

## Development of the Northern Sea Route: how great is the need for satellite observation?

**Bård Wormdal**

The sea route between Europe and Asia is significantly shorter via Arctic waters than via the Suez Canal. Changes in global climate have resulted in a diminishing of ice in Arctic waters. This has resulted in the Northern Sea Route establishing itself as a viable commercial alternative, which is expected to expand in the years ahead. Satellite observation is one of the methods employed to gather information about ice conditions, weather and oil spills, and is a prerequisite for ensuring the continued development of the new traffic.

The European colonial powers started investigating whether there were shorter transport routes via northern waters as early as in the 17th century. However, it was not until 1879 that the Swedish-Finnish explorer Adolf Erik Nordenskjöld, as the first Western explorer, sailed to the Bering Strait. The transport route was expanded during the Soviet era, and in 1978 the first year-round transportation of iron and other metals commenced between Yenisey in the east and Murmansk in the west, supported by icebreakers in winter. Foreign vessels were first granted permission to traffic between east and west in Russian northern waters in July 1991, just a few months after the collapse of the Soviet Union.

In 1997 the Finnish oil tanker the Uikku was the first non-Russian flagged vessel that sailed the entire Northern Sea Route. In 2012, 46 registered vessels used the passage. This figure rose the following year to 71. A total of 1.35 million metric tons comprising bulk, liquid, LNG and general cargo was transported in 2013<sup>1</sup>. In 2030, transportation could account for one-quarter of all goods transport between Europe and Asia.<sup>2</sup> This development would be dependent on the ice diminishing rapidly, but the researchers disagree on the speed at which the ice will melt. According to some estimates the entire Arctic

Bård Wormdal is the author of the « Satellite War » and Journalist at NRK – Norway's largest media house.

*Les opinions exprimées dans ce texte n'engagent que leur auteur.*

ISBN : 978-2-36567-261-0  
© Tous droits réservés, Paris, Ifri



<sup>1</sup> <http://www.arctic-lio.com/node/209>

<sup>2</sup> [http://www.huffingtonpost.com/2013/05/29/arctic-shipping-northern-sea-route\\_n\\_3351109.html](http://www.huffingtonpost.com/2013/05/29/arctic-shipping-northern-sea-route_n_3351109.html)

could be ice-free by 2040.<sup>3</sup>

Nonetheless, shipping companies that aim to use the new sea route face major challenges. The passage is still only fully navigable from the beginning of July to November in areas where only one-year old ice is formed. One-year old ice is around 1.6 metres thick. There is no fixed window for the period during which traffic is permitted. Everything is dependent on ice conditions. One of the challenges lies in receiving updated satellite information about ice conditions.

### **The use of primarily radar satellites**

The satellites that are best suited for observation of ice conditions are radar satellites, as they can produce images under all light and weather conditions. Radar satellites have been utilised for monitoring the sea route since 1991. Images were transmitted in real-time from the radar satellite ERS-1 to assist the French vessel L'Astrolabe sailing from Europe to Japan in navigating through ice-filled waters.<sup>4</sup>

The attempt was successful, and led to the Nansen Centers in Bergen, Norway and St. Petersburg and the Murmansk Shipping Company entering into a co-operation on the use of radar satellites as support for nuclear-powered icebreakers and convoys. Since then, data from ERS-2, Radarsat and Envisat has also been employed. The satellite images were particularly valuable in calculating movement of ice in straits and near coastlines. The Russians have also utilised images from the Russian satellite Okean to monitor ice in the Barents Sea and Kara Sea.

Most of the radar satellites in polar orbit, for example Cosmo-Skymed and TerraSar-X, are however best suited to imaging land areas. There are currently very few radar satellites on the market that are developed and suitable for producing images of ice in this area. Radarsat-2 is an exception. It was designed and built especially for maritime monitoring of northern areas. There is a formal co-operation with the Russian authorities on the use of Radarsat, encompassing amongst other things the establishment of two ground stations at Samara Aerospace University and the Northern Arctic Federal University.

New radar satellites will be designed and launched in the years ahead that are specially designed to chart ice and generate data that will be available free of charge in the public domain, for instance from the new European Sentinel satellites. One question is whether new radar satellites, that won't have data freely available, will be adapted for monitoring of ice conditions for the Northern Sea Route.

Another problem today is reliable weather data and weather forecasts based on satellite data. The sea areas in question are often fogbound. Several times in recent years vessels have been taken unawares by bad weather that has appeared virtually out of the blue. Western vessels receive weather data from the Russian authorities, but accessibility and language problems have caused problems. Optical ice, weather and environmental data have proven to be highly valuable from the American NOAA, Aqua and Terra satellites and Russian Meteor.

