



KONGSBERG SEATEX AS

**MarSafe North**

Gard Ueland

2011-10-26



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WORLD CLASS – through people, technology and dedication





A satellite map of the Arctic region, showing the North Pole and surrounding landmasses. The map displays a large area of white ice in the center, with dark blue water indicating ice-free shipping lanes. The landmasses are colored in shades of green and brown, representing vegetation and terrain. A grid of white dotted lines is overlaid on the map, indicating latitude and longitude. The text is overlaid on a semi-transparent blue box in the lower-left quadrant.

Map of the Arctic including ice free shipping lanes, based on JAXA/NASA-satellite data from the 26th - 28th of August 2011.

Graphic: Lars Kaleschke, KlimaCampus, Universität Hamburg



# “Young and thin instead of old and bulky”

## Researchers report on changes in Arctic sea ice after return of research vessel Polarstern,

October 6, 2011

Compared to their measurements from 2007, when the extent of the sea ice had diminished to a record minimum of 4.3 million square kilometres, the researchers have not yet found any differences, however.

**“The ice has not recovered. This summer it appears to have melted to exactly the same degree as in 2007. Yes, it is exactly as thin as in the record year,”** says Hendricks.



# Norway's High North Strategy



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*"It is in Norway's interest, and also the responsibility of any coastal state, to ensure high standards for safety at sea, search and rescue services, and oil spill response in order to protect the riches of the sea. Increased activity on both the Norwegian and the Russian side of the border in the High North will lead to an increase in the volume of maritime transport and add to the environmental pressure."*

*"There will be considerable development activities in connection with petroleum operations in the southern Barents Sea in the next few years. This may be of major significance for competence-building and for local and regional business development in the future. The Government's aim is that Norway will be the best steward of resources in the High North, with oil and gas operations that meet very stringent environmental standards, and with continual knowledge generation, research and development in the petroleum sector."*

Quotes from: The Norwegian Government's High North Strategy,  
December 2006.

# Arctic Council – Secretariat Tromsø



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## Arctic Council Ministers Sign Agreement in Nuuk

..... The Ministers also decided to strengthen the Arctic Council by establishing a secretariat to increase the ability of the Council to address future challenges in the region. The secretariat will be located in Tromsø, Norway.

Nuuk, 2011-05-12

The first undisputed sighting of the Pole was on May 12, 1926 by Norwegian explorer **Roald Amundsen** and his United States sponsor Lincoln Ellsworth from the airship Norge. – On the day 85 years earlier.



# Denmark: Leaked Document Reveals Plans to Claim Parts of the North Pole



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Denmark plans to lay claim to parts of the North Pole and other areas in the Arctic, where melting ice is uncovering new shipping routes, fishing grounds and drilling opportunities for oil and gas, a leaked government document showed Tuesday.

The draft document, titled "Strategy for the Arctic," said Denmark's Science Ministry had started collecting data to formally submit a claim for those areas no later than 2014 to the United Nations Commission on the Limits of the Continental Shelf. Russia, Norway and the United States have their own claims — sometimes competing — in a region believed to hold as much as 25 percent of the world's undiscovered oil and gas.

**By THE ASSOCIATED PRESS**  
**Published: May 17, 2011**

## Denmark moves forward on North Pole claim

August 22, 2011



View of an Arctic fjord. Denmark presented its "Arctic Strategy" for the next decade, confirming that it intends to lay claim to the North Pole sea bed by 2014 at the latest.

# Russia claims North Pole by planting flag on seabed



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Russian expedition Arktika 2007 made the first descent to the ocean bottom below the North Pole, and planted a titanium flag of Russia on the seabed.

**August 2, 2007**



# Canada Presses Claims Over a Chunk of Arctic



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## Ottawa Moves to Expand Footprint Over Territory's Natural Resources Before Its Rival Russia Does

SEPTEMBER 28, 2011

RESOLUTE, Nunavut—As global interest in Arctic exploration explodes, Canada is pushing to assert rights over a larger chunk of the polar region and lure companies to exploit the territory's promising natural resources.



