Satelllite images for Winternavigation

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Finnish Transport Agency
Safeguarding year a 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 from1889.
- From 1971 even all Bay of Bothnia ports have been kept open for year a round maritime transport

”Of all the worlds countries, relative to GNP, Finland’s national economy and competitiveness are most negatively effected by winter navigation!”

Finnish-Swedish winter navigation system

Ice-information and Assessment of conditions
Managing risk and allocating resources
Securing Maritime Transport

”Over 85% of Finnish GNP comes from goods transported to and/or from Finland via sea. All Finnish seaports freeze during normal winter!”

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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

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Winternavigation
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**

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Winter is a natural barrier
Increased logistical costs

- Icebreaking costs
- Increased fuel costs
- Transport delays
- Damages to merchant vessels

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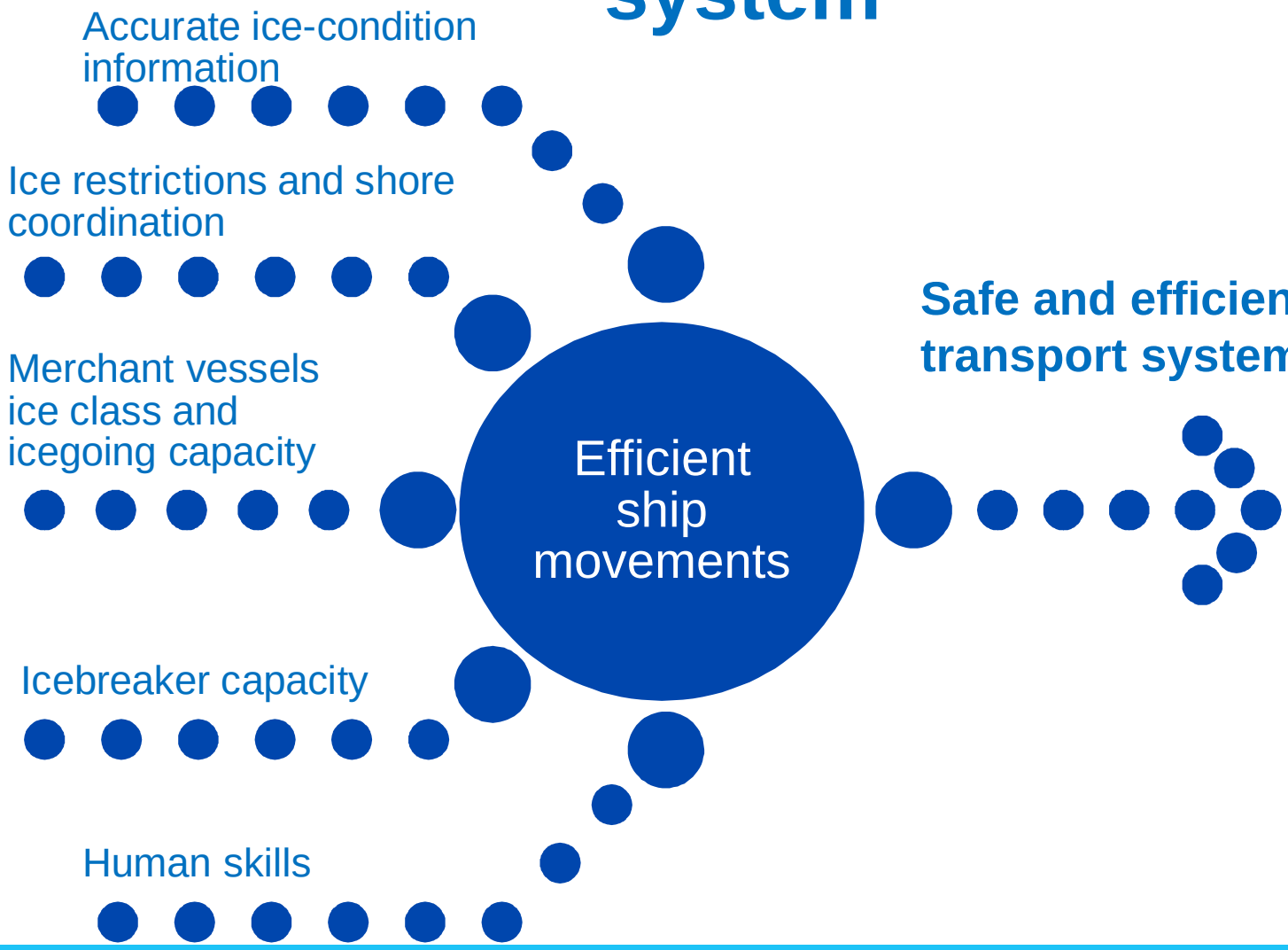
Components of winternavigation system



