

Arctic Commercial Shipping and the Strategic Significance of the Northern Sea Route

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A container ship transits Russia's Kola Bay in July 2009. Photo courtesy flickr user [euno](#).

In early August 2013, the general cargo vessel *M/V Yong Sheng* — a ship operated by the China Ocean Shipping Group Company and

weighing in at 19,150 deadweight tonnes — sailed from Dalian in northeastern China, bound for Rotterdam in the Netherlands. Ordinarily this would be another unremarkable voyage amongst thousands made by Chinese-flagged merchant vessels every year. On this occasion, however, the *Yong Sheng* sailed via the Northern Sea Route (NSR) rather than via the Indian Ocean and the Suez Canal, making it the first-ever Chinese vessel to do so.¹ Normally, the passage via Suez would take a vessel of this type some 48 days, but her route across the top of the world reduced the transit time to 35 days. This reduction of 13 days will translate into significant savings in fuel costs, canal fees and the costs associated with embarkation of an armed security team to deter and defend against the possibility of a pirate attack while transiting the high risk area in the Indian Ocean.

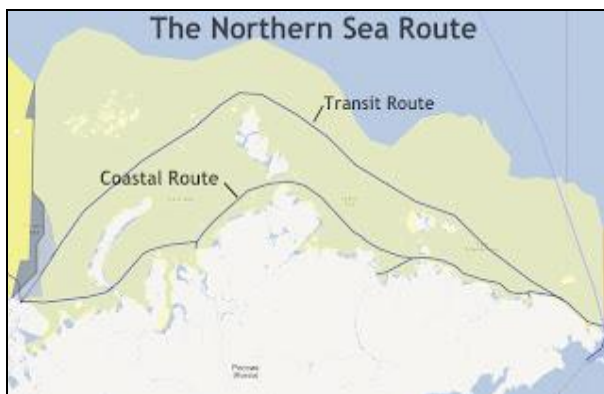
Due to the significant numbers of vessels that have transited the NSR in recent years, this particular crossing would seem at first glance to be a relatively unremarkable event. However, the voyage was very deliberately planned and timed, as it occurred just three months after China secured ‘permanent observer’ status at the Arctic Council. This is the international body that facilitates high-level intergovernmental exchanges between member states to promote cooperation and coordination on matters pertaining to the

protection of the Arctic environment and sustainable economic development of this unique and sensitive geo-space. In effect, by applying for, and being granted, permanent observer status of the Arctic Council and then dispatching a vessel to transit the NSR at the earliest opportunity (due to sufficient pack-ice retreat), China has made an unmistakable statement – she has recognized the current and future geopolitical and economic importance of the Arctic and regards the region and the NSR as strategically important to its national interest.

1. Introduction

Following the establishment of the geographical and historical context of the NSR, the aim of this paper is to provide an observational and analytical discussion of the vital commercial, economic, geopolitical, strategic, security and environmental features that are shaping what could become a key trading route between the eastern, western and northern hemispheres. The NSR is a maritime passage that could also enable the faster expansion of the exploration and production of oil and gas in the Arctic; significantly shorten the east-west maritime trading belt between higher latitude European and Asian ports; and dramatically alter the strategic value to, and utilization of, the Arctic Ocean by the world's established and emerging great powers.

Nevertheless, there remain important challenges and obstacles to the evolution of the NSR into a major, high-volume intercontinental maritime trading route. Under current climatic conditions, the NSR is only open to mainstream commercial shipping for a few months during the Arctic summer, which limits transit windows and transit tonnage capacity. Even then, icebreaker escort (of which there are limited numbers) is still required. There is scant search and rescue coverage in these high latitudes in the event ships get into trouble and declare an emergency. Special and expensive insurance coverage is required due to the navigational hazards involved and, notwithstanding existing security concerns in the form of piracy and armed robbery at sea in the Indian Ocean and the embryonic threat of attacks against vessels transiting the Suez Canal by Sinai-based extremists, the NSR traverses what is still Russia's geopolitical and military sphere of influence, which ensures that Moscow fundamentally controls this space and can apply de facto (if not endemic de jure) military control over maritime trading commerce should it become geo-strategically expedient to do so.



