Winternavigation is a system

Operational aspects related to long term weather/ice predictions

Ex. Head of Winternavigation Unit
Jarkko Toivola

The 6th WMO Arctic Climate Forum (ACF- 6)

Special thanks to Väylä (FTIA) for the usage of pictures and screenshots

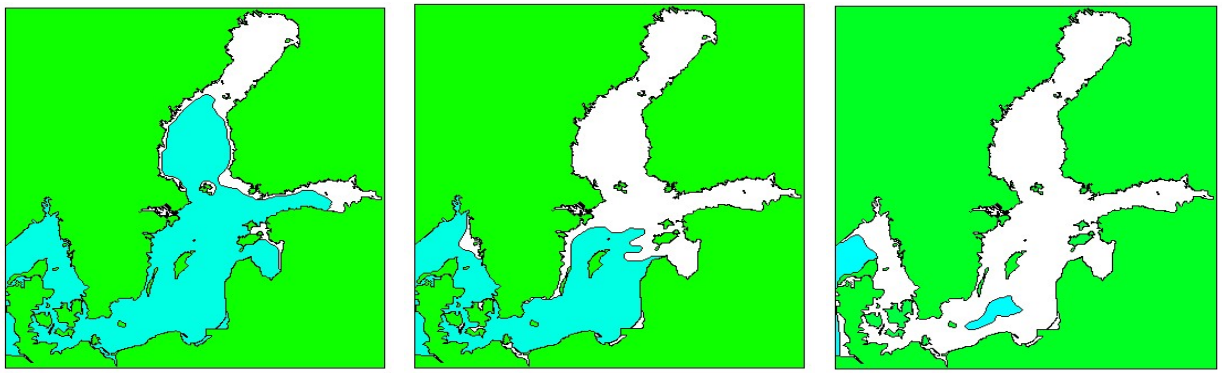
Väylävirasto
Trafikledsverket

Jarkko Toivola

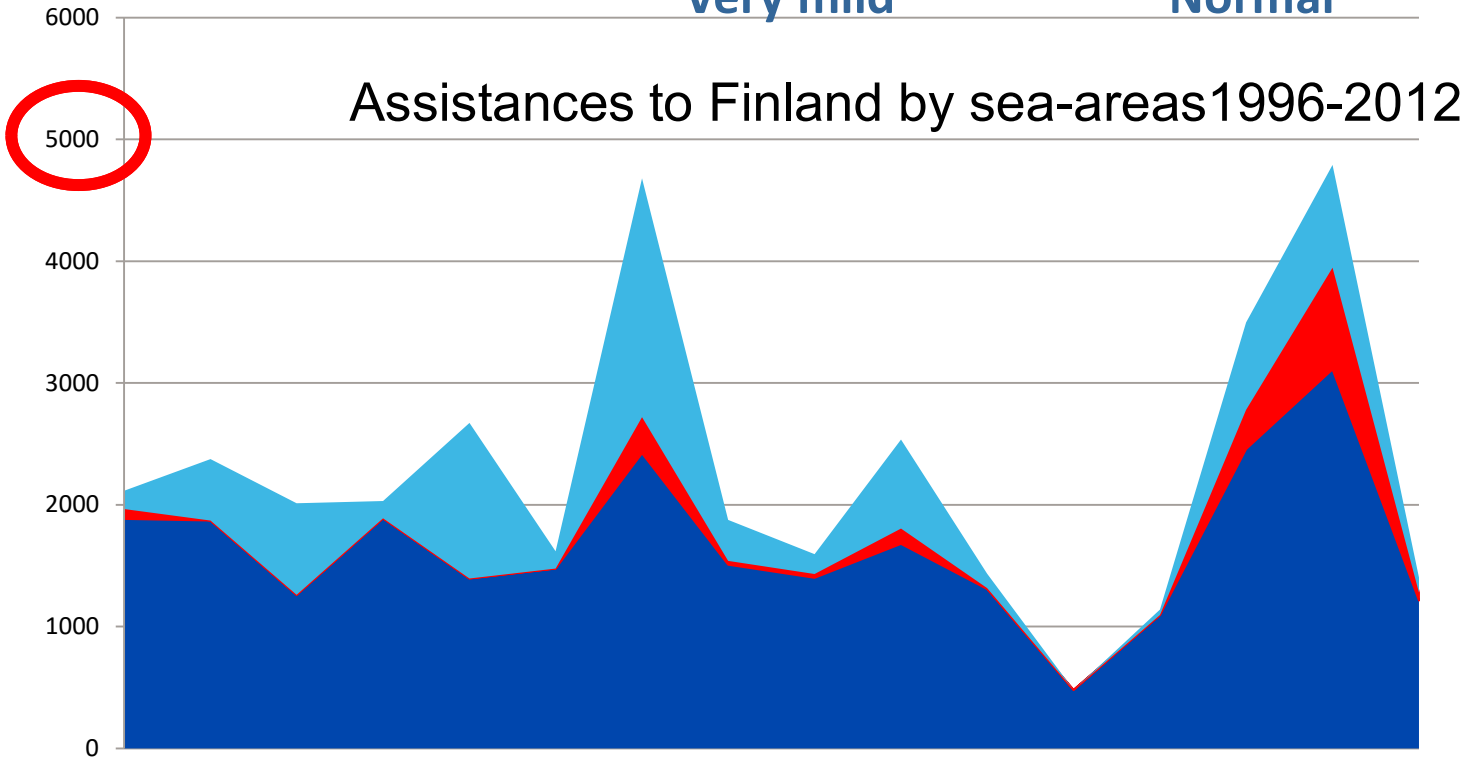
- Born 1959
- First time onboard 1975, Master since 1993, last time onboard 2009.
- Chief Maritime Specialist and Head of Winter Navigation Unit, Finnish Transport Agency
- Present, Vice President Alfons Håkans
- Returning to Chief Maritime Specialist and Head of Winter Navigation Unit, Finnish Transport and Infrastructure Agency
- Onboard career mostly on Neste Oil tankers and tugs, including several years of Greenland trade and decades of Baltic year around service
- Azimuth propulsion training master, global missions for vessels ranging from full size icebreakers to small tugs and ferries.
- Several missions to Sakhalin offshore icemanagement.operation 2004-2007
- OCIMF ICE 2011-2019

