

## **Satellite images for Winternavigation**

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# Finnish Transport Agency

## Safeguarding year a round waterborne transportation

- Responsible authority to safeguard winternavigation for Finnish 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 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!”**

**Liikennevirasto**



Co-financed by the European Union  
Trans-European Transport Network (TEN-T)

# 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



# 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**

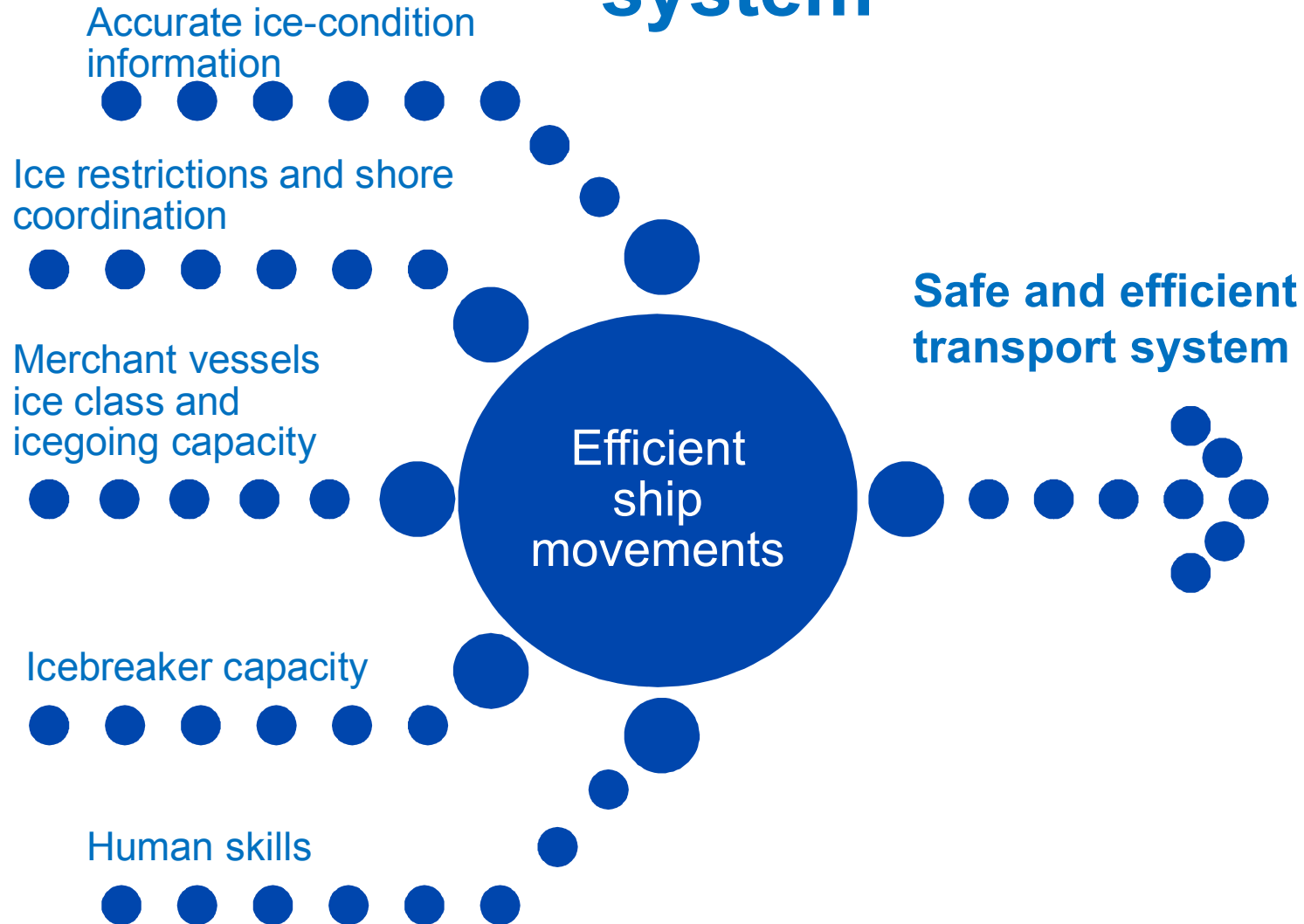
# Winter is a natural barrier

## Increased logistical costs

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

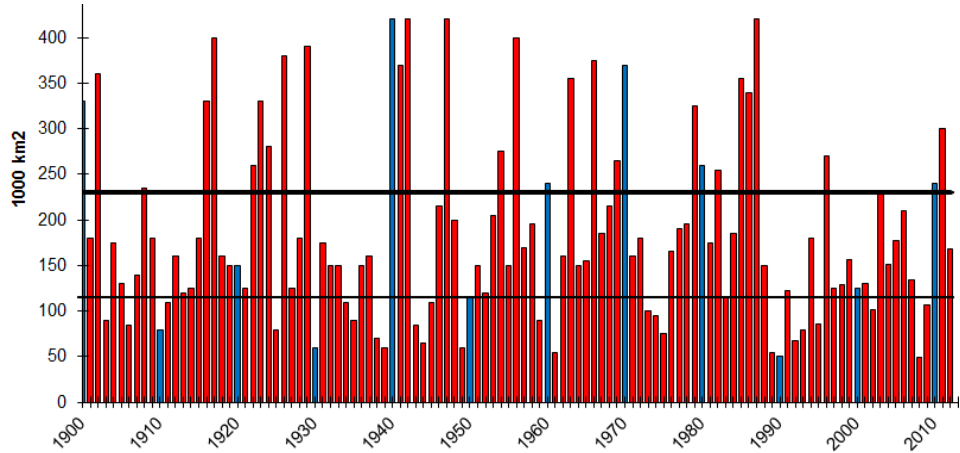


# Components of winternavigation system





# All winters are not the same



Mild