# China and the Race to Exploit the Warming Arctic



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One inevitable impact of global warming is greater Arctic melting. Nations are now staking claims to vast Arctic resources—oil, gas and minerals—that will soon be within reach. What role can China play in the Arctic? How can the Arctic's fragile environment be protected? **Danish Ambassador Friis Arne Petersen will present Denmark's new Strategy for the Arctic and explain why China is an important player in the Arctic.**

Political scientist Damien Degeorges will follow with an overview of the role of Greenland, a vast territory with considerable hydropower potential and deposits of rare earth elements. He will also talk about the relationship between China and Greenland and ways to improve it in the field of climate change.

DATE: October 28, 2011



The icebreaker "Snow Dragon" is set to carry over a hundred Chinese scientists to the North Pole for scientific expedition from Xiamen. (July 2010)



FOREIGN CORRESPONDENTS' CLUB  
OF CHINA 驻华外国记者协会



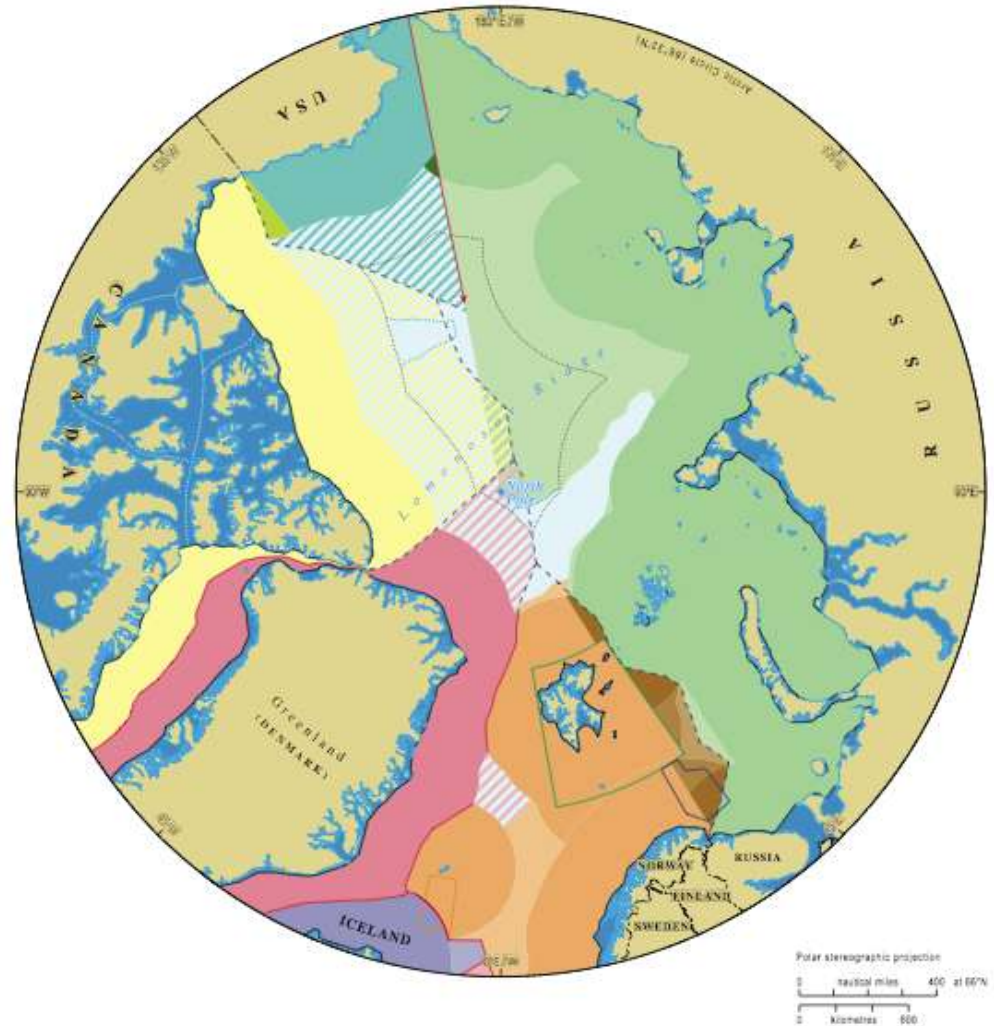
# Who Owns the Arctic?