Old picture and old ice, decades of Finnish arctic shipping experience

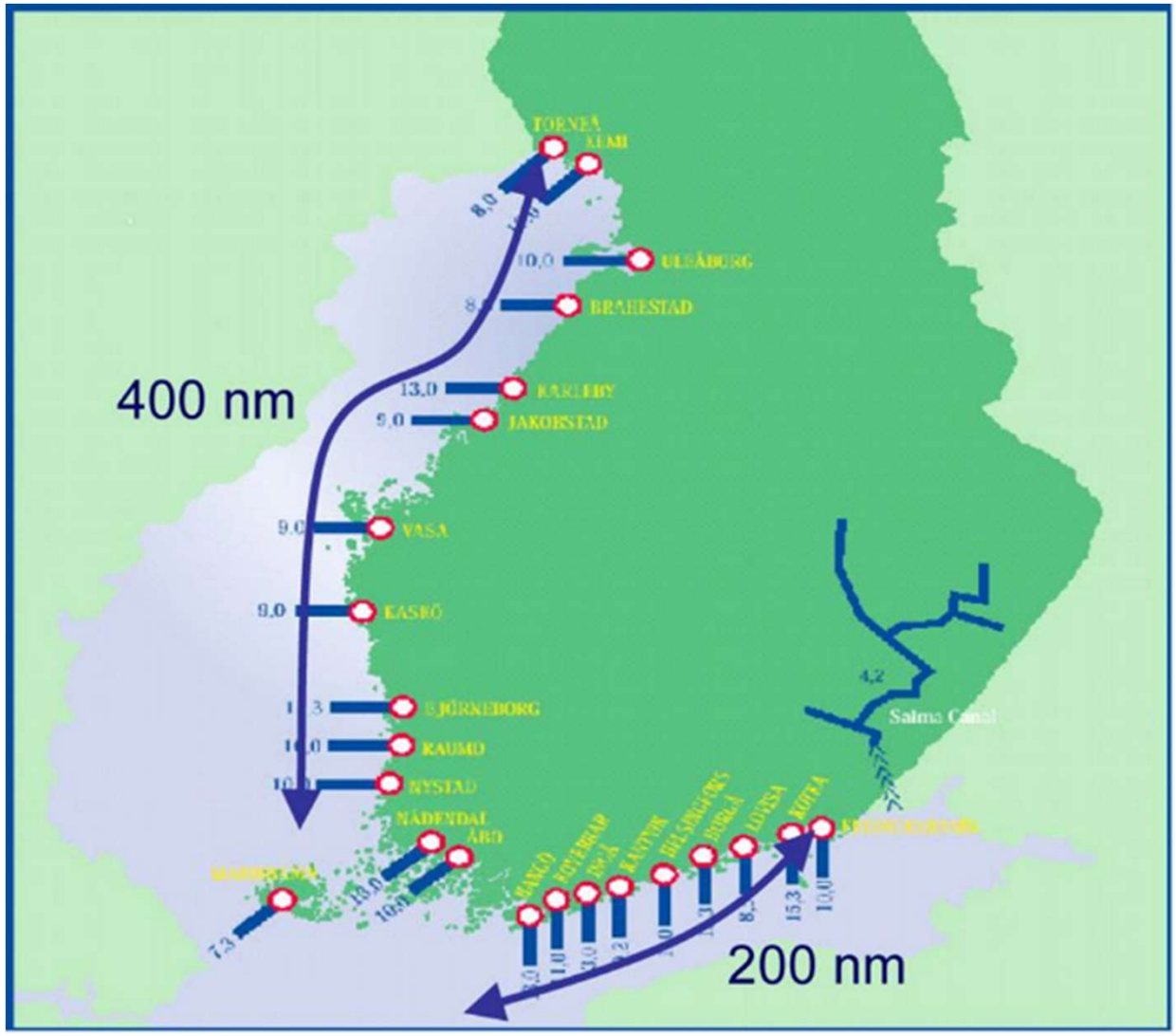
Baltic ice winter classification



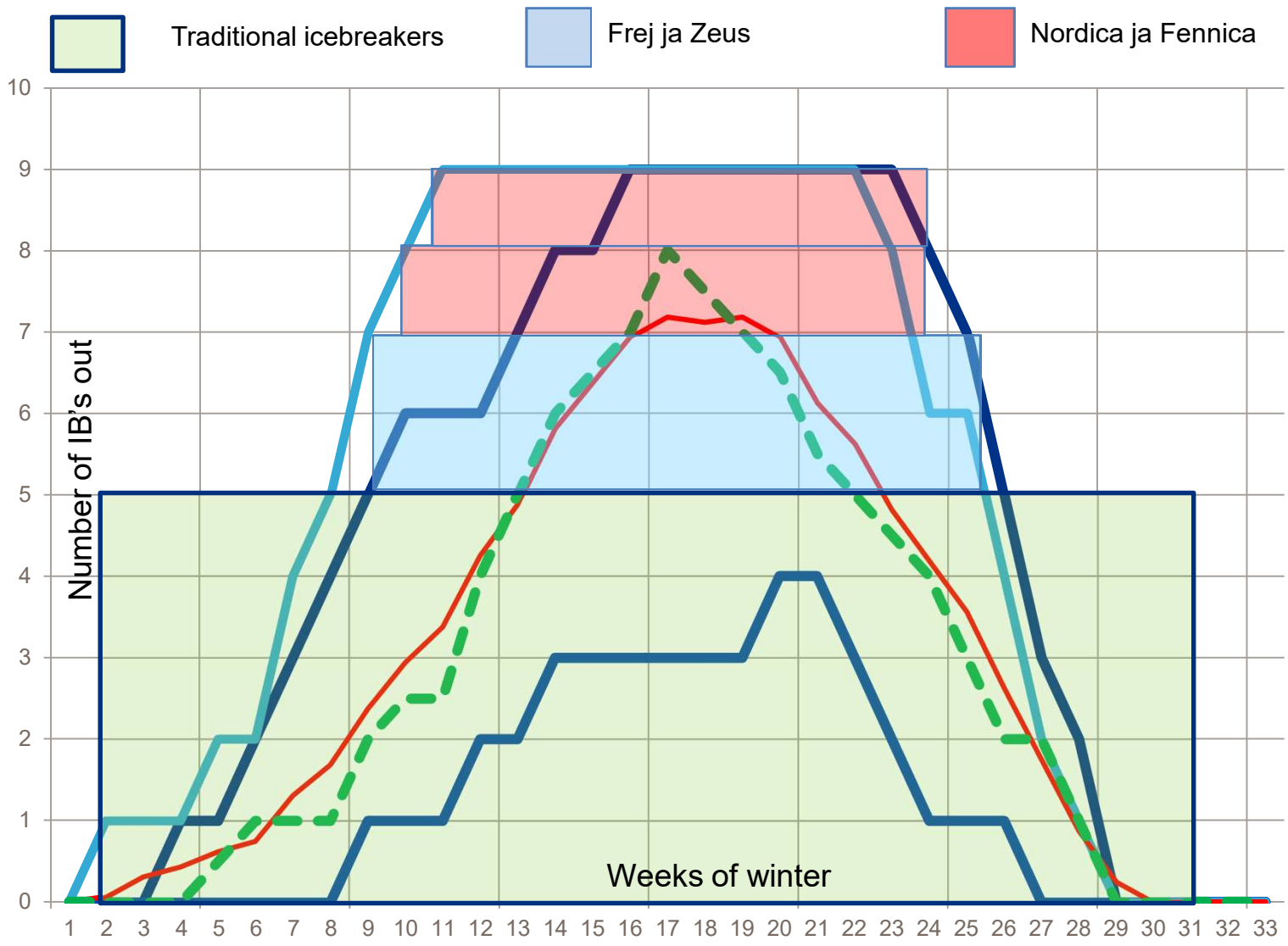
Very mild | Normal | Hard



