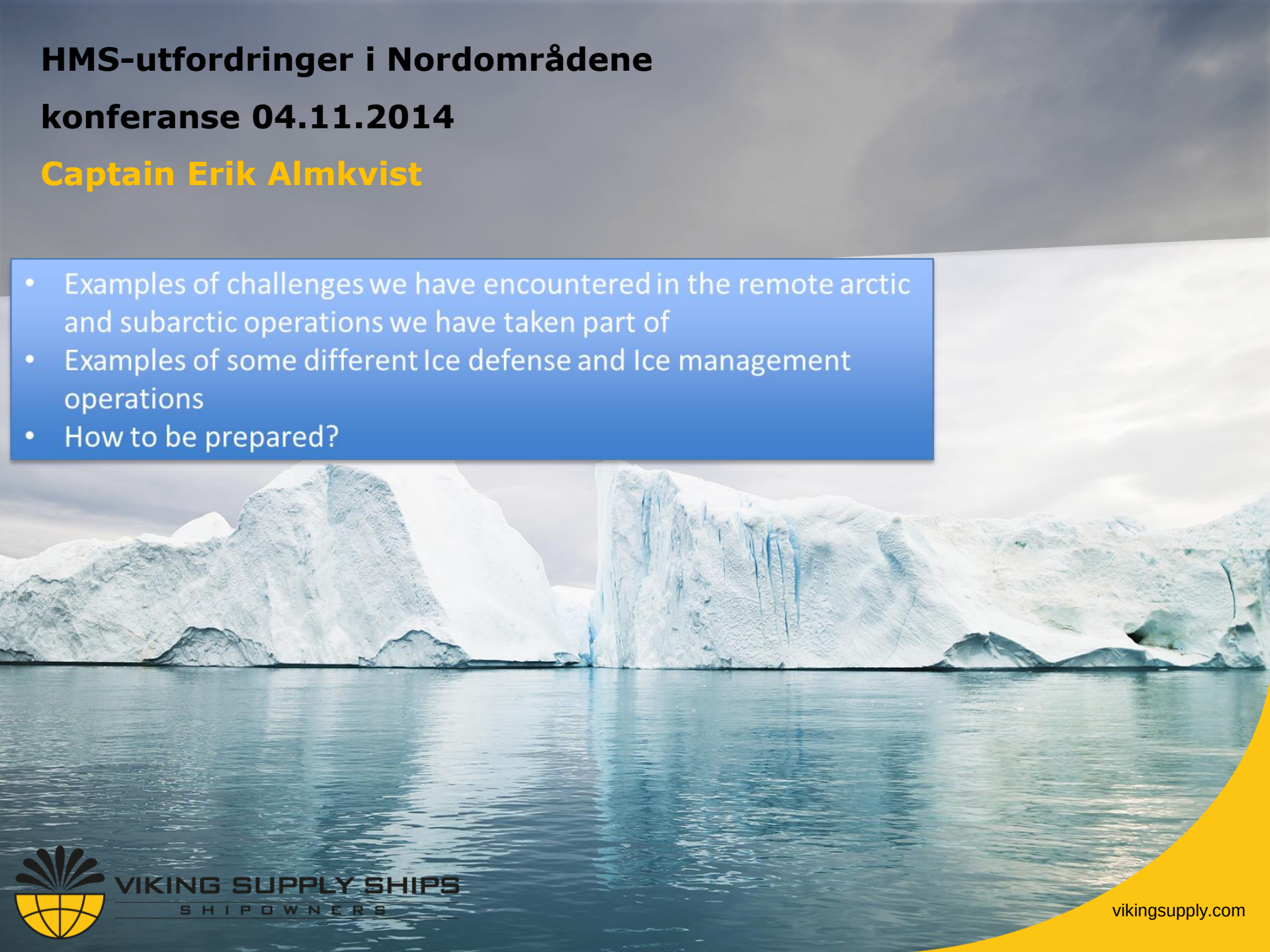
HMS-utfordringer i Nordområdene

konferanse 04.11.2014

Captain Erik Almkvist

- Examples of challenges we have encountered in the remote arctic and subarctic operations we have taken part of
- Examples of some different Ice defense and Ice management operations
- How to be prepared?