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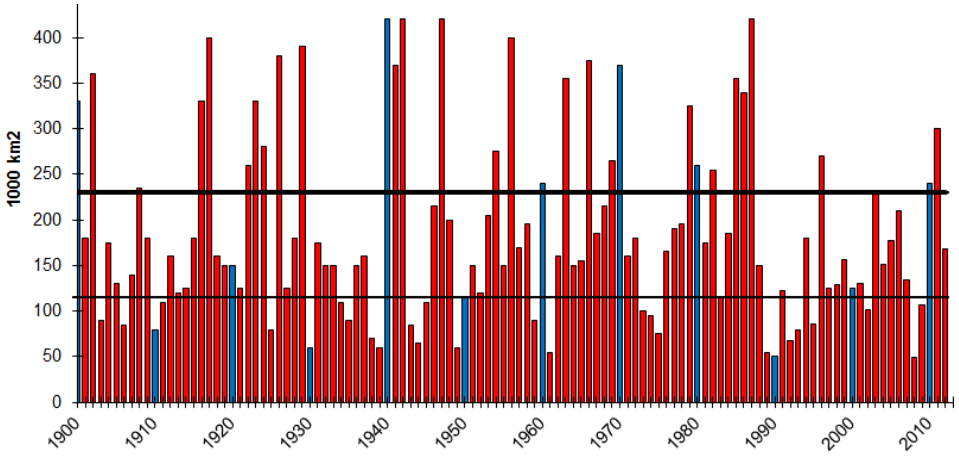
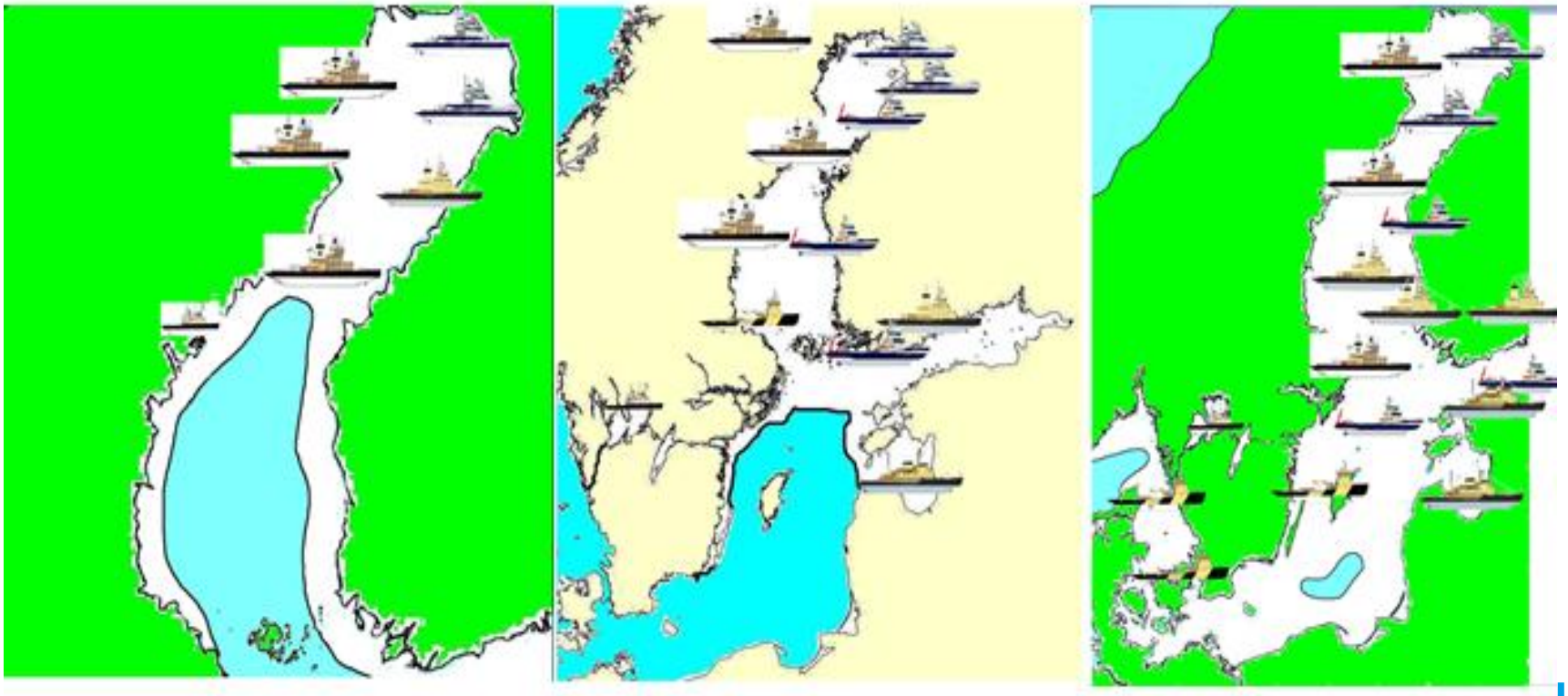
All winters are not the same