Assistance distance is critical for required capacity



IB Reserves today and usage 1996-2012

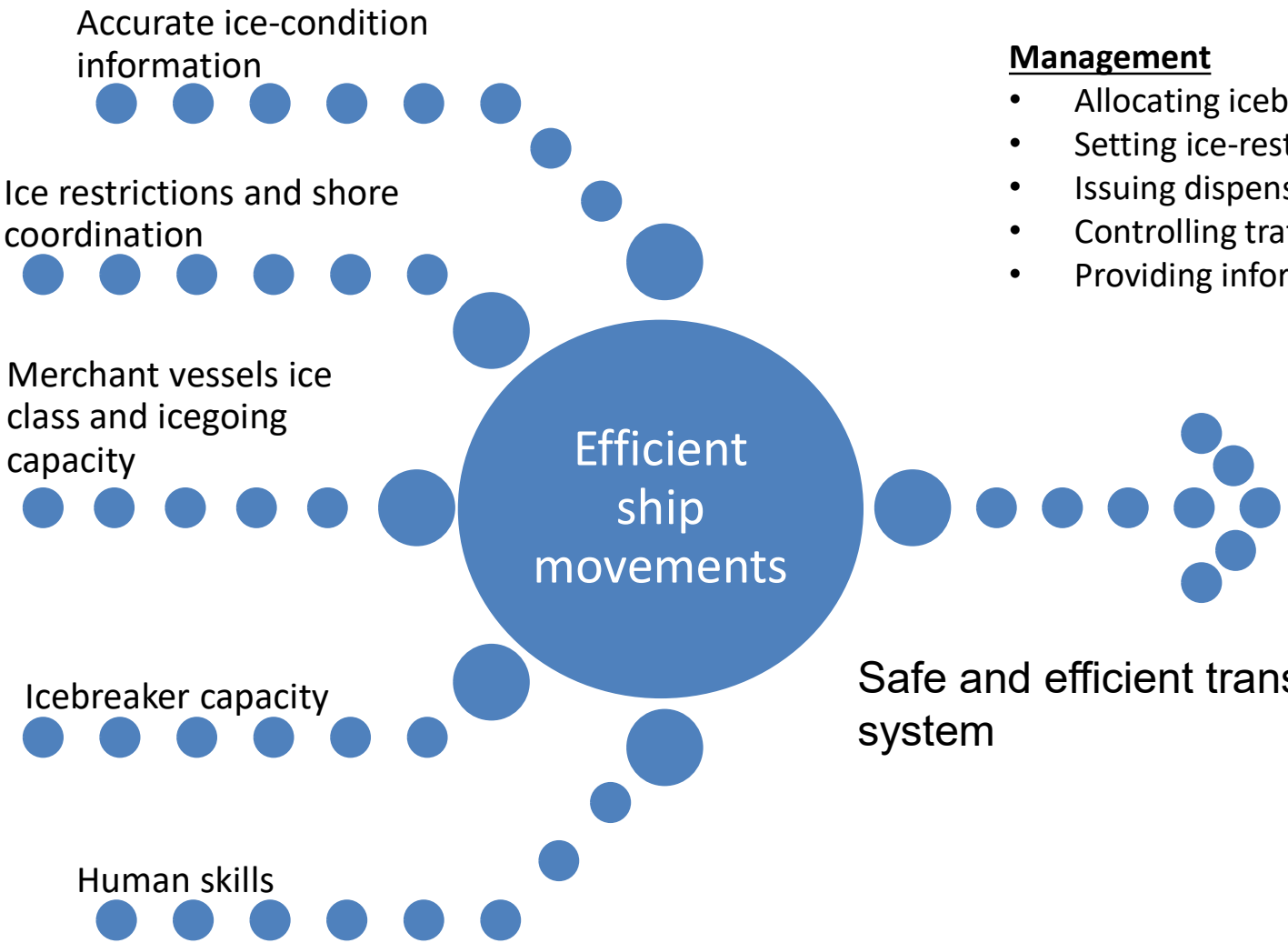


Even strong Ro-Ro vessels sometimes need two icebreakers to proceed in heavily ridged and pressurized ice fields