Normal



Severe

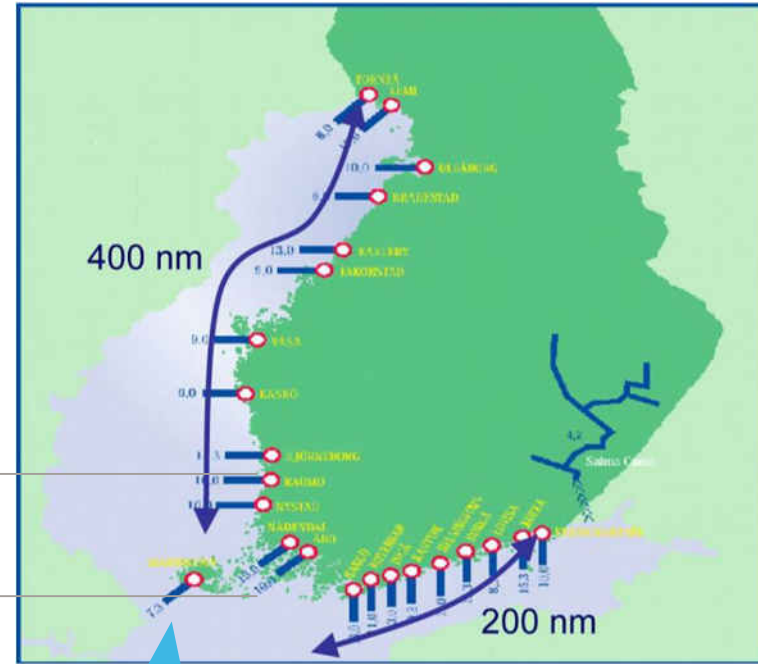
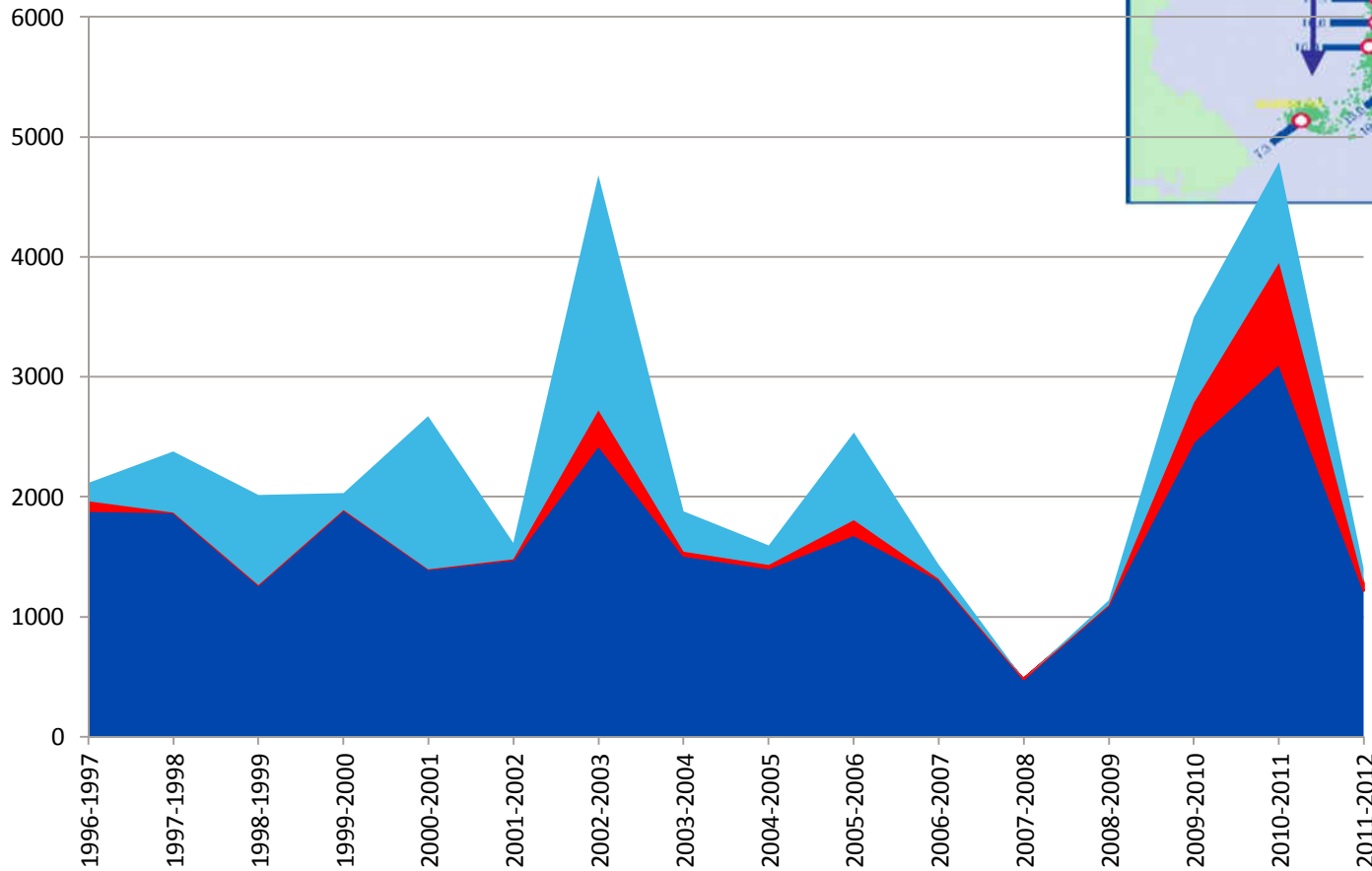


# Statistical Facts for Finland

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

Volatility due to varying winters

Number of assistances to Finland



- Avustetut Suomenlahti
- Avustetut Selkämeri
- Avustetut Perämeri

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[www.liikennevirasto.fi](http://www.liikennevirasto.fi)