Mild

Normal

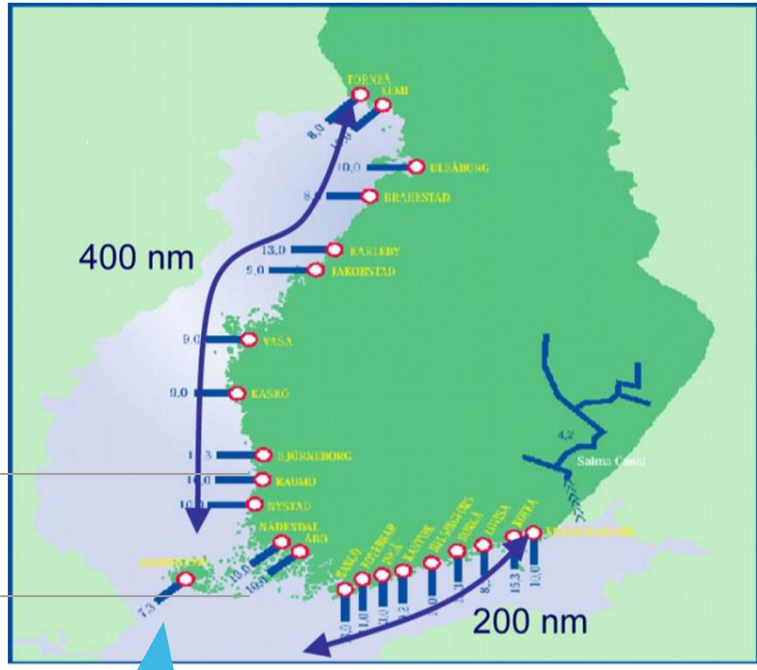
Severe

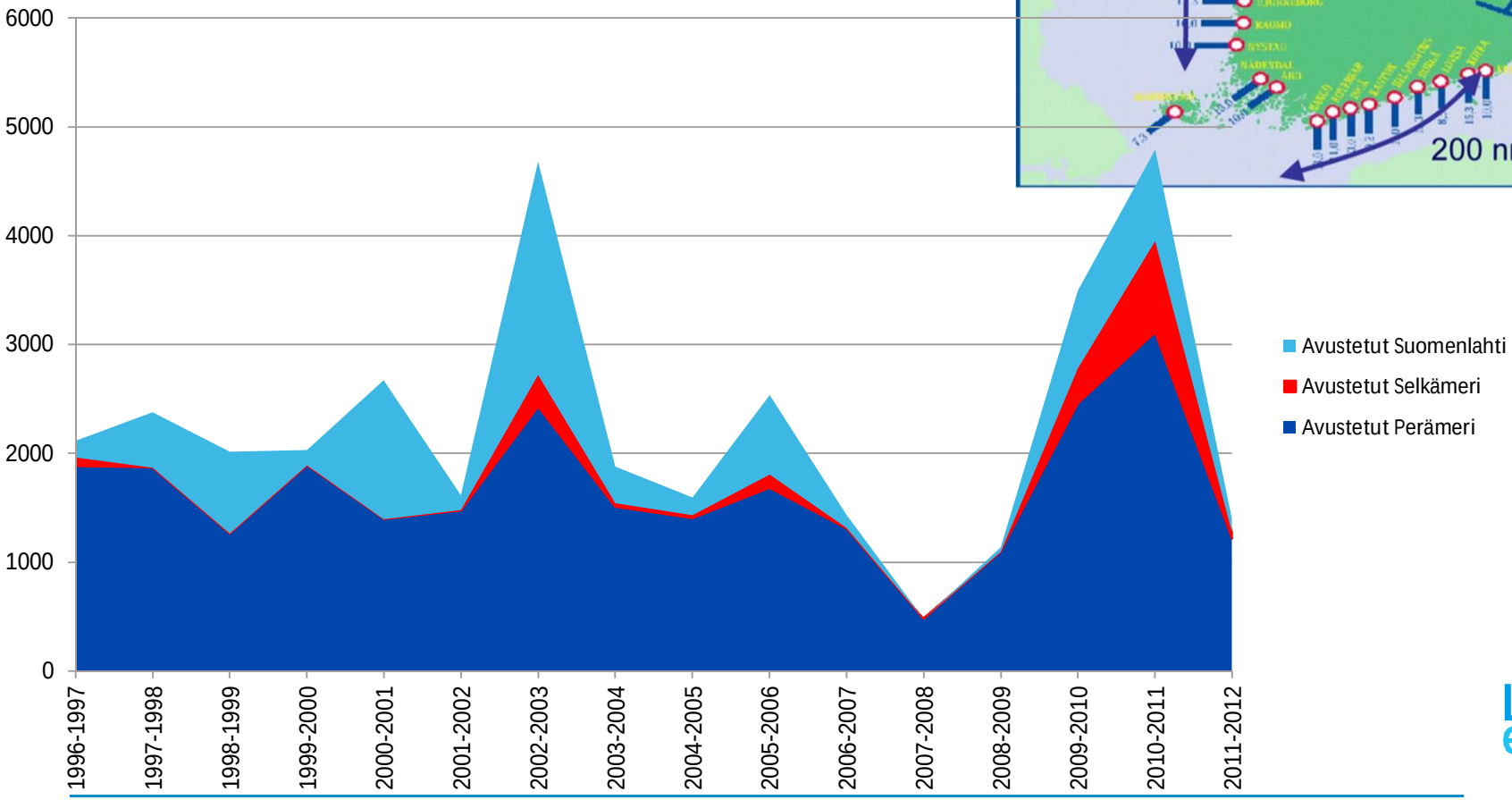
Statistical Facts for Finland

Length of assistances vs. number of ports, first one is critical

Volatility due to varying winters

Number of assistances to Finland





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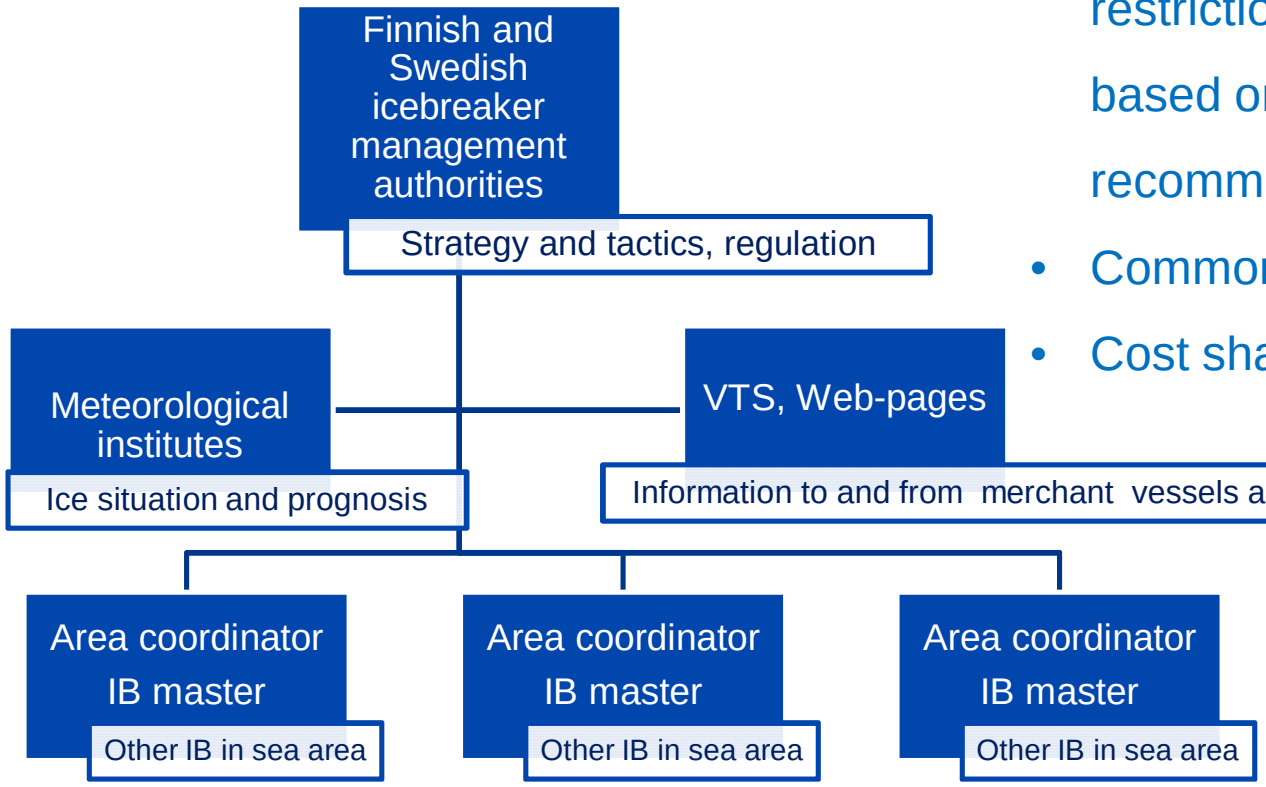
Principals of co-operation Management of icebreaking activities



- 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

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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 icepressure
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