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
Pure safety issue

General management and safety of a winternavigation system

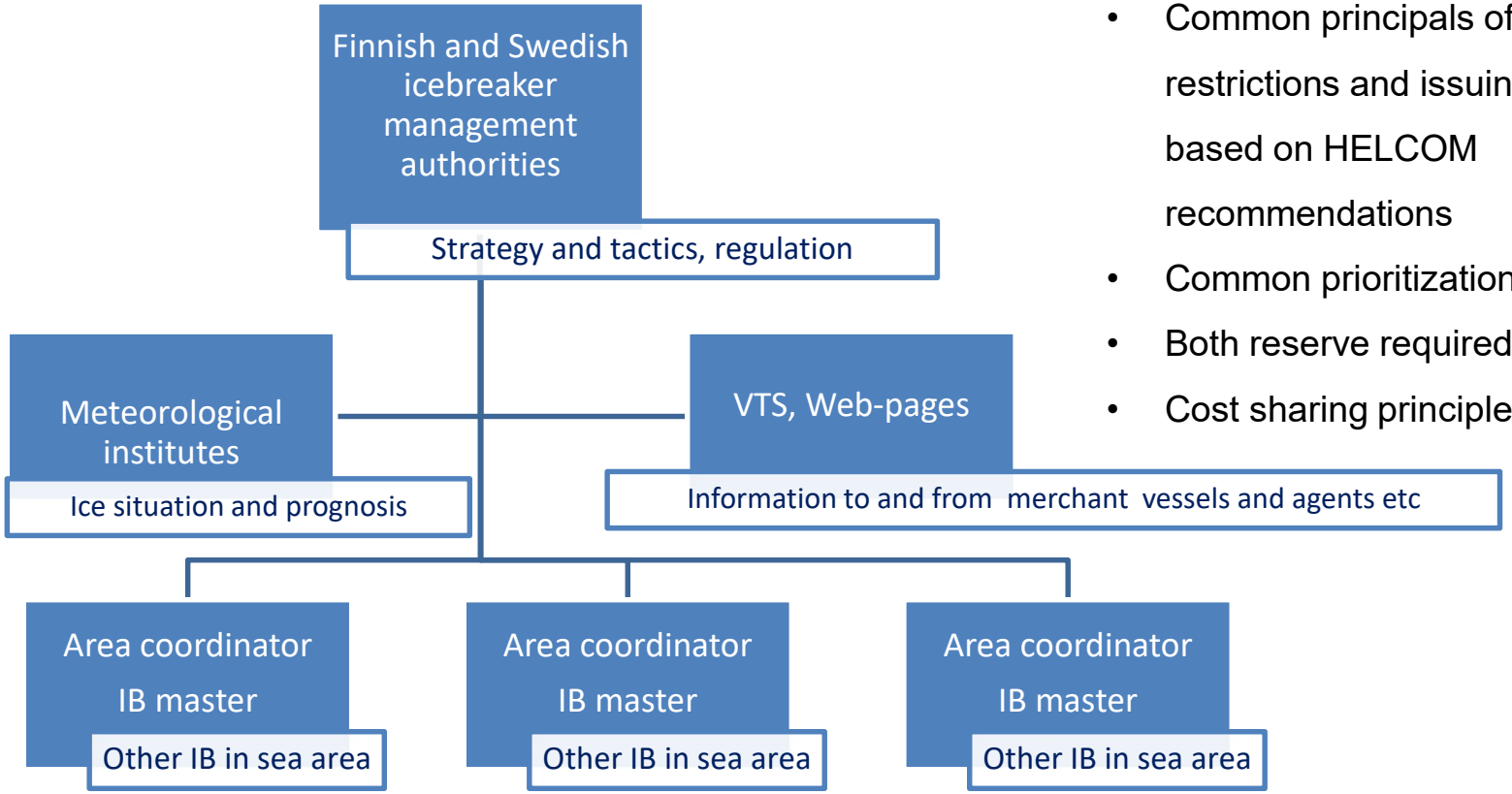
Icebreaker and traffic-management, administration