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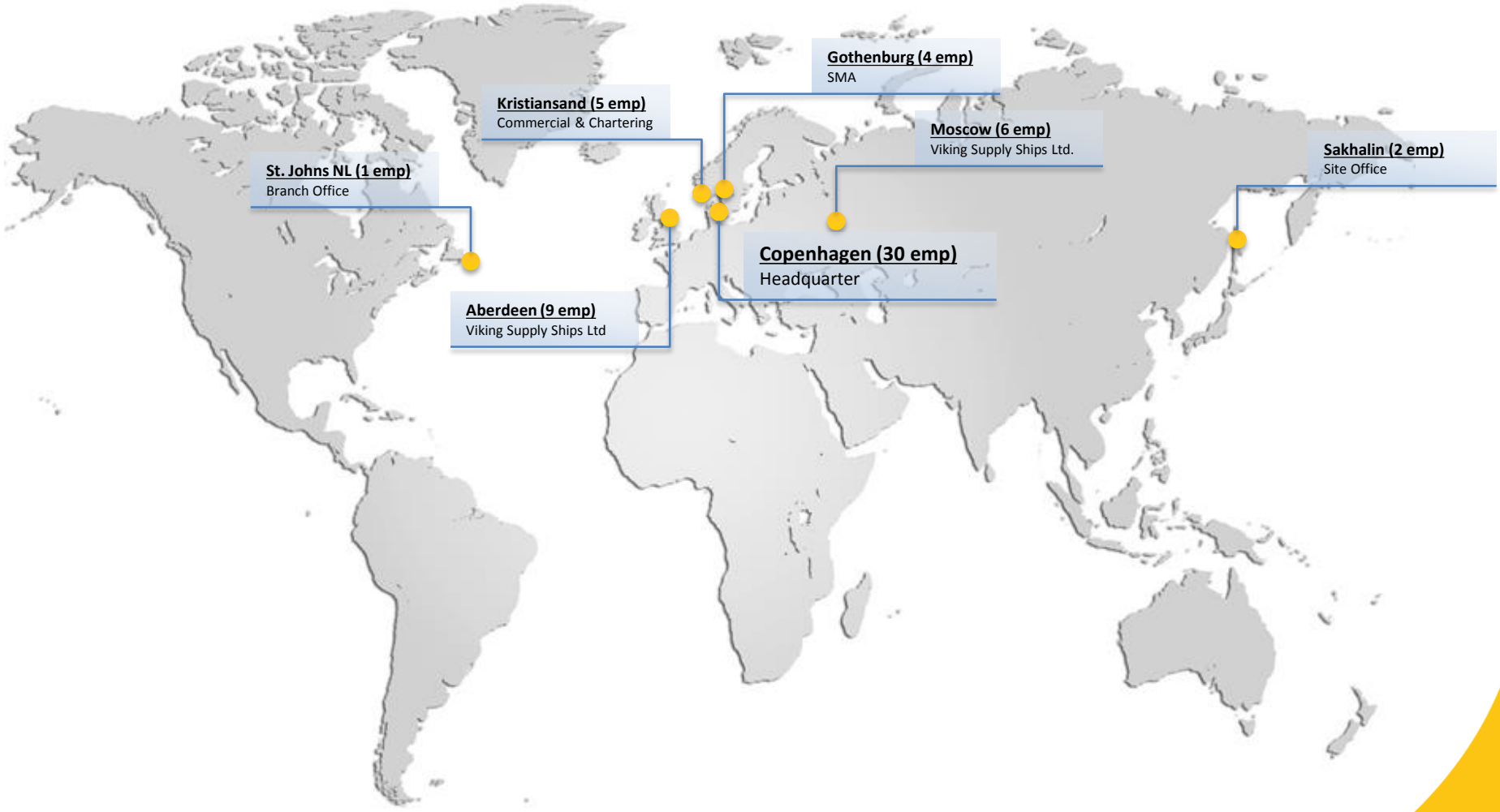
Where we are