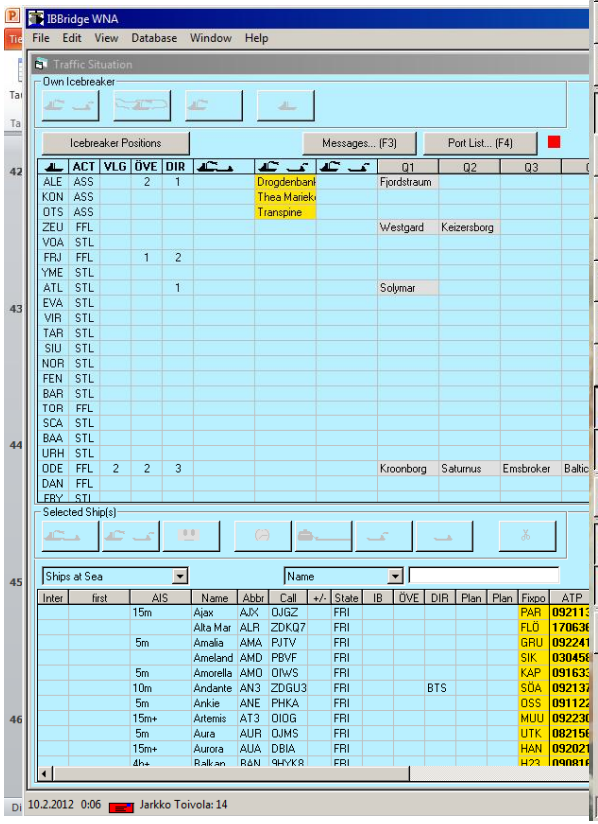
Real breakthrough was when satellite imagery and specially when synthetic aperture