Management

- Allocating icebreaker resources
- Setting ice-restrictions
- Issuing dispenses
- Controlling traffic
- Providing information

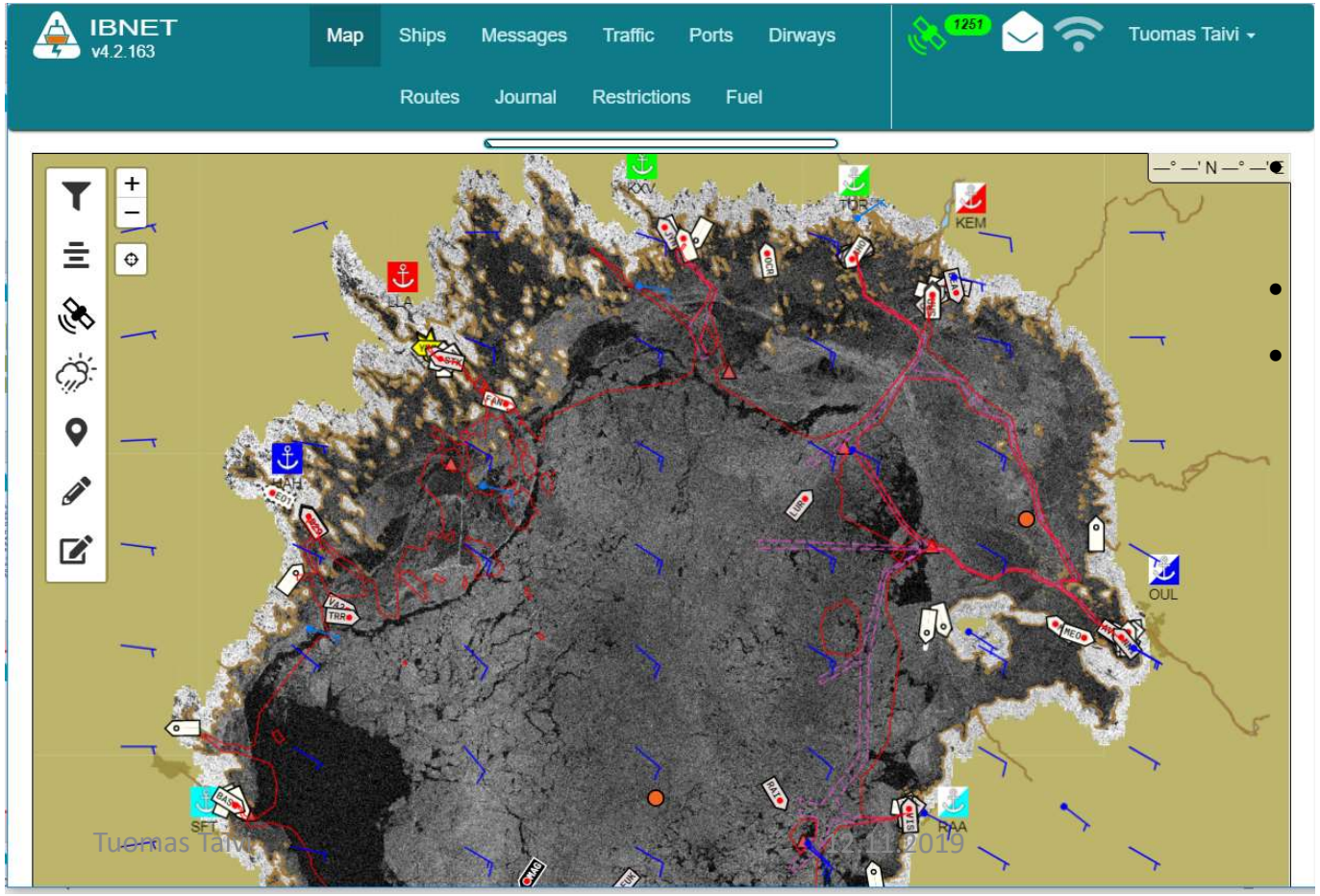
Management of SWE-FIN icebreaking activities



