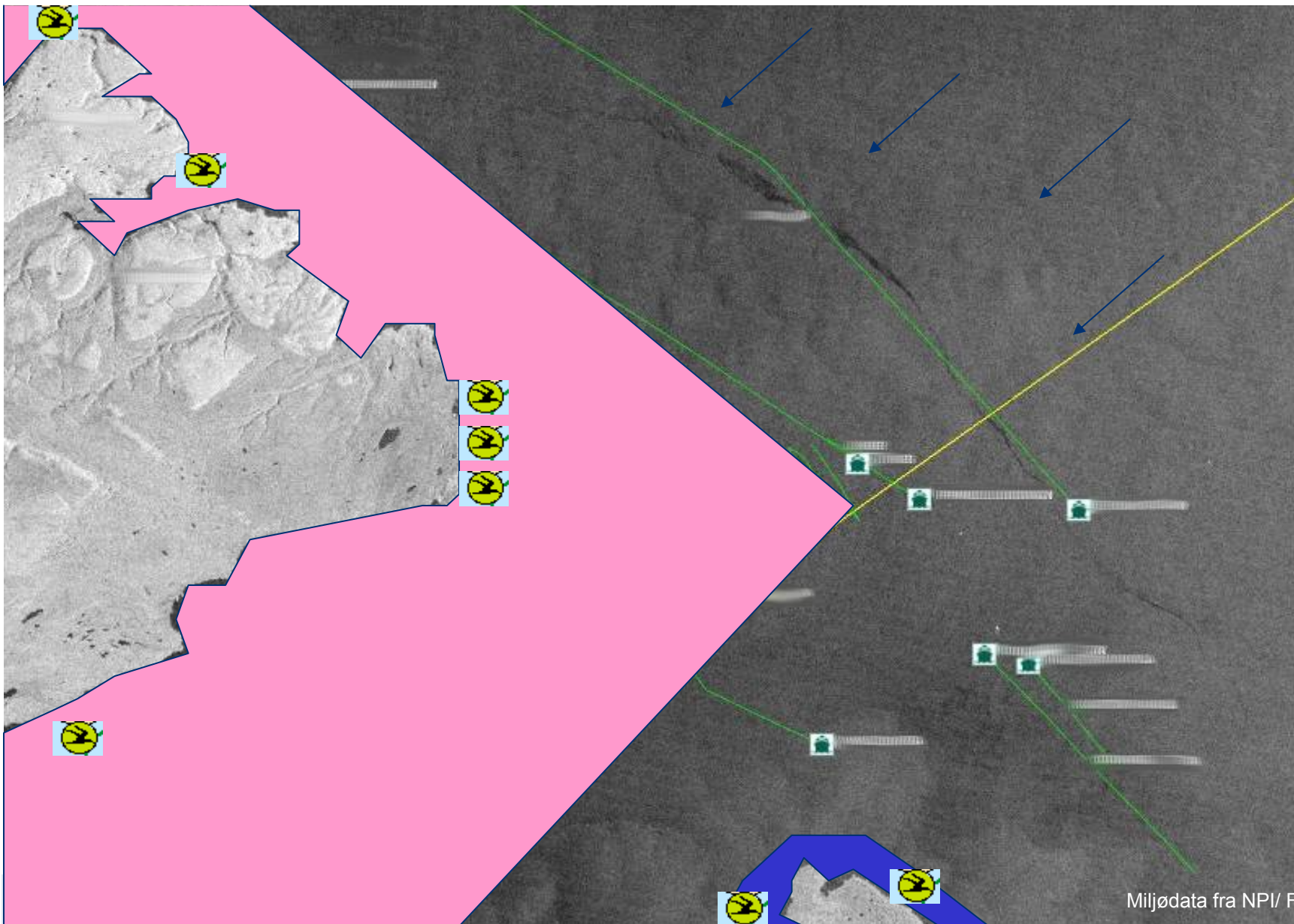
Tegnforklaring

 Hekkekoloni

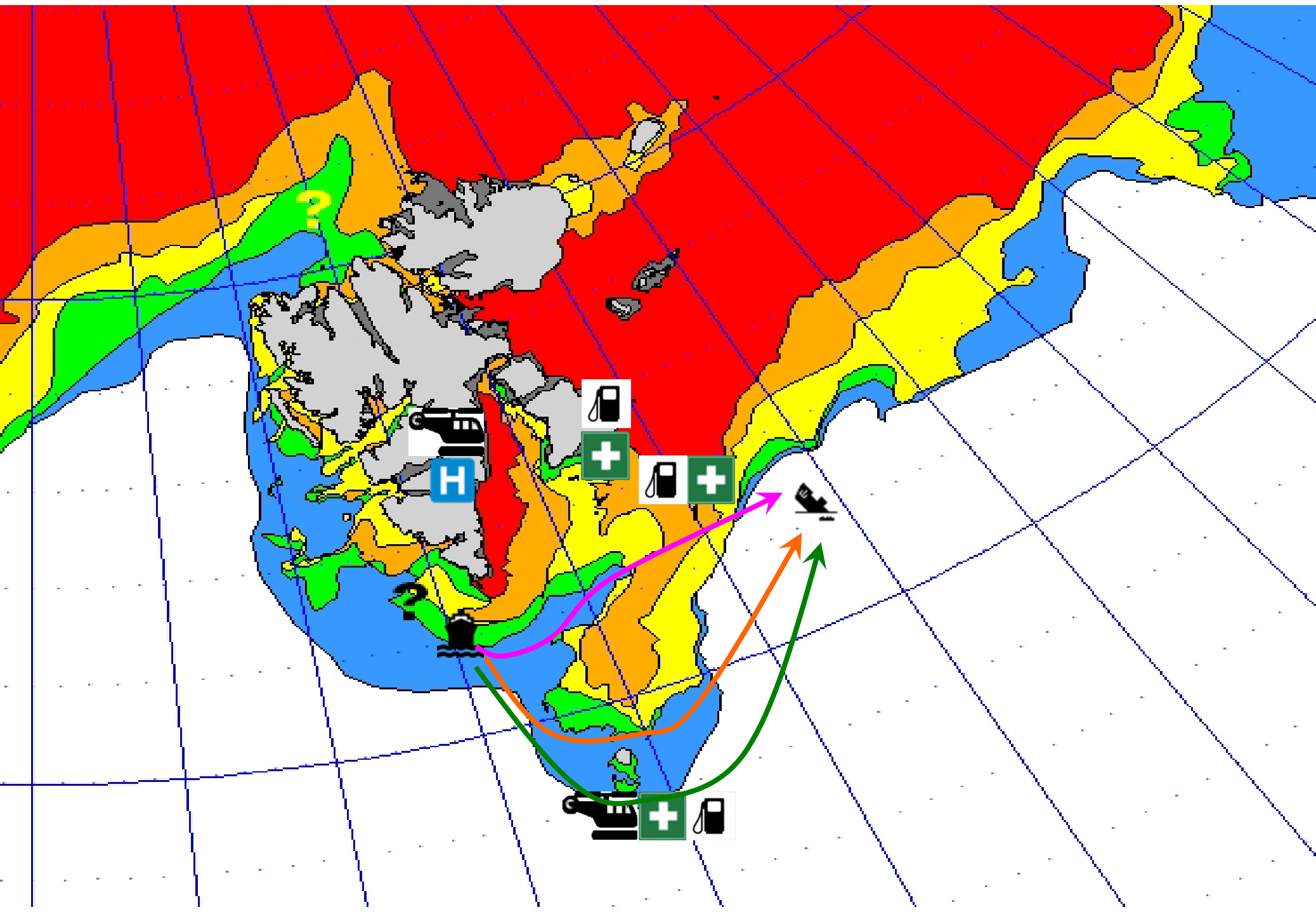
Verdifulle områder

-  Gytefelt lodde
-  Gytefelt kongekrabbe
-  Steinkobbe
-  Korallrev

 wind



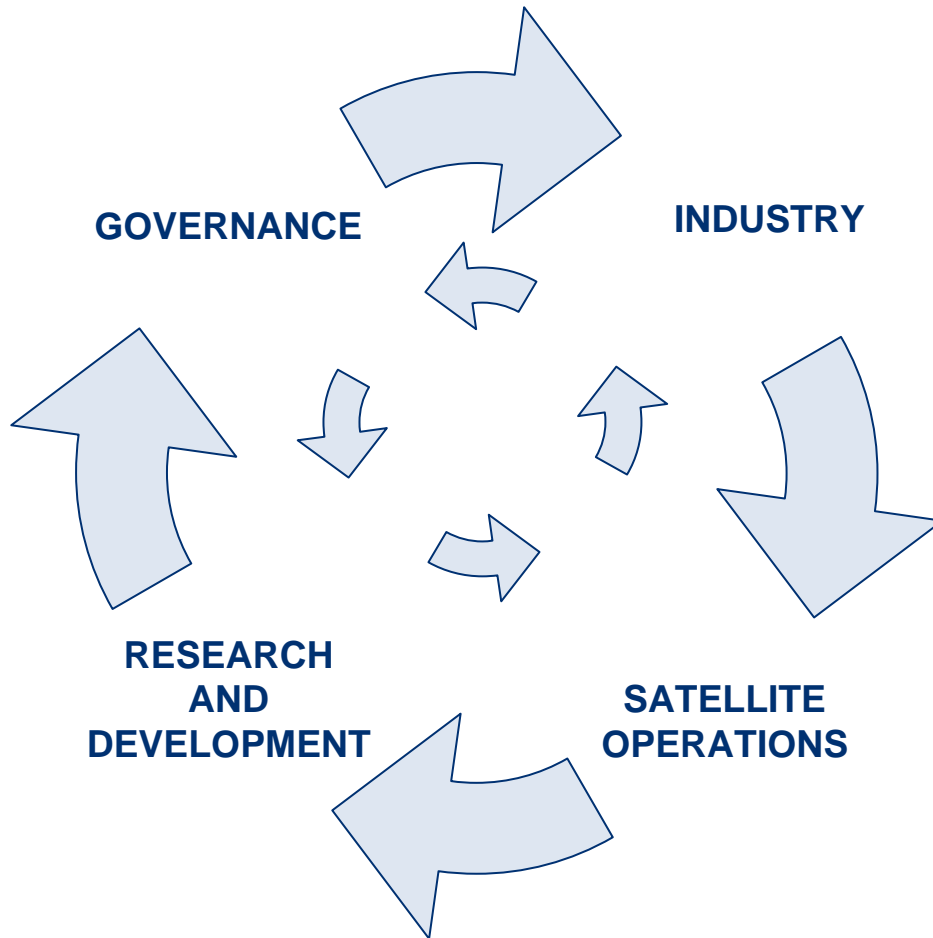
Miljødata fra NPI/ Forvaltningsplanen



Summary: satellite technology and governance

- Self-governance is of equal importance
 - You are responsible for your actions
 - help could be too far away.
- Information obtained from satellites can be used to allow humans to exploit the Arctic responsibly.
 - Real-time images
 - Real-time tracking
- It can be used to monitor activities that are detrimental to the Arctic.
 - Pollution
 - Illegal fishing
- Tracking people:
 - Good - faster rescue?
 - Bad - invasion of privacy?

The challenge: satellite technology and governance



COMMUNICATE

Each sector needs to know

What is required

What is possible



Thank you for your attention

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