radar (SAR) imagery come available.

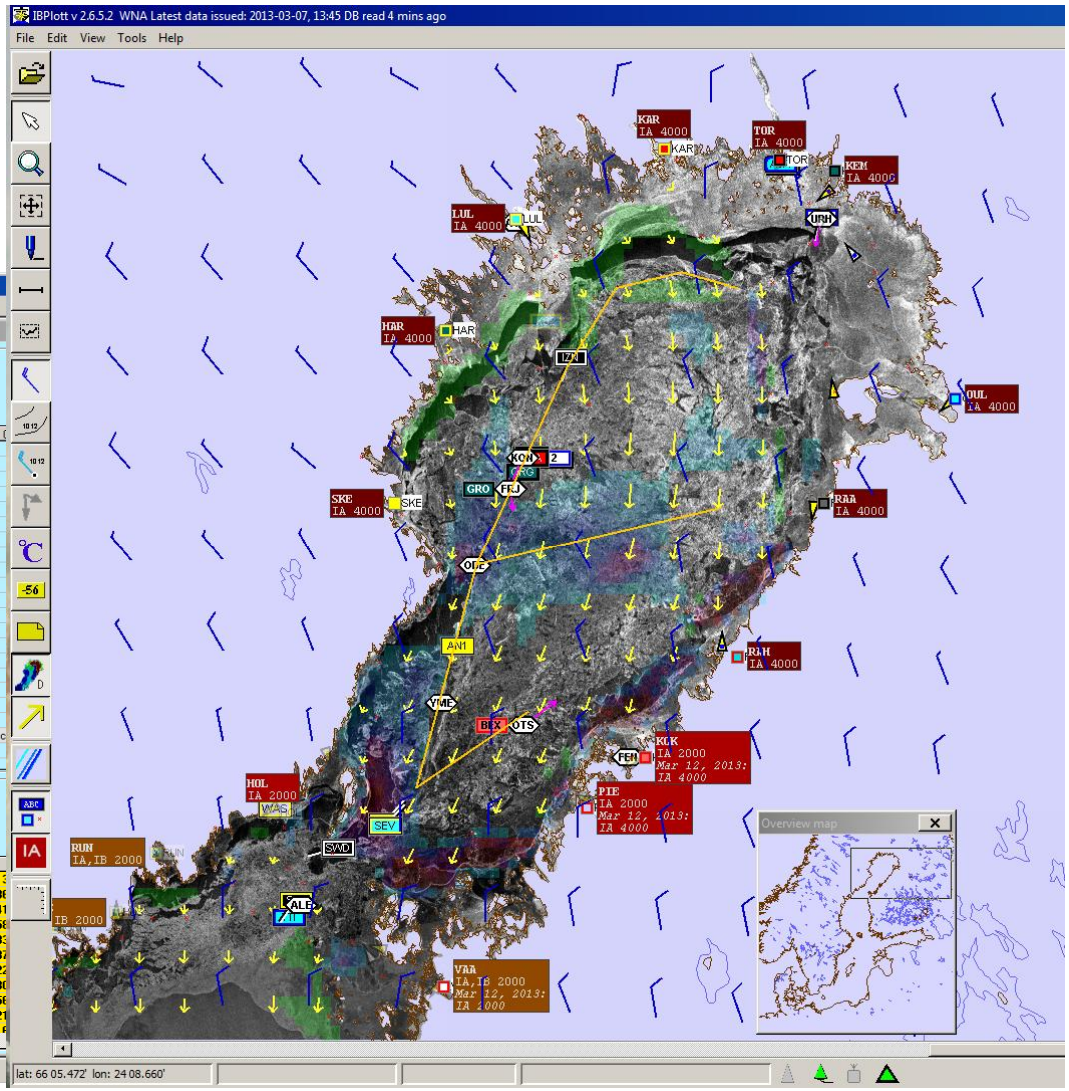
Fundamental positive factors of satellite imagery