- Common management via IBnet
- Common principals of setting restrictions and issuing dispenses based on HELCOM recommendations
- Common prioritization
- Both reserve required capacity
- Cost sharing principles

IbNet, SWE-FIN common on-line winternavigation management platform
Satellite images and online traffic information

Väylävirasto
Trafikledsverket



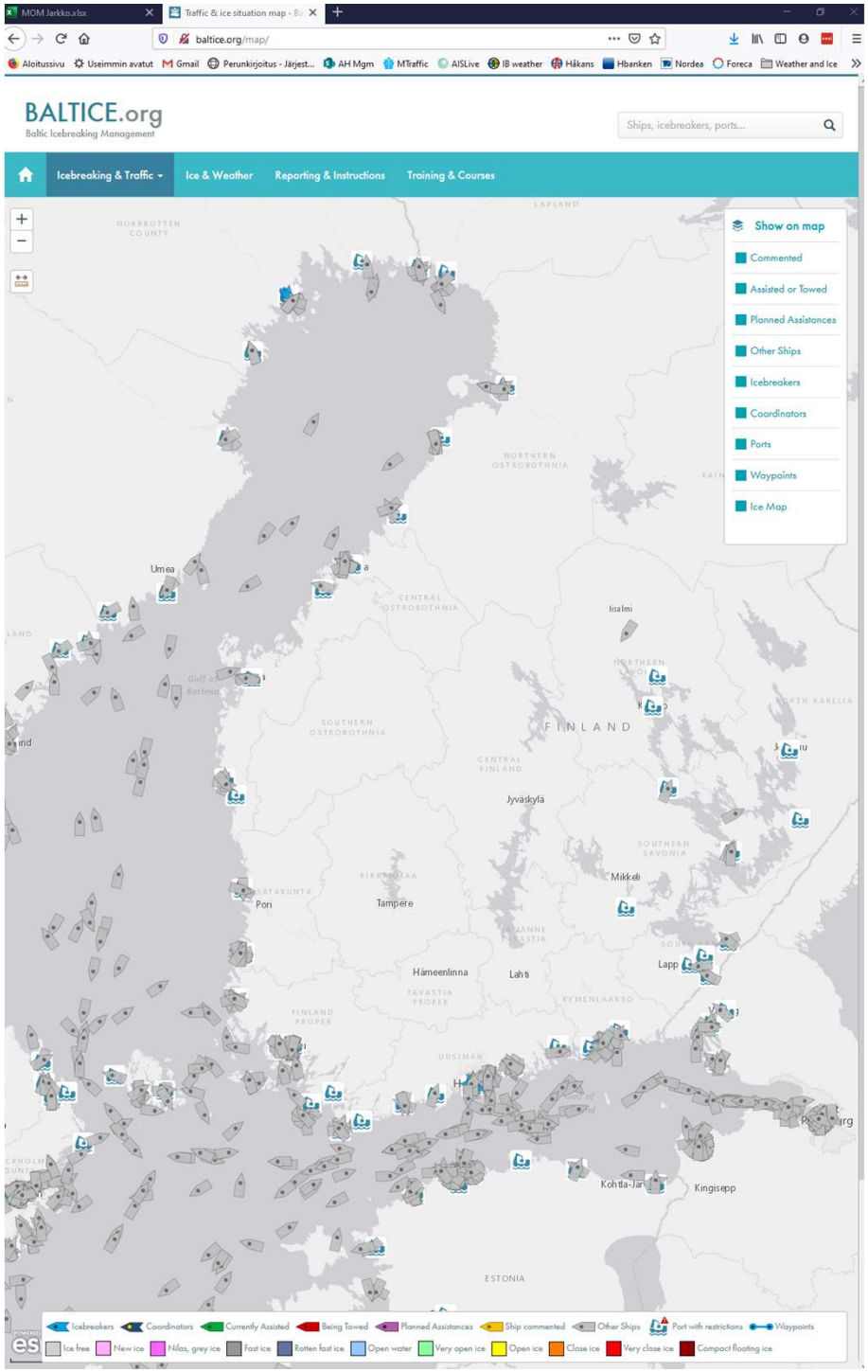
Allocating icebreaker resources

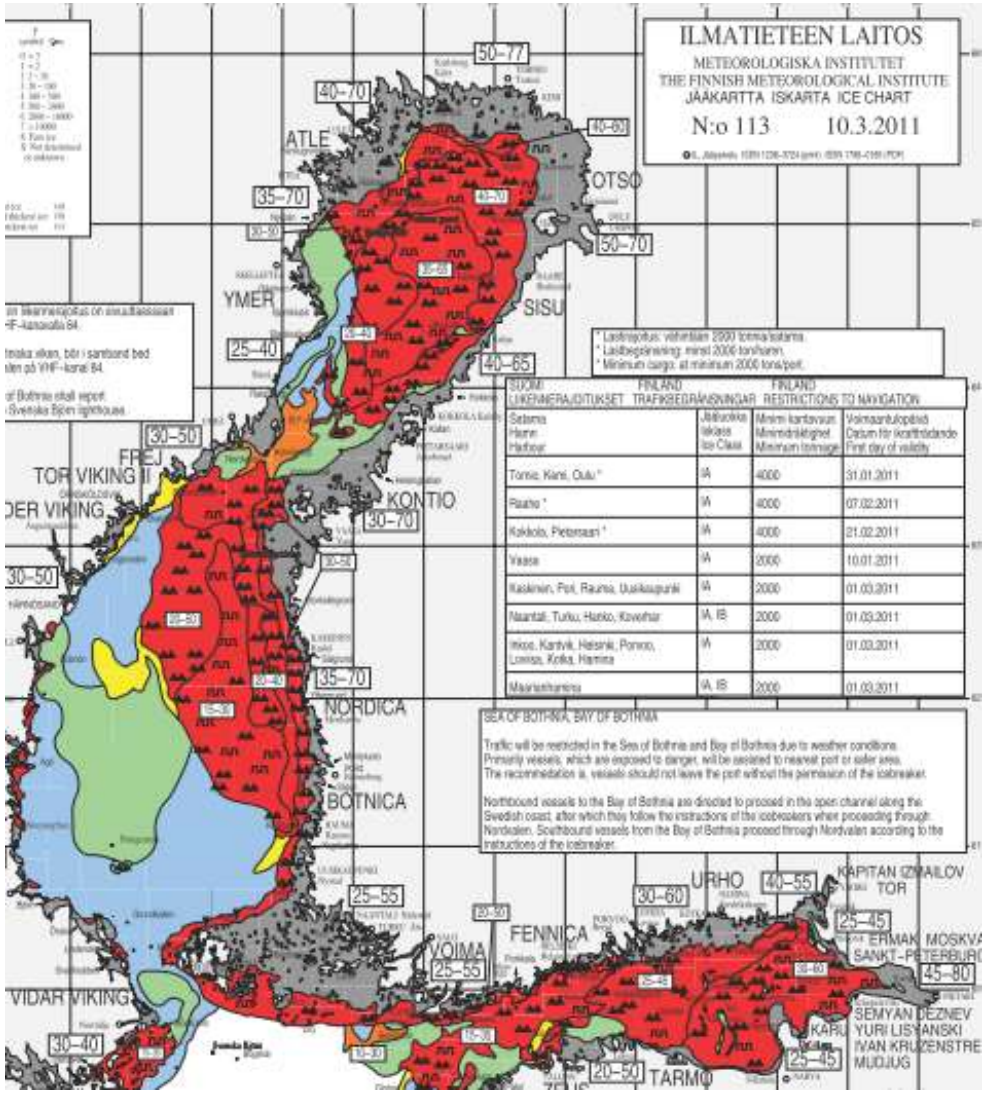