The Japanese company Axelspace has plans to launch a micro-satellite, WNISAT-1, whose primary task will be to monitor ice conditions for the sea route. There is already a need for more up-to-date optical and infrared images. The challenge for WNISAT-1 and other projects is whether there is and will be sufficient shipping traffic

---

<sup>3</sup> [http://www.huffingtonpost.com/2013/05/29/arctic-shipping-northern-sea-route\\_n\\_3351109.html](http://www.huffingtonpost.com/2013/05/29/arctic-shipping-northern-sea-route_n_3351109.html)

<sup>4</sup> <http://link.springer.com/book/10.1007/978-3-540-48840-8>

and thus a customer base for financing. 5

There are also challenges concerning communications. The geostationary communications satellites shall in theory function up to 80 degrees north, which is five degrees further north than most of the Northern Sea Route. Nonetheless, shipping companies have encountered problems with use of Inmarsat and other geostationary satellite systems.

Iridium does not have a limit of up to 80 degrees, but this system has also proven to be unstable. It will be improved with the next generation, Iridium NEXT, which according to the plan will be operative in two years' time. The Norwegian telecommunications company Telenor is now collaborating with Norwegian space authorities on the launch of a communications satellite that could also function at Arctic latitudes. Both Iridium NEXT and the Norwegian communications satellite will have broadband capacity.

### **Broad international interest**

Russia is eager to develop the Northern Sea Route. At present this interest is primarily connected to developing the oil and gas industry and exploitation of other raw materials in these areas. It is understood that there are massive unexploited oil and gas resources in the Russian north, in Timan-Pechora, Yenisei-Laptev, Barents-Kara, Indigirka-Chukotka, South Jamal, Lena-Anabar and Anabar. Maritime transport is a necessary prerequisite.

Meanwhile, Russia has also shown considerable interest in establishing the sea route as an international transport route. As an example the Russian authorities supported the first transport of iron ore from a western port to Asia when in September 2010 the motor vessel Nordic Barents sailed from Norway to China. Criticism has been raised on several occasions against the level of the fee imposed for using the passage. There has also been criticism against the requirement to use icebreakers even if there has been little or no ice, which has resulted in additional costs. Others have maintained that the level of costs for the Northern Sea Route compare favourably with Suez Canal rates, which is often the alternative.

In Norwegian politics, development of co-operation with Russia has played a vital role in modern day security policy. A key feature of this has been commercial/industrial co-operation. The Norwegian authorities have urged Norwegian shipping interests to develop the Northern Sea Route together with Russian interests. This takes place in amongst other forums the Centre for High North Logistics, which has received support at Norwegian ministerial level.<sup>6</sup>

Danish, Swedish and Finnish shipping companies currently have vessels that use the Northern Sea Route, and the Finnish authorities have shown interest in transporting products from a growing mining industry via a future railway to Northern Norway, continuing by vessel through the Northern Sea Route.

The United States is the only country that does not accept that the seaway is under Russian jurisdiction, based on article 234 in the United Nation's (UN) Law of the Sea. <sup>7</sup> U.S. vessels have on several occasions operated in this area without due consideration of Russian regulations. <sup>8</sup> This could lead to conflicts of a similar nature

---

<sup>5</sup> <http://en.axelspace.com/solution/wnisat1/>

<sup>6</sup> [http://www.dnv.com/industry/oil\\_gas/publications/updates/arctic\\_update/2010/01\\_2010/thecentreforhighnorthlogistics.asp](http://www.dnv.com/industry/oil_gas/publications/updates/arctic_update/2010/01_2010/thecentreforhighnorthlogistics.asp)

<sup>7</sup> <http://www.fni.no/doc%26pdf/clr-norden-nsr-en.pdf>

<sup>8</sup> <http://www.fni.no/doc%26pdf/clr-norden-nsr-en.pdf>

to those we have seen between Canadian and American interests in the new sea route north of the Canadian mainland, which could also occur between the United States and Russia with regard to the Northern Sea Route. It's hard to envisage other countries raising objections in the future.

Asian countries have shown an increasing interest for the Arctic in recent years. Two examples are that India and China have been granted observer status on the Arctic Council. The first Chinese freighter, Yong Sheng, sailed through the Northern Sea Route in the autumn of 2013.<sup>9</sup> Chinese and Russian companies have entered into long-term co-operation agreements to develop the sea route.

### **The Northern Sea Route and the future**

Just how quickly development of the Northern Sea Route will proceed is dependent on the ice melting, but could also be affected by environmental conditions. A major oil spill from an oil tanker in ice-filled waters could cause long-term damage to the vulnerable natural environment due to low temperatures and a gravely inadequate apparatus in many places to deal with spills. Greenpeace recently gathered two million signatures against drilling for oil in the Arctic.<sup>10</sup> Consideration of environmental preservation could prove a restraint on development of the Northern Sea Route, which in turn would have consequences for the requirement for improved satellite observation of the sea route.

---

<sup>9</sup> <http://gcaptain.com/port-of-rotterdam-sees-arrival-of-first-ship-via-northern-sea-route/>

<sup>10</sup> <http://www.greenpeace.org/norway/no/getinvolved/Online-actions/Arctic/free-our-activists/>