- 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





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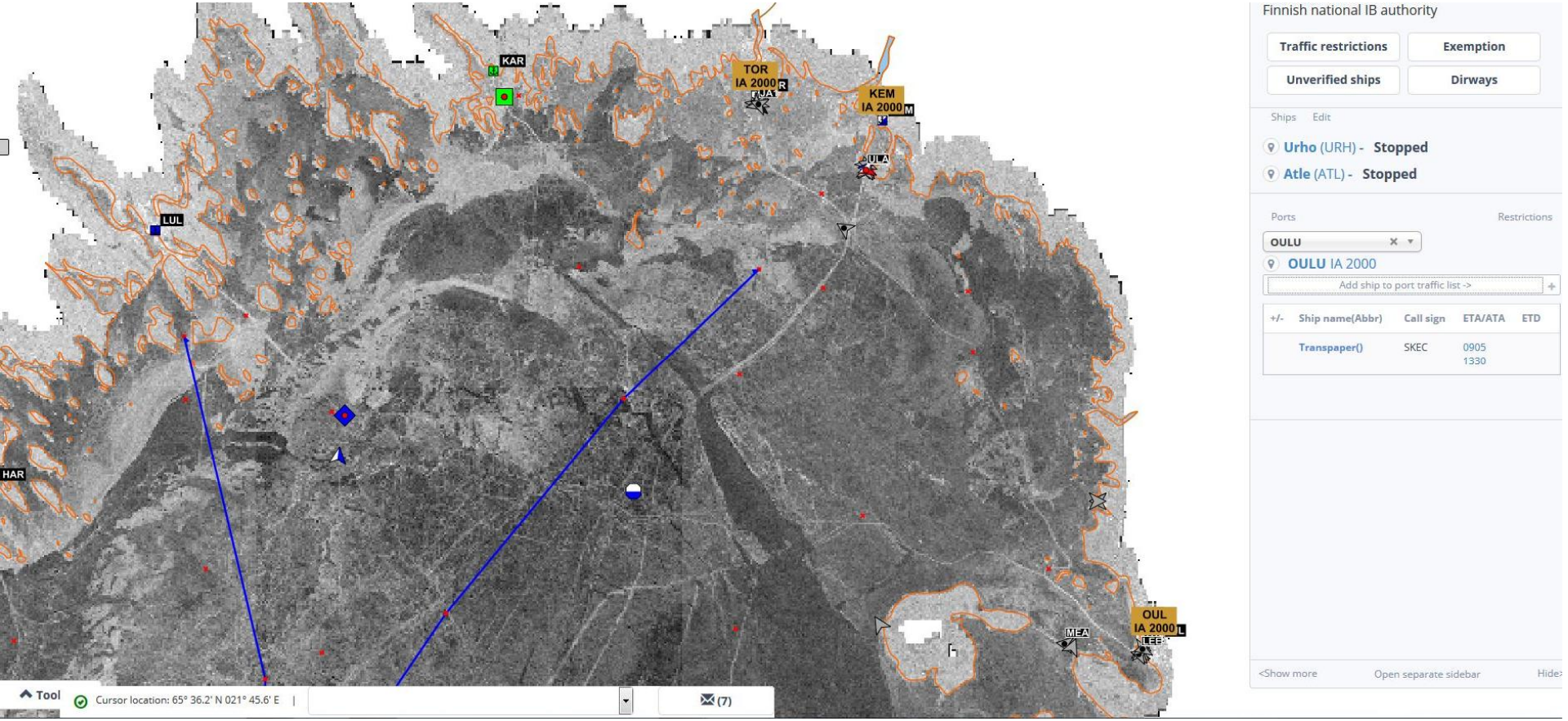
Next generation Winternavigation management
IBNext, co-funded by EU TEN-T