- Setting ice-restrictions
- Issuing dispenses

FMI provides satellite images.

Chart material from: © Liikenneviraston lupa nro LIVI/6415/07.03.01/2018 and SMA
Radarsat-2: Copyright: The Copernicus Space Component Data Access (CSCDA) and MDA
TerraSAR-X: (c) DLR (2017) provided under COPERNICUS by the European Union and ESA, all rights reserved

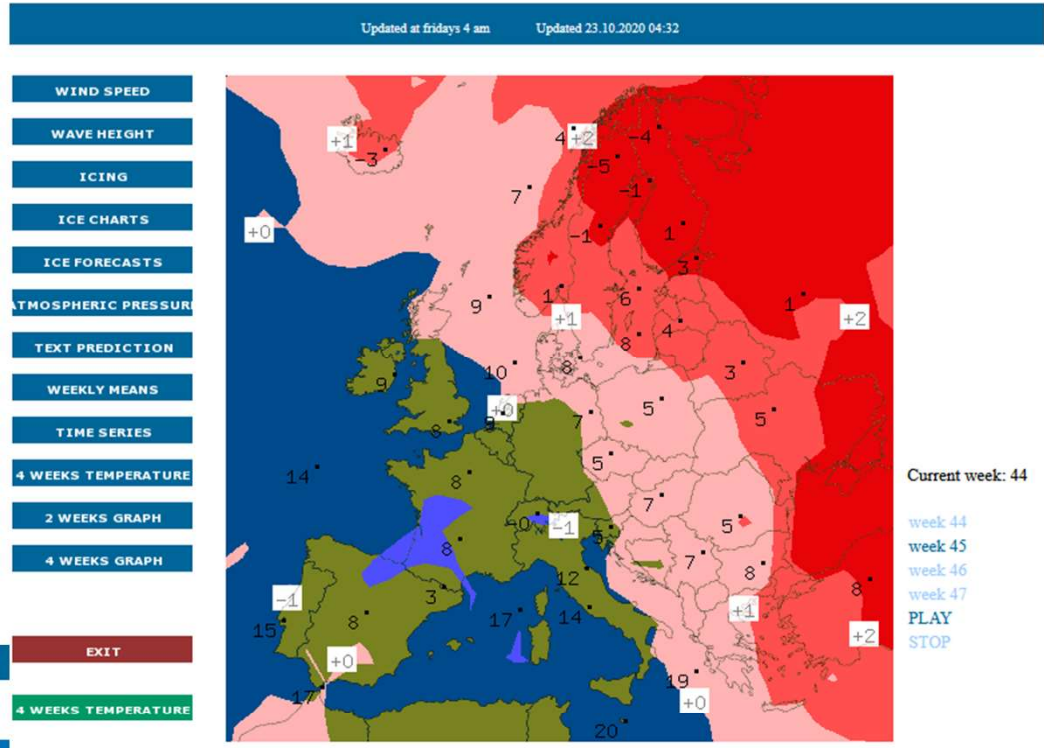
Prognosis, ice and weather information. Restrictions