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October 1, 2007



# Nordområdene tema under møtet mellom Stoltenberg og Obama



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USA ser med stor interesse på utviklingen i nordområdene, blant annet muligheten for samarbeid om olje- og gass, sa han og forteller at USA ønsker å samarbeide mer om blant annet beredskaps- og redningsarbeid i de sårbare, arktiske havområdene.

Obama var dessuten opptatt av at Norge og Russland var blitt enige om delelinjen i Barentshavet.



**October 20, 2011**

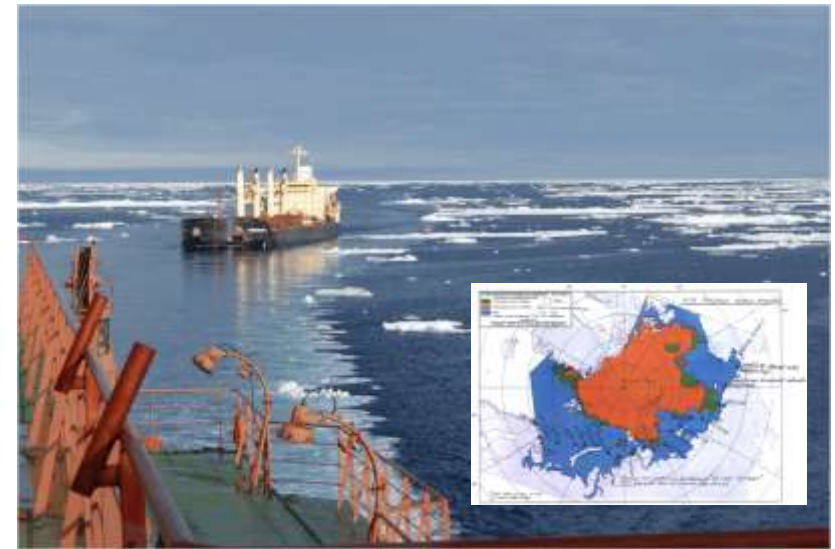


# Northern Sea Route



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## TSCHUDI



### CARGO FROM KIRKENES AND MURMANSK

Destination	Via Suez Canal			Through Northern Sea Route			Days saved
	Distance Nm.	Speed Knts	Days	Distance Nm.	Speed Knts	Days	
Shanghai, China*	12050	14,0	37	6500	12,9*	21*	- 16
Busan, Korea	12400	14,0	38	6050	12,9	19,5	- 18,5
Yokohama, Japan	12730	14,0	39	5750	12,9	18,5	- 20,5

\* Based on an actual voyage performed by MV Nordic Barents from Kirkenes to Lianyungang (China), September 2010

September 2010



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# Arctic GNSS Initiative

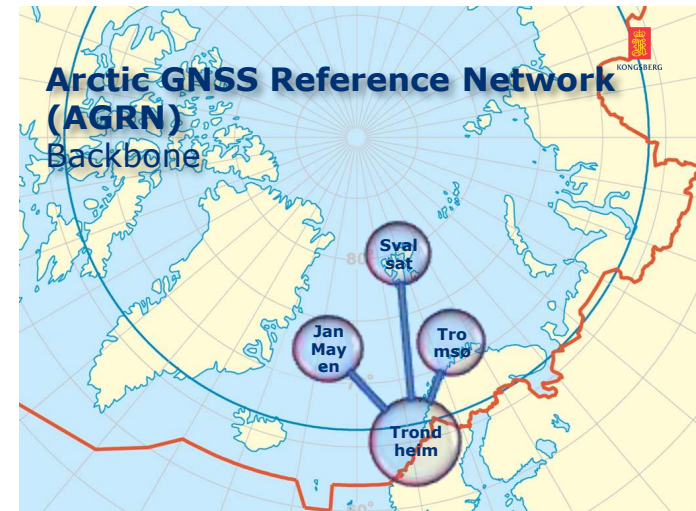


# Typical AGI provided services



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- Support and experts advice to public authorities in matters related to safe navigation, tracking and monitoring, precise and reliable position references for critical operations.
- Recommendations for best practices and augmentation of services
- Collaboration with users – either individually or group – for developing solutions to specific operational requirements.