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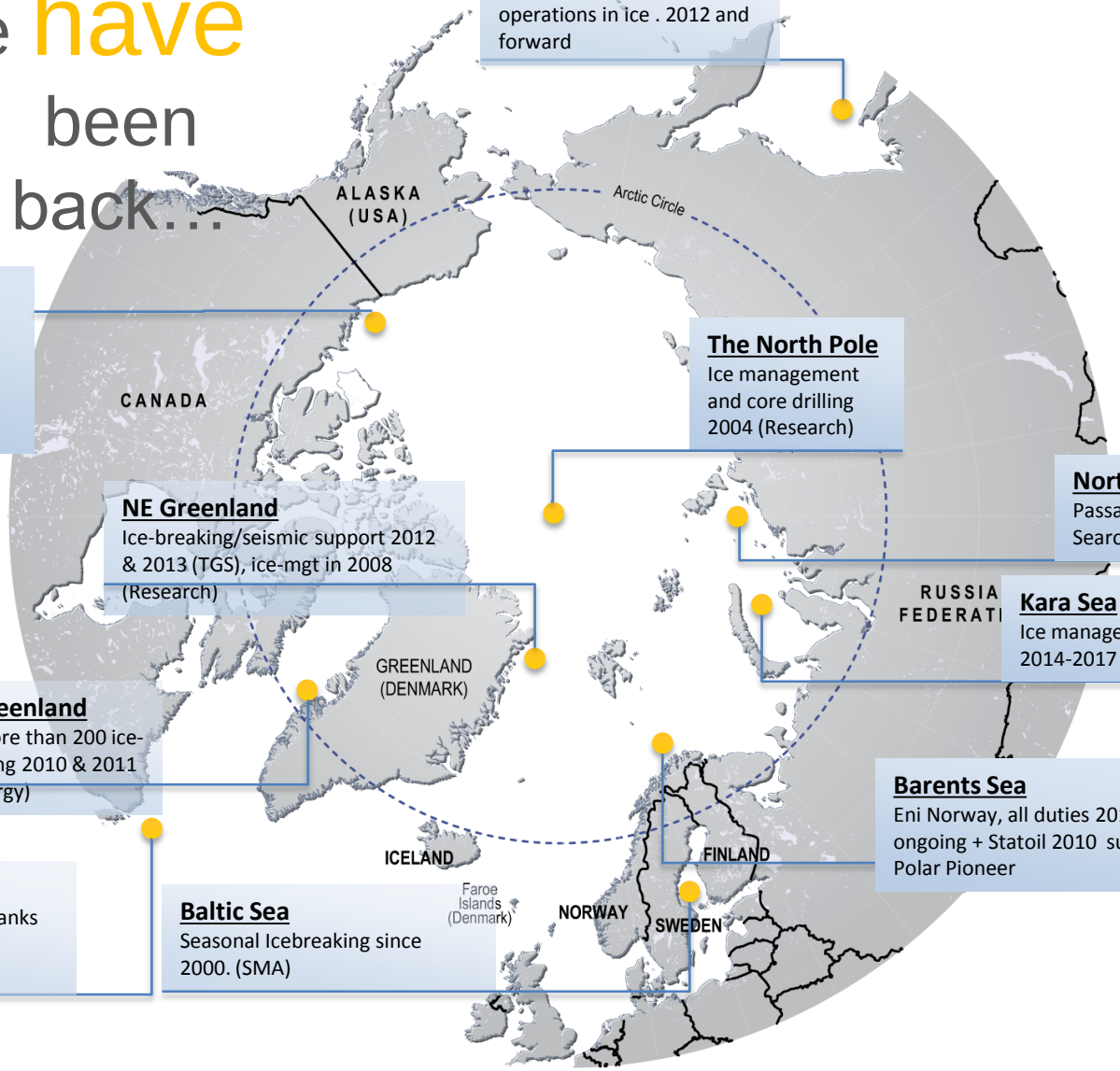
Where we have been and going back…



Sahkalin Russia
Ice-management and supply operations in ice . 2012 and forward

Alaska
Shell US, Ice-management and anchorhandling 2007,2010, 2012, (2015-2017)

The North Pole
Ice management and core drilling 2004 (Research)

Northern Searoute
Passage of the Northern Searoute

NE Greenland
Ice-breaking/seismic support 2012 & 2013 (TGS), ice-mgt in 2008 (Research)

Kara Sea
Ice management 2014-2017 (KMNG)

West Greenland
Moved more than 200 ice-bergs during 2010 & 2011 (Cairn Energy)

Barents Sea
Eni Norway, all duties 2011-ongoing + Statoil 2010 support Polar Pioneer

Canada
Ice berg management Grand Banks Canada for Chevron and Husky Energy (2012 and 2013)

Baltic Sea
Seasonal Icebreaking since 2000. (SMA)