Present short, medium and long-term prognosis reliability:

Operational: 3-5 days
Tactical: 5-7 days
Strategic: Only general trend



Temperatures in an animation are **mean values from years 2008 - 2019** - not forecasted temperatures.

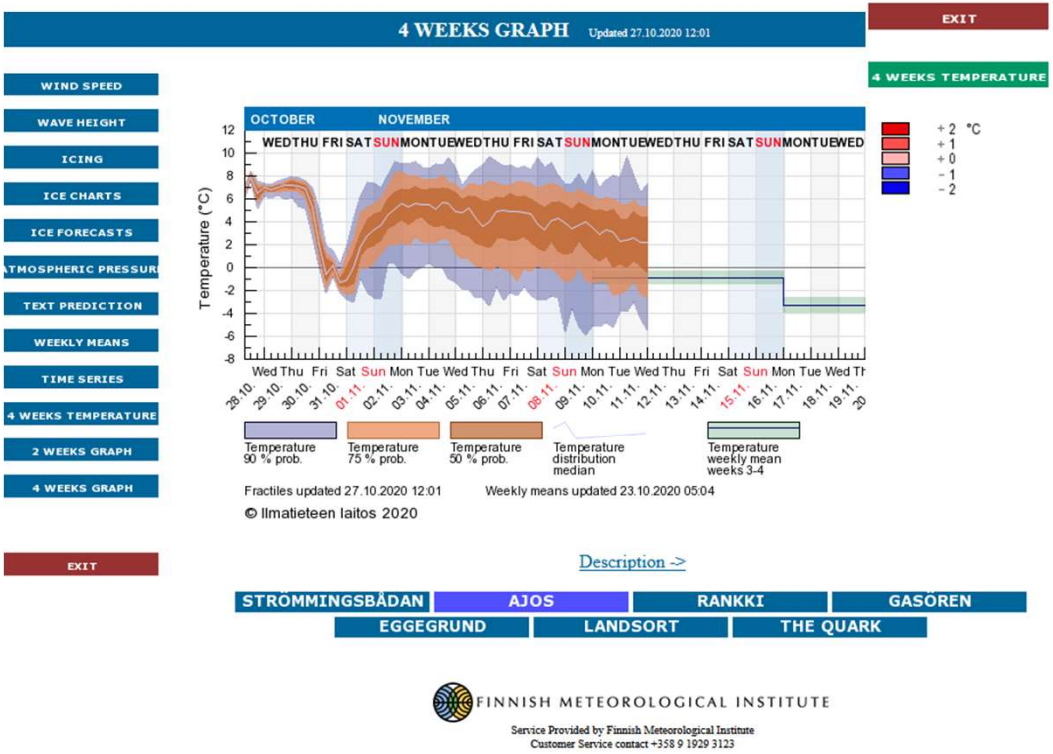
Colorized regions represent forecasted relative change to a normal temperature (numbers in the animation).

Please notice, that there's a high uncertainty in long forecasts.

EUROPE SKANDINAVIA

FINNISH METEOROLOGICAL INSTITUTE

Service Provided by Finnish Meteorological Institute
Customer Service contact +358 9 1929 3123



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

- Present short, medium and long-term prognosis reliability makes it in fact impossible for charterers, cargo interests or even Winternavigation management to do efficient tactical decisions.

- New ways to predict and present ice situation development within a single winter should be developed to improve operational, economical and safety aspects, and to reduce environmental impact of Northern Baltic Winternavigation system.

- Any developments on this worlds biggest Winternavigation system could be adjusted to implementation for other Arctic region maritime transport systems.

Long term change and challenge factors, mitigation should be based on reliable longterm ice predictions

- **Traffic flows**
  - Changes in transport volumes
  - New ship sizes
- **Merchant vessels independent ice going capabilities**
  - SOX > Fuel prize > no incentive to use extra power
  - EEDI > focus on open water performance
- **Operator competence**
  - Modern manning practices reduce possibilities to assure long term experience base onboard
- **Climate change**
  - Time span, variation between winters
- **Renewal of icebreaker capacity**
  - Scale of investment
  - Availability from possible commercial sector of icebreaking

Thank you for your attention

Jarkko Toivola