Liikennevirasto

# 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



**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**

# 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

IBBridge WNA

File Edit View Database Window Help

Traffic Substation

Down Icebreaker

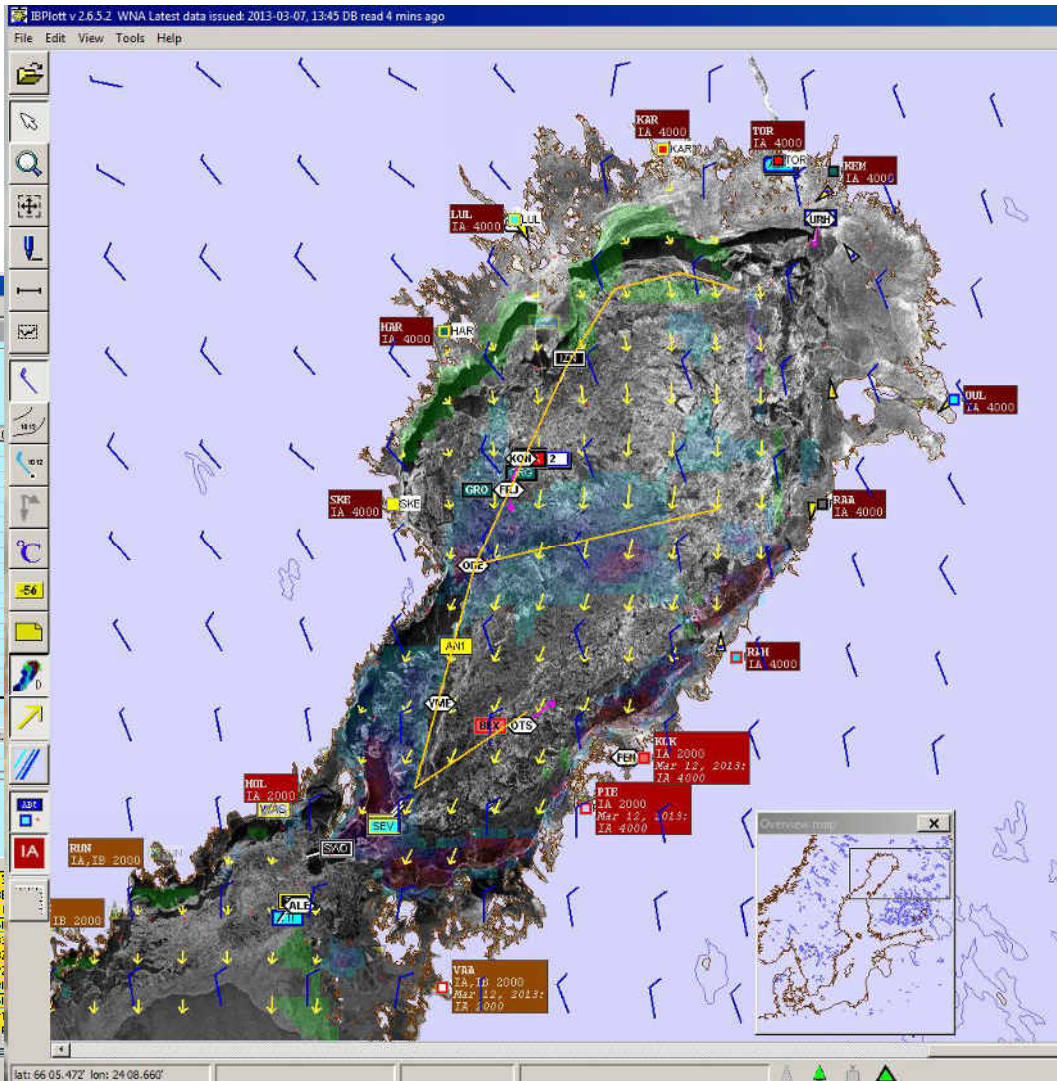
Icebreaker Positions

ACT	VLG	DVE	DIR	Q1	Q2	Q3
ALE	ASS	2	1			
KON	ASS			Disigleribari	Fjaldstraum	
OTS	ASS			Thea Marik		
				Tionsine		
ZEU	FFL			Westgard	Keibersborg	
VDA	STL					
FRJ	FFL	1	2			
YME	STL					
ATL	STL		1		Solymar	
EVA	STL					
VIR	STL					
TAR	STL					
SIU	STL					
NOR	STL					
FEN	STL					
BAN	STL					
TOR	FFL					
SCA	STL					
USA	STL					
URH	STL					
ODE	FFL	2	2	3		
DAN	FFL					
FIN	STL					