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Current fleet

Vessels	Type	Description	BP/Deck	Ice-class
	Ice-breaker/ AHTS	Tor Viking class	200 tonnes	Ice 10
	Ice-classed AHTS	Loke Viking class	221 tonnes	Ice 1A
	PSV	VS 470 Mk II	710 sq. Meter	N/A
	PSV	SBS Cirrus	840 sq. Meter	N/A
	AHTS	Odin Viking	183 tonnes	N/A
	Ice-breaker	Oden (SMA mgt)	250 tonnes	PC-2
	Ice-breaker	Atle class (SMA mgt)	186 tonnes	1A-Super IB
	Ice-breaker	Ale class (SMA mgt)	51 tonnes	1A-Super IB

Challenges with remote locations

Logistic challenges

- Crew changes. planning and long travels distances. Be flexible.
- Spare parts, enough?
- Backup resources, vessels equipment and plans?
- Enough storage place for all spare equipment?
- Medical emergencies. How to handle evacuations?

Challenges with Northern remote locations

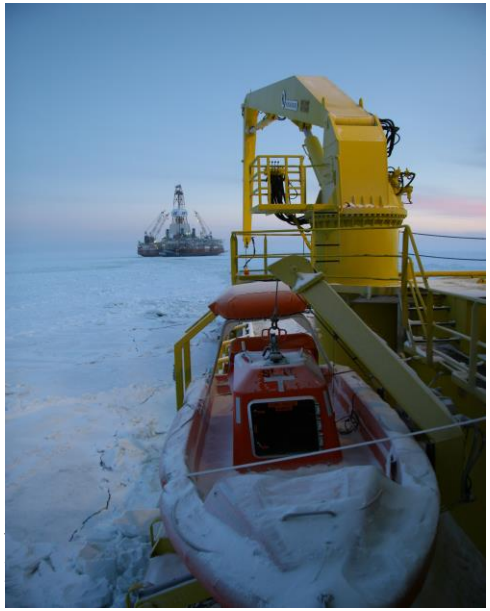
Some examples

- Cold environment for equipment and products, are the equipment going to work and what is the limits?
- Ice or risk of ice. Vessels with correct ice class, know your vessels limitations.
- Lack of experience with ice and cold climate operations.
- Communication problems at high latitudes.
- Sensitive environment, handle garbage and waste.
- Fuel; lack of fuel reserve, cold climate, requirement for low sulfur fuel.
- Things take more time

FREEZING OF EQUIPMENT

Are the vessels and the crew built for it?

All this is no new challenges for the shipping industry.



Viking Ice Academy



VIKING ICE ACADEMY

Custom made training for new projects

Unique company sponsored Ice-training program – theoretical and practical

Operated together with Swedish Maritime College

Approved by Swedish Maritime Authorities to issue official Ice-endorsement

A training facility for our joint partners



ONSHORE

VSS/Company Ice Centre

KSAT KONGSBERG — SAT Imagery

StormGeo — Met Ocean info.

Ice Map/Ice Forecast

Strategy

BLOM IMAGING THE WORLD — Airplane Surveillance

OFFSHORE

MT — VSAT-IRIDIUM

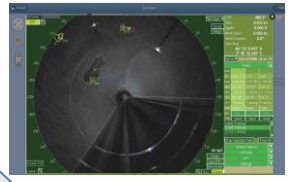
Tactical Ice Tracking and Communication System Real time/Near real time update

- Vessel/rig Position, speed and heading
- Replication of SAT Imagery
- Replication of Ice charts
- Replication of Met ocean Info
- Replication of Radar images
- Iceberg, floe, ridges position, heading and speed
- Onshore/Offshore Messaging and phone
- Logistics Tracking and Planning