## Arctic GNSS Initiative - Contacts

Kongsberg Seatex AS  
Trondheim, Norway  
Contact person: [stig.erik.christiansen@kongsberg.com](mailto:stig.erik.christiansen@kongsberg.com)



Shtokman-Barents Sea

Foto: © Yu.Gudoshnikov, Goran Wilkman et. al., © AARI 2001

## Key focus areas

- Safety and security
- Offshore operations in the high north
- Northern routes (maritime and aviation)
- Signal propagation at high latitudes
- Effects of ionosphere and troposphere
- Satellite constellations and effects at high latitudes
- Mitigation techniques of effects in the Arctic
- Reliability of navigation solutions
- Integrated solutions
- Mapping vs. positioning
- Communication
- Tracking

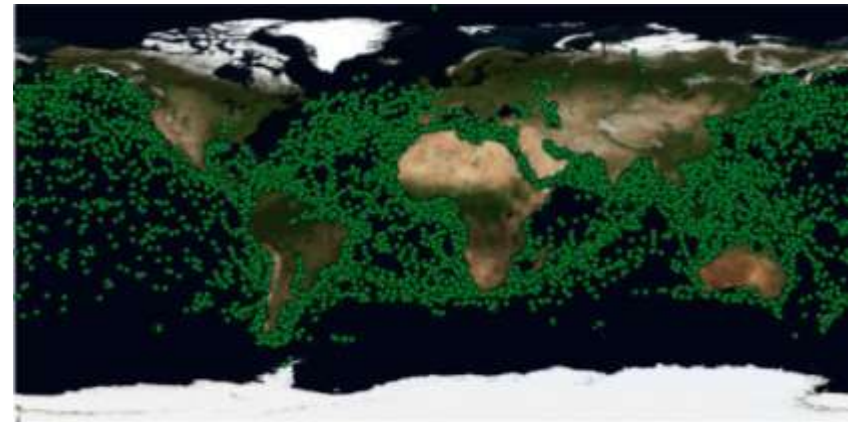
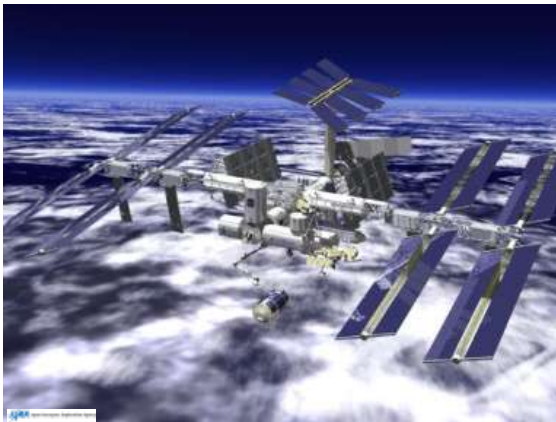
# AIS technology in Space



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- KSX AIS-Receiver has been successfully operational onboard the International Space Station for more than one year.
- ESA has expressed its satisfaction on the obtained results
- Well in line with Norway's High North initiatives.



THE FULL PICTURE



# AISSat-1 First Results July 12, 2010



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"Det er en liten satellitt, men den er et stort skritt for norsk romfart"  
Statsråd Trond Giske

*"Satellite-based AIS information will make it easier and faster for the Maritime Traffic Control and rescue centers to get an overview of maritime traffic, find the position of ships in distress or in need of assistance, and finding vessels that may assist on this. Satellite AIS makes it even easier to identify vessels that are responsible for oil spills in the waters." KYSTVERKET June 28, 2011.*



AIS data from AISSat-1 (Orange/Pink) added to AIS data from the Coastal Network (Green)



The objectives of MarSafe North are to provide recommendations that will contribute to increased maritime safety in the High North, equivalent or better than the safety level in the North Sea.



**State-of-the-Art  
(North Sea)**



**Arctic  
challenges**



**New:  
Infrastructure?  
Technologies?  
Operations?  
Procedures?  
Regulations?**



**State-of-the-Art  
(High North)**

**Business as usual**

**Business as usual**

# The MarSafe Project



## Reference Group



Total project:

**23 000 000 NOK**

Funding from MAROFF:

**9 200 000 NOK**

Project period:

**2008 – 2011**

Project owner:

**Kongsberg Seatex,  
Tony Haugen**

Project management:

**MARINTEK, Kay Fjørtoft**

Homepage:

**[www.sintef.no/marsafe](http://www.sintef.no/marsafe)**



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## Kongsberg Maritime