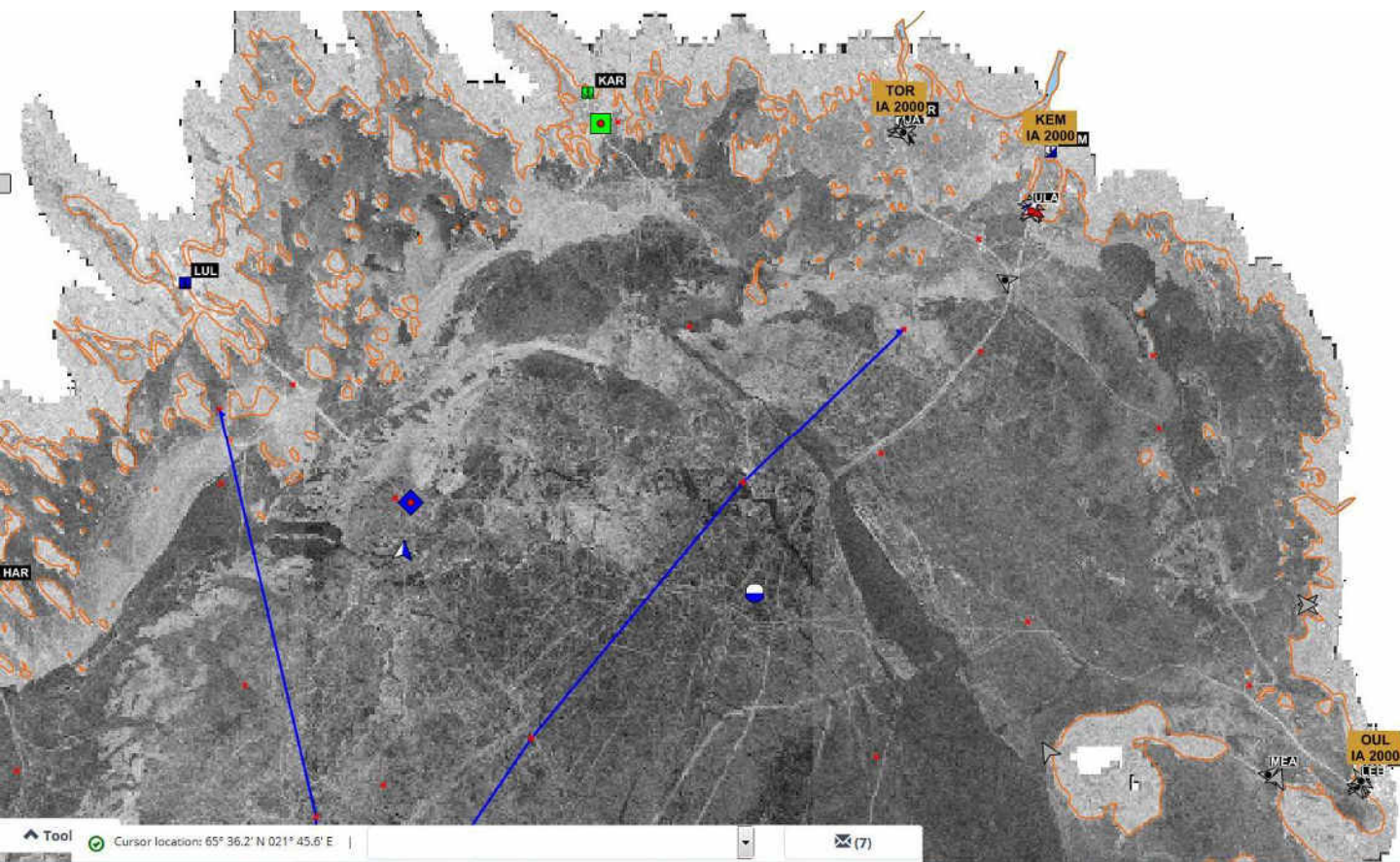
Select Ship(s)