Ice drift beacons

Drones

Logistics Tracking



Ice Radar image
Met Ocean Info
Ice/Floe/Iceberg Info

Tactical Instructions
Operation progress

Oilspill Monitoring

LOGISTICS

Egersund Group
Fishing - Aquaculture - Trade

Ice Towing equipment

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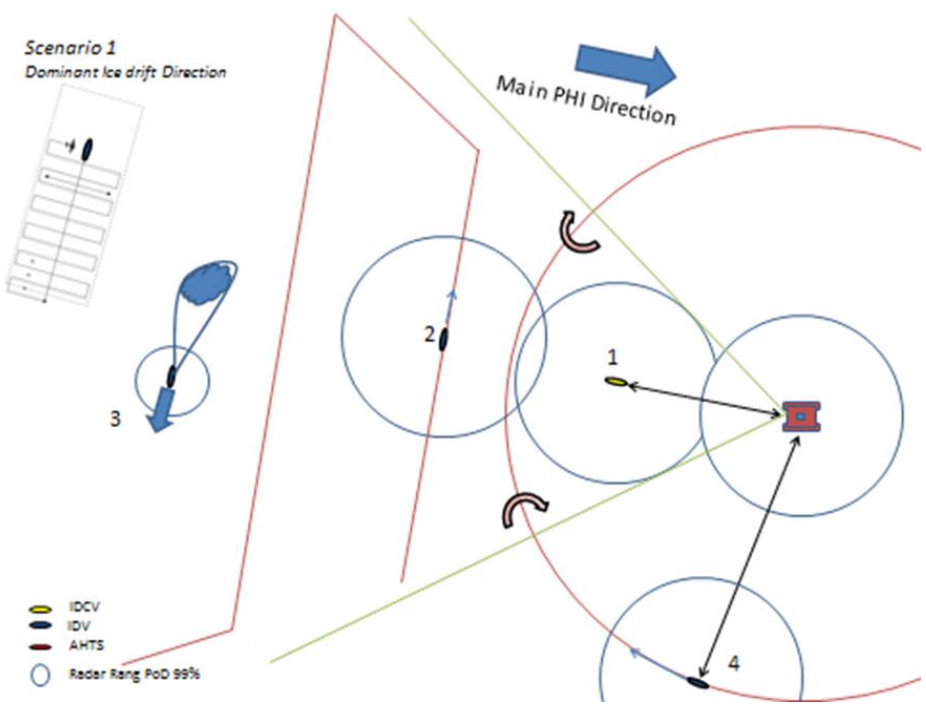
Ice Defense

Iceberg management
Controlling a constantly moving and changing object in an constantly changing and moving environment.

Vessels and rigs with less ice class are able to work in an open water environment

- Ice Rope
- Ice Towing Net
- Water Canon
- Prop Wash



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Iceberg towing/Ice Management
Example from West Greenland 2010/11

- Chartered by Capricorn Greenland Exploration (Cairn Energy) for iceberg management duties.
- SOW; **detect, monitor**, tow and deflect icebergs that are making a threat to the drilling operations locations.
- Fiber ropes and iceberg towing gear specially designed for deflecting ice bergs.
- The vessels towed more than 200 icebergs.

Ice Management

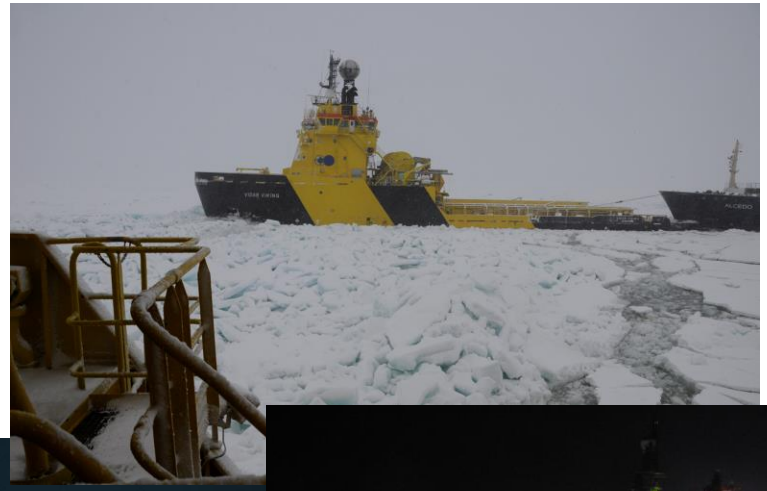
Ice Breaking Management

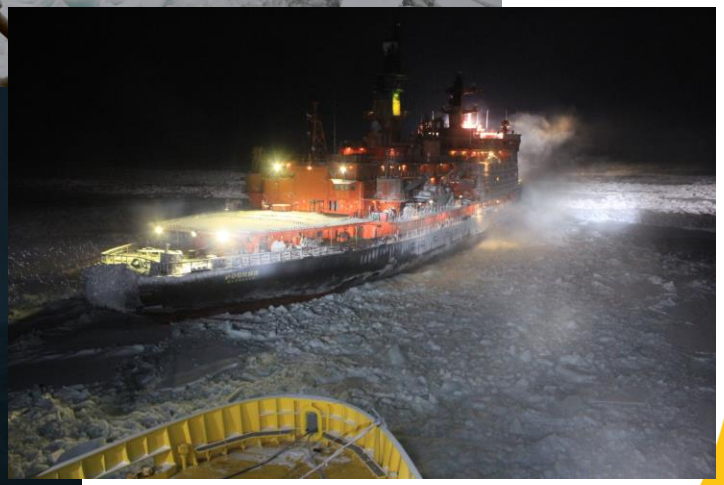
Keeping a channel or an area “open” for vessels or drill rigs to operate and transit safely **in** ice.