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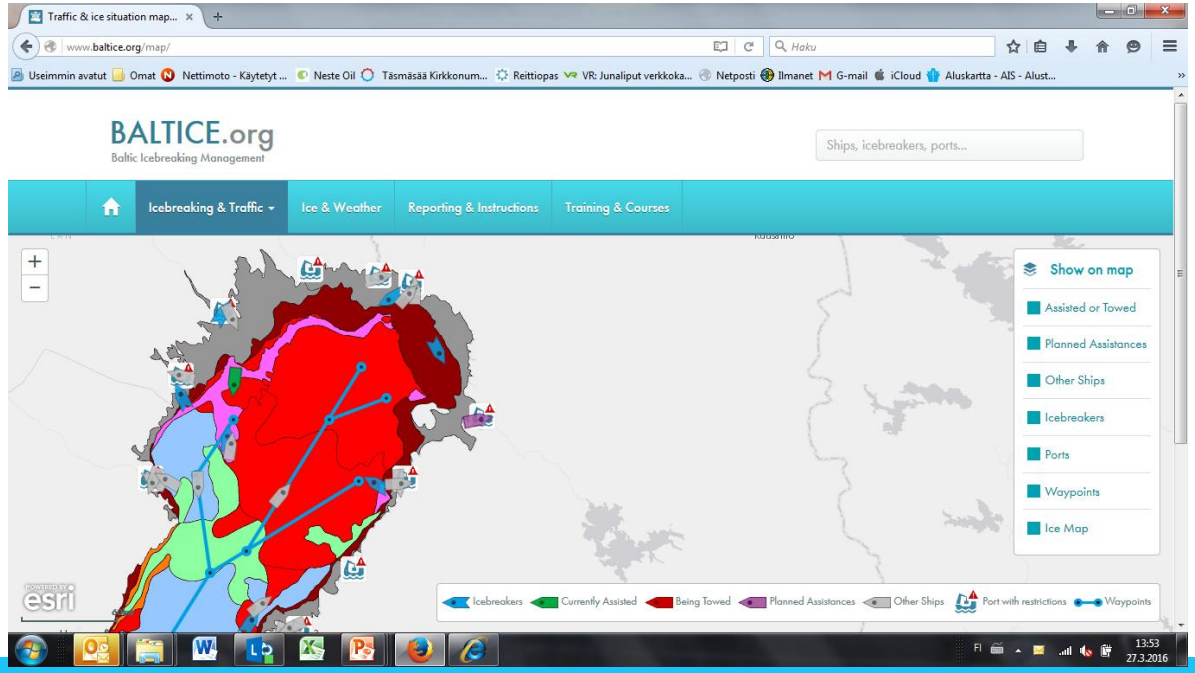
Baltic Icebreaker Management authorities BIM

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!

Accurate ice information is base of all operative decisions