Ship at Sea

Inter	Act	AS	Name	Abbr	Cal	+/	State	IB	DVE	DIR	Plan	Plan	Excol	ATF
	5m		Alek	AM	DJG		FR						P:3	092113
	5m		Alfa Mar	ALR	ZD-07		FR						F:3	170631
	5m		Argo	AMA	ZUTV		FR						G:3	102224
	5m		Arctic	ART	1111		FR						P:3	101140
	5m		Arctic	ARH	DW-5		FR						P:3	091823
	5m		Arctic	ARH	ZD-33		FR		BTE				S:3	092133
	5m		Arctic	ANE	PH-A		FR						OSS	081122
	5m		Arctic	AT3	DZ-5		FR						P:3	102228
	5m		Arctic	ARH	1111		FR						P:3	102155
	5m		Arctic	AUA	DB-A		FR						P:3	092021
	5m		Arctic	ARH	1111		FR						P:3	080901



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



Finnish national IB authority

Traffic restrictions    Exemption

Unverified ships    Dirways

Ships    Edit

📍 Urho (URH) - Stopped

📍 Atle (ATL) - Stopped

Ports    Restrictions

OULU

📍 OULU IA 2000

Add ship to port traffic list ->

+/-	Ship name(Abbr)	Call sign	ETA/ATA	ETD
	Transpaper()	SKEC	0905	1330

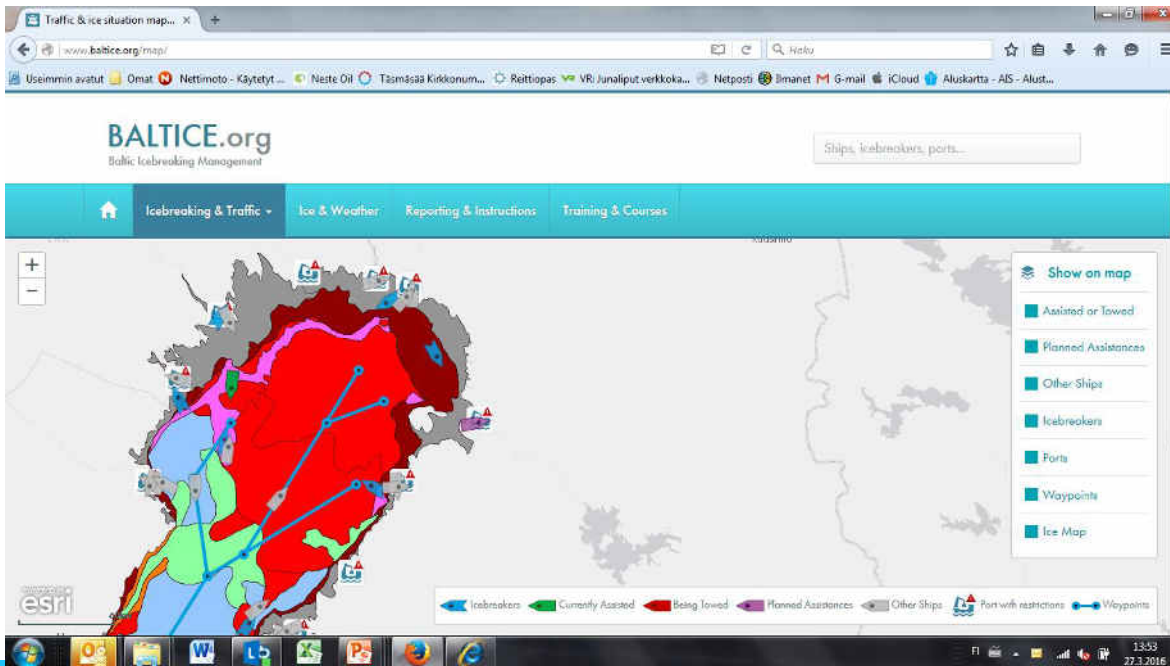
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# Baltic Icebreaker Management authorities BIM

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](http://www.baltice.org)  
Primary information  
source for operators  
onshore and offshore

# Winternavigation is International Team Work Thank You for Your attention!



Merchant vessels independent ice going capacity

Icebreaker capacity

Operator skills

Accurate ice information is base of all operative decisions