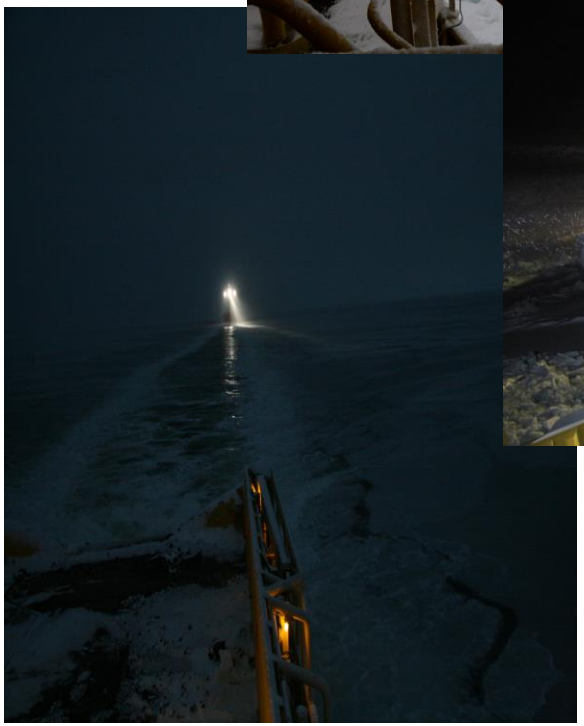
Large difference between 1st year ice, 2nd year ice and multi year ice. Hardness of ice

- Melting ice in the spring vs. Ice during the winter and freeze up.
- Ridge penetration

The Ice Management might be a way to allow operation to start earlier and go on later in an season.