Northern Sea Route: A maritime trading route across what is not a single clearly defined passage, but a number of alternative passages between Novaya Zemlya (which sits astride the Barents & Kara Seas) and the Bering Strait, which divides Alaska and the eastern-most tip of the Russian mainland. The route is some 2,500 nautical miles long and has been transited by modern merchant vessels in a little as 7.5 days.



A ship transits through Arctic sea ice. Photo courtesy flickr user [ashatsea](#).

The NSR, which used to be known as the Northeast Passage prior to the 20th century (this reference is still used in some of the literature), is the Arctic

Ocean maritime trading link between the North Atlantic Ocean and the northwestern Pacific Ocean. It extends fundamentally from the Kara Gate between the Russian mainland and the island of Novaya Zemlya and the northern entrance to the Bering Strait separating Siberia from Alaska. As a result of steadily retreating summer ice margins in the Kara Sea, the Laptev Sea and East Siberian Sea, increasing fuel costs for merchant vessels, and the extant threat of piracy in the northern Indian Ocean, the NSR has in very recent times become of clear commercial interest to global maritime trade. Additionally, the steadily increasing, if controversial, oil and gas exploration projects underway in the Arctic region are necessitating the expansion of support vessel and specialized offshore vessel deployments to the region; some of which must use the NSR to get into operating position.

2. Historical background of the NSR

Prior to the first successful single-voyage transit of the NSR, there were several expeditions to the Arctic waters by European explorers in the 16th and 17th centuries – notably those led by Willoughby and Burrough (which reached the eastern Barents Sea), Brunel, Pet, Jackman (who sailed as far as the Kara Sea), and perhaps most famously, the expeditions led by Willem Barents, who voyaged as far as Novaya Zemlya. Following the European polar explorers, various Russian Cossack mariners had explored the entire length of the north Eurasian coast by the middle of the 17th century, establishing settlements along the way at the mouths to the great Siberian rivers – Olenek, Yana, Indigirka and the Kolyma. As a result, technically speaking the credit for the earliest successful and deliberate exploration of the NSR and the Eurasian Arctic littoral is Russia's. During the 18th century, several expeditions, including the Great Northern Expedition and an attempt by Captain James Cook's *HMS Resolution* in 1778, attempted to traverse the NSR; however, all attempts were thwarted at various points due to heavy pack ice.

It was not until the 19th century that the first successful single-transit would be made. In 1878, the Swedish explorer and scientist, Baron A.E. Nordenskjöld, departed eastwards from the Kara Sea on the *Vega*. She made it as far as Kolyuchinskaya Bay, but was eventually forced to remain there over the winter due to the impenetrable ice. The *Vega* resumed her passage the following summer and passed through the Bearing Strait on 20 July 1879.

During the 20th century, the NSR was of pivotal strategic importance to the Soviet Union during the aftermath of the Bolshevik Revolution, the Second World War and the Cold War. After 1917, the USSR had effectively isolated herself from the Western powers and their extensive sphere of control in the Atlantic, Indian and large parts of the Pacific Oceans. This, added to the fact that the NSR is significantly shorter as a maritime connector between the western and eastern parts of the Soviet Union, meant that the link became critical for Soviet commercial shipping and naval maneuver between the country's Atlantic and Pacific bases. In 1932, as head of the Chief Directorate of the Northern Sea Route, Otto Schmidt, led the first non-stop transit of the NSR, and in 1935, following the official 'opening' of the route in the previous year, the NSR entered into the era of its being utilized continuously for commercial and military utilization by the USSR. Total transit tonnage fluctuated over the next 52 years, peaking in 1987 at with the aggregate conveyance of 6.6 million tonnes.

