Satellite images for Winternavigation

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Finnish Transport Agency
Safeguarding year round waterborne transportation

- Responsible authority to safeguard winternavigation for Finish ports both at the coasts of Baltic Sea and Lake Saimaa. Procurement and coordination of icebreaker resources. Setting of ice-restrictions. Developing the winternavigation system and information channels.

- At the moment 9 icebreakers in contract for sea icebreaking and 3-4 for Lake Saimaa. Deep co-operation with Swedish icebreaker authorities.

- Average cost of icebreaking 50 M€, varies between winters from 45M€ to 65M€ at present cost level

- Over 100 years of Finnish icebreaking history, starting from 1889.

- From 1971 even all Bay of Bothnia ports have been kept open for year round maritime transport
"Of all the world’s countries, relative to GNP, Finland’s national economy and competitiveness are most negatively affected by winter navigation!"

"Over 85% of Finnish GNP comes from goods transported to and/or from Finland via sea. All Finnish seaports freeze during normal winter!"
Baltic Sea is one of the busiest maritime areas in the world

- More than **2000 ships** are navigating the Baltic Sea at any given time
- More than **750 million tonnes** are transported to and from the Baltic Sea’s ports every year
- That is about **15 %** of the world’s maritime transportation
Cooperation between Baltic Sea countries

Develop safe, reliable and efficient winter navigation

Strategic and operational cooperation between the Baltic Sea countries

Long-term vision to create a joint Baltic Icebreaking service
Winter is a natural barrier
Increased logistical costs

- Icebreaking costs
- Increased fuel costs
- Transport delays
- Damages to merchant vessels
Components of winternavigation system

- Accurate ice-condition information
- Ice restrictions and shore coordination
- Merchant vessels ice class and icegoing capacity
- Icebreaker capacity
- Human skills

Efficient ship movements

Safe and efficient transport system
All winters are not the same
Statistical Facts for Finland
Length of assistances vs. number of ports, first one is critical
Volatility due to varying winters
Number of assistances to Finland
Principals of cooperation
Management of icebreaking activities

- Both reserve required capacity
- Common management via IBnet
- Common principals of setting restrictions and issuing dispenses based on HELCOM recommendations
- Common prioritization
- Cost sharing principles
Baltic Sea is often difficult even for icebreakers. "Keel" of an ice ridge is approximately 8-9 times the height of the "Sail." Deepest measures ridges over 20m total height.

In harsh ice conditions and under ice pressure, it is a pure safety issue.
Ice conditions information, base for all operations

Sources of information

- Historically based from observations and measurements from vessels
- Later additionally by aerial surveillance from fixed wing planes and even from helicopters

Both still utilized fully but they are limited by covered area and sensitive for visual and flying conditions

Real breakthrough was when satellite imagery and specially when synthetic aperture radar (SAR) imagery come available.

Fundamental positive factors of satellite imagery

- Large area coverage
- Easy and accurate positioning of ice features in ice data
- Specially SAR not sensitive for clouds and other visual conditions
- Frequent SAR information combined to sophisticated ice modeling provide precise ice features and dynamics information and prediction modeling
- Consecutive added efficiency and safety of winternavigation
Icebreaker and general on-line management, IBnet, in future IBNext co-funded by EU

- Allocating icebreaker resources
- Setting ice-restrictions
- Issuing dispenses
Next generation Winternavigation management
IBNext, co-funded by EU TEN-T
Baltic Icebreaker Management authorities BIM

Baltic states icebreaker management authorities organization for co-operation

- Authorities experience available for chartering and even for long term system development decisions
- Long history of operations and performance of vessels in Baltic waters

www.baltice.org
Primary information source for operators onshore and offshore
Winternavigation is International Team Work
Thank You for Your attention!

Icebreaker capacity
Merchant vessels independent ice going capacity
Accurate ice information is base of all operative decisions

Operator skills