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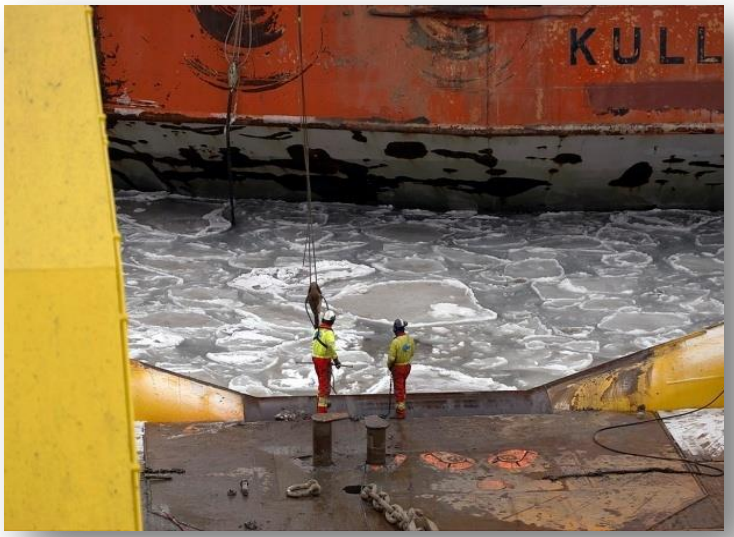
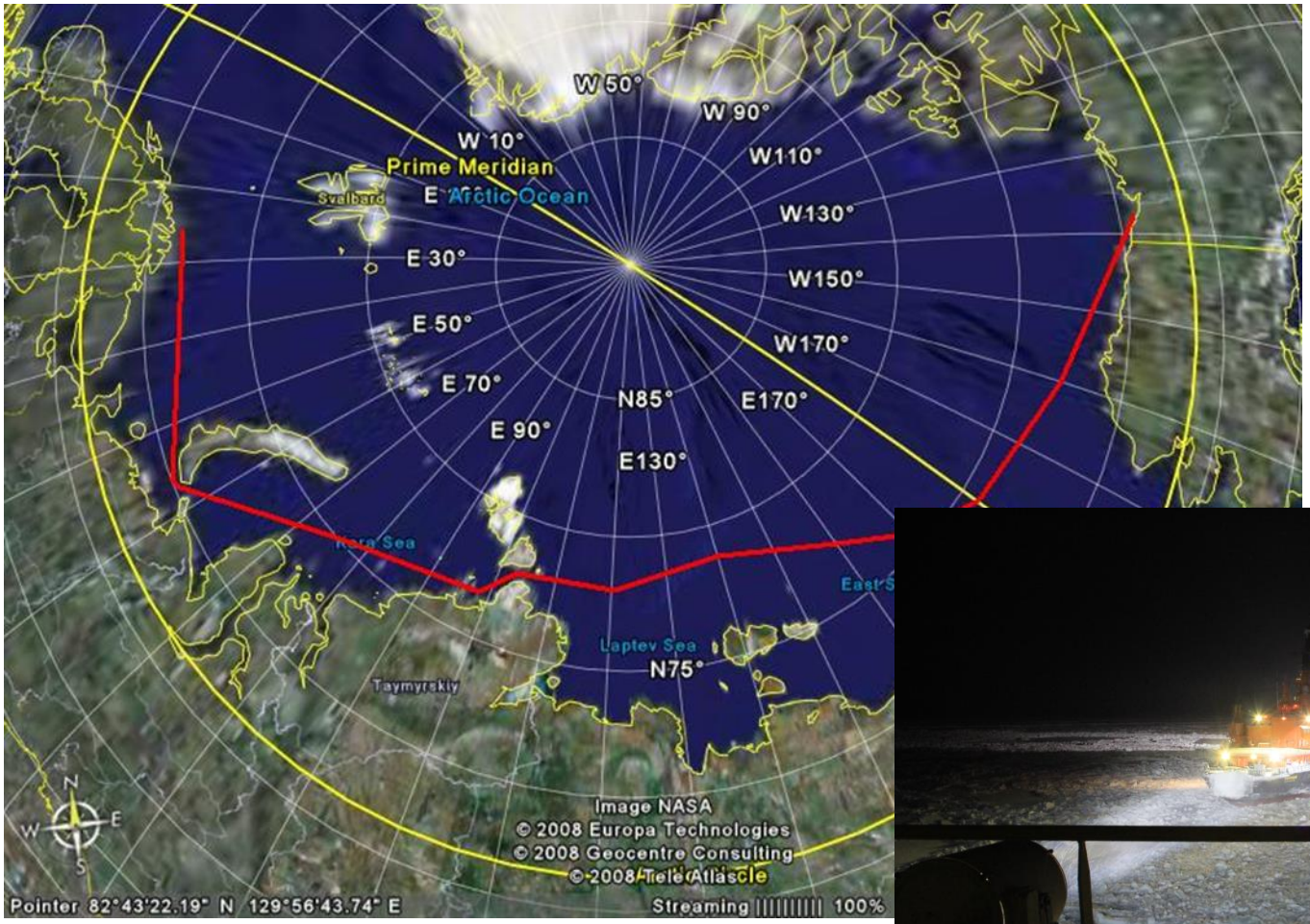
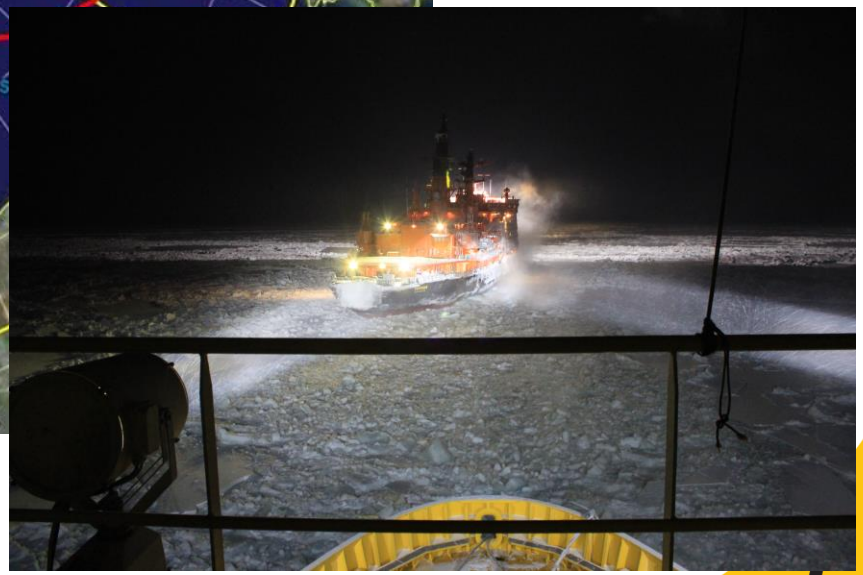
Example from Beaufort Sea 2007, 2010 and 2012