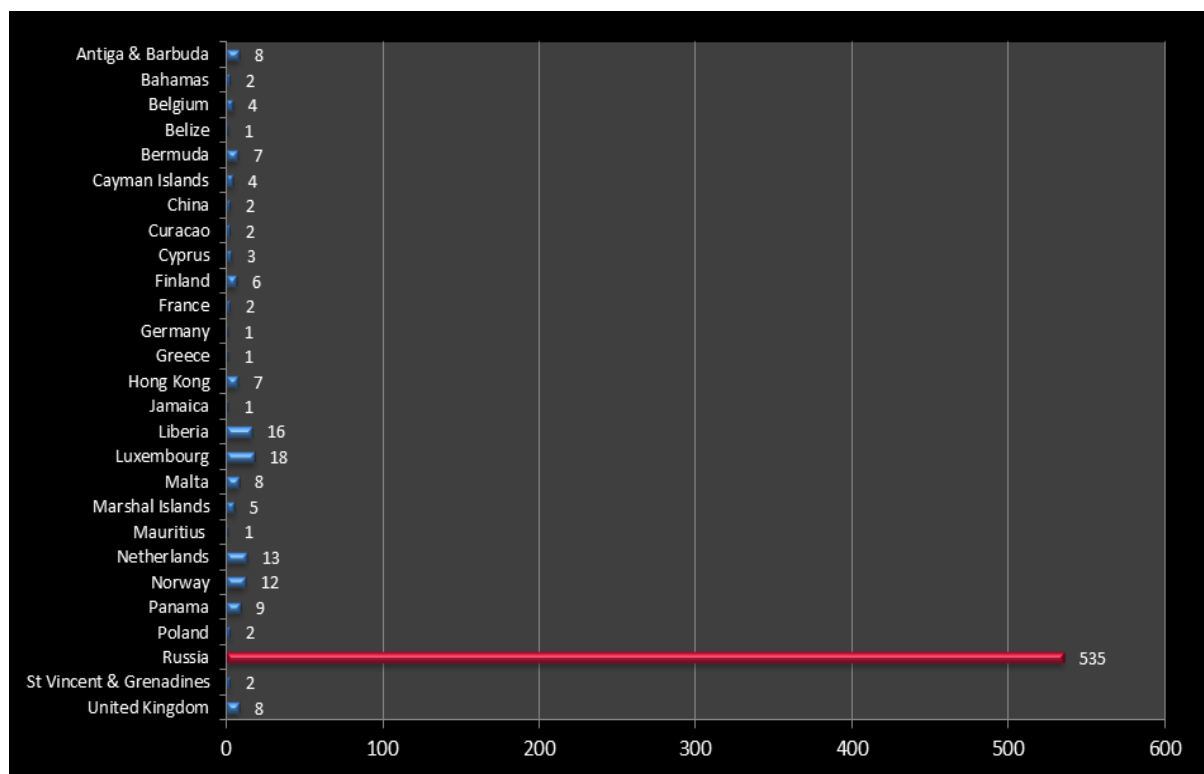
Throughout the Soviet era, this maritime space remained, not surprisingly, inaccessible to any foreign countries, with the exception of some permitted transits of German vessels and warships during the very early part of WWII. The volume of shipping and tonnage moved through the NSR declined sharply after the fall of the USSR. In 1991, the route was officially opened to foreign-flagged and owned merchant vessels in an attempt to boost trade. Despite the very recent resurgence in commercial interest and utilization of the NSR by European and Asian shipping companies, however, aggregate annual usage is still well below its 1987 peak. Commercial utilization of the NSR remained stagnant for the last decade of the 20th century as Russia's politico-economic fortunes faltered following the break-up of the USSR, and east-west liquid bulk, break-bulk and liner service shipping flows stuck to traditional routing via the Indian Ocean and western Pacific.

3. NSR's contemporary commercial status & significance

In contemplating the current literature and media reporting, it is clear that there is a great deal of interest and fascination concerning the recent and on-going utilization of the NSR, and there is acute excitement about the route's future potential as an international maritime trading route of global significance. Indeed, utilization of the passage has increased significantly in the last three years in particular. In 2013, the Russian Federal State Institution — the Northern Sea Route Administration (NSRA) — granted 372 permits for intention to transit. This contrasts starkly with the 46 granted in 2012 and the mere four granted in 2011. By the beginning of the final quarter of 2013, some 630 vessels were listed as applicants in the NSRA's 'Consideration of Applications' list.²

By the end of 2013, approximately 1.5 million tonnes of cargo of all types will have been conveyed through the NSR. In comparison to the insignificant international utilization of the NSR during the two decades between 1990 and the end of 2010, the advancing figures over the last three years are encouraging indeed. However, the aggregate trade volume figures listed above are tiny in comparison to the over 17,225 transits by merchant vessels of the Suez Canal in 2012, which amounted to some 928 million tonnes of cargo.³

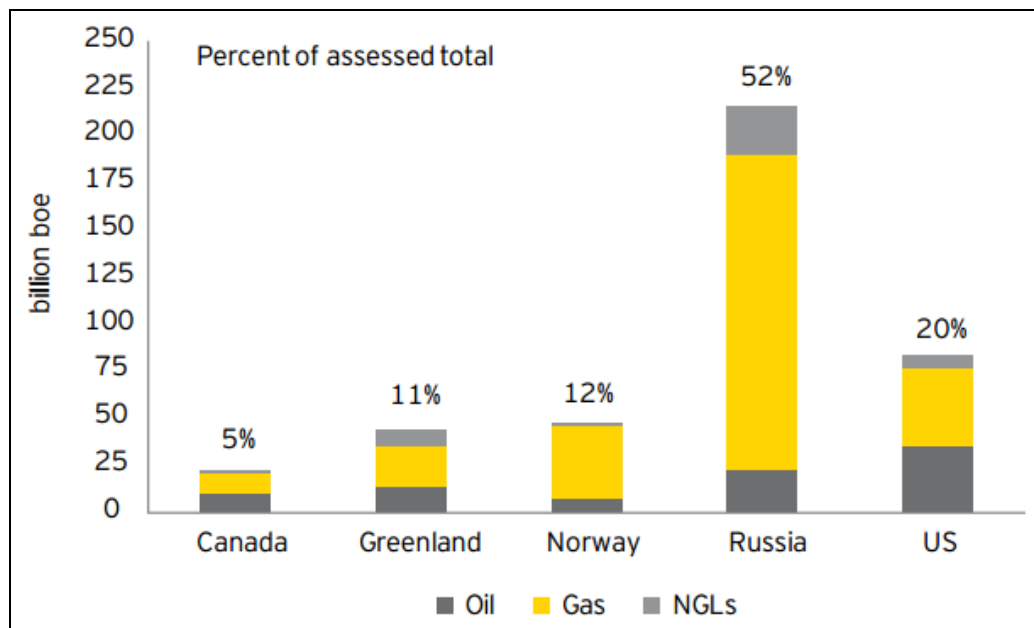
This statistical contrast yields an unambiguous dialectic: though the practical utilization of the NSR is evident and its attractiveness to shipping companies is growing, particularly those with ports of loading and discharge in higher latitudes, the route's relevance compared to the traditional sea lines of communication (SLOC) remains embryonic. This is evidenced in another way when a comparison is drawn of the numbers of different flag states used by vessels that have applied in 2013 to transit the NSR. There is an overwhelming preponderance of Russian-flagged vessels intending to operate in the NSR (not all of which will be undertaking an end-to-end transit), and Russian vessels operating in the NSR outnumber the combined total of non-Russian registered ships by over 5.6 times.



4. NSR's relevance to Arctic oil and gas exploration, development and production

In 2008, the U.S. Geological Survey estimated that the Arctic region could contain up to 13% and 30% of the Earth's undiscovered oil and natural gas reserves, respectively. The same report suggested that as many as 160 billion barrels of oil could exist in the region.⁴ Of these estimates, in terms of barrels of oil equivalent, Russia holds the great majority — some 52% of the assessed total. However, while Russia holds by far the dominant quantity of gas, the United States has the greater proportion of oil reserves.

Vital Russian hydrocarbon basins and systems are located (from east to west) in areas including the East Barents, South Kara, Laptev, East Siberian and Chukchi basins, with the first three being the most important. With regards to the offshore areas of these basins, it can quickly be seen that the NSR is pivotal to the potential expansion of all three phases of oil and gas exploration, development and production in these waters.



Exploration

The exploration phase is characterized by seismic surveys and exploratory 'wild cat' drilling. The first of these necessitates the ability for specialized 2-D and 3-D seismic survey vessels and their support ships being able to access exploration blocs via relatively ice-free navigation tracks. Support vessels need to ensure continuous supply links between these vessels (that can spend up to several months continuously on station) and ports on the mainland. Without sufficient seismic coverage, it is not possible to properly ascertain the optimum locations to site exploration wells and proceed with the campaign. Exploratory, wild cat wells require all of the components of specialized drilling rigs to be towed into position and constructed over the well site, which will necessitate ice breaker assistance and shore-side support at key ports along the Russian NSR coastal margin. Once constructed and operational, drilling rigs (initially in the Kara Sea) require continuous support from Platform Support Vessels (PSVs). Similar marine logistical

support is required for the ensuing appraisal drilling campaign, which determines if the reservoir is commercially feasible.

Development and production

These phases require considerably more in the way of extraction and production infrastructure and equipment, specialized offshore vessel involvement and support, and eventually the means of conveyance (pipelines and/or tankers) and export terminals. In these phases there could be a requirement to install offshore production platforms, access for sub-sea construction and pipe-laying vessels, and continuous PSV support. In prolific blocks that are distant from shore bases, the scale of support will be of enormous proportions and will necessitate the uninterrupted deployment and of large fleets of PSVs and shuttle tankers.

The following list indicates the sizable and expanding nature of key exploration and production operations in areas accessed by the NSR:

- **Yamal LNG (Novatek + Total + one):** This project is intended for the supply of liquid natural gas (LNG) to China and Japan via the NSR. If this goes ahead, it will significantly boost Russia's drive to open up the NSR to increased LNG carrier traffic.⁵
- **Kara Sea oil exploration:** Exploratory seismic survey and drilling campaign in the Prinovozemelsky blocks, led by Rosneft in partnership with Statoil, ExxonMobil and ENI.⁶
- **Petchora Sea exploratory drilling (area is located to the west of the Kara Gate):** First commercial offshore development in the Arctic centered on the Pirazlomnaya platform (which recently involved the high-profile Greenpeace demonstration using the *M/V Arctic Sunrise*). The field license is held by Gazprom Neft Shelf.
- **Yuzhnoe-Khykchuyu oil field:** Production of 7.5 million tons of very high quality crude oil per year. The field is operated by Lukoil and is linked by 158 km export line to the Varandey Oil Export Terminal on the Siberian coast.

The continued viability and expansion of these projects will be predicated on the increasing utilization, efficiency, safety and security of the NSR. For this reason, it comes as no surprise that the Russian government is greatly increasing the logistical capacity and security resources being deployed to the country's northernmost littoral. This was most recently characterized by a substantial and highly publicized military expansion and deployment to reactivated bases in the NSR corridor.



The NSR, Northwest Passage and hydrocarbon basins in the Arctic

5. Wider geopolitical and security issues regarding the NSR

On 16 September 2013, Russia's president, Vladimir Putin, announced that the government was re-opening a military base on the west coast of Kotelnik Island in the Novosibirsk Island group, with the purpose of reinstating a permanent naval and air force capability in the country's Arctic maritime. This conspicuous policy development was presented as a vital part of ensuring the security, safety, and commercial effectiveness of the NSR as part of the country's drive to fast-track the commercial exploitation of the region between the Kara Gate and the Bering Strait.

During the preceding week, a task group of ten Russian warships (led by the guided missile cruiser, *Peter the Great*) and the nuclear icebreakers — *Yamal*, *Vaigach*, *Taimyr* and *50 Let Pobedy* — arrived at Novosibirsk having sailed 2,000 nautical miles from Severomorsk. Within 17 days, all of the equipment and forces had been brought ashore using helicopters and support vessels. Currently, the former airbase – Temp – is being brought back into operation, and flight operations for An-72, An-74, and Il-76 aircraft commenced by the end of October. The Russian General Staff has stated that the new base will ensure the security of petroleum resources and extraction projects in the Russian Arctic littoral and boost the state's ability to maintain security over the NSR. However, there is currently no offshore production in the Laptev Sea or the East Siberian Sea, and the number of vessels sailing via the NSR remains modest.⁷

In reality, the fundamental purpose of this very public policy decision by the Putin government was two-fold: 1) to establish the means by which Russia could project military power within, and from, its northernmost geo-space; and 2), by extension, to send a clear message to other powers that want to use the NSR for their unhindered trade and potentially for naval expedition and deployment. Russia wanted all public and private

actors engaged in the Arctic to know that the NSR falls firmly within Russia’s geopolitical sphere of control and will remain so regardless of the region’s advancing internationalization.

Though the United States and some of its northern NATO allies have long maintained the capacity to deploy substantive military power into high latitudes, emerging great powers, principally China, which attained permanent observer status at the Arctic Council in 2013, have now developed the capability to maintain expeditionary power projection far from their mainland bases. Given China’s well-known concern over the vulnerability to closure of its southern SLOCs connecting the Indian Ocean with the South China Sea, it will view the NSR as a potential alternative trading route to its markets in Europe and the US east coast. Furthermore, if the