- North of Alaska in the Beaufort Sea and Chukchi Sea.
- The Tor Viking supported the offshore rigs Kulluk and Northern Discoverer.
- SOW;
  - Anchor handling in ice,
  - Towing in ice infested waters
  - Ice management
  - Other support duties in ice.



Transits between operational areas





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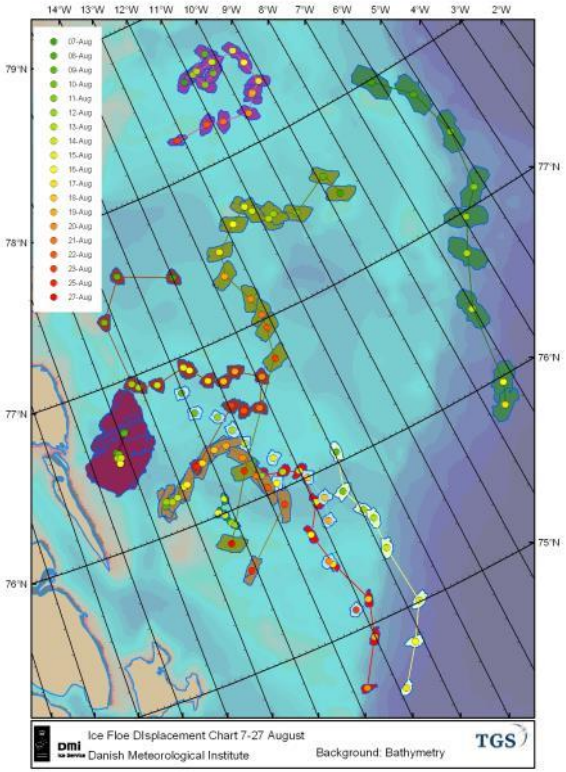
Example from Seismic support NE Greenland 2012/13 for TGS

- Balder Viking chartered by TGS Nopec for 60-80 days NE Greenland
- Campaign by Bureau of Minerals and Petroleum Greenland
- High success with 5000 km seismic lines carried out for the first time in this area
- The Russian Seismic vessel “Akademik Shatskiy” with ice class 1A
- 79-80 degrees North
- Challenging area in terms of ice conditions, weather (fog) and remote from any logistics
- Crew change from Spitsbergen with fishing vessel
- No refueling during the 60 days campaign
- Dual engine helicopter from Fonna Fly AS



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Example of experience with logistics issues during our projects

- Lack of infrastructure, lack of quay, lack of anything
- Stand alone operations, Logistics via for example Svalbard, 3.5 days transit.
- Crew Change, at sea with assist vessel
- Helicopter medevac not always available due to remote location and fogy weather or not suitable equipment.
- Important with training, general ice management, corporation between all parties. **Common understanding very important**
- Provision, 2+ Months supplies
- Oil Spill preparedness
- Sludge, general waste – need to be planned ahead
- Fouled propellers, what to do – towage to nearest port.
- PSV shuttle traffic to port 6-7 days transit. (NW Greenland to Scotland)
- Fuel supply.
- Lack of support functions from non existing base.
- Multifunction duties on vessel, do not go to far
- Personnel transfers. Lack of bed space in the field.
- Icing in ice vs open water; end of project due to lack of experience and knowledge on-board Seismic vsl.

How to handle the challenges

Good planning is the key!

- All parties involved has to be aware of the hazards and what is required to mitigate the risks. A small thing can be a big problem in the remote arctic. Well prepared scope
- Hazop the scope in good time to be able to adjust. Define the weak links.
- Develop manuals that describe the environmental challenges and how to handle. Learn from earlier projects.
- Use vessels and equipment that is suitable in the environment. Time to prepare.
- Training of personnel. Involvement across the organizations.

Situations will change when you are working with ice.

Be flexible

Important to be one Team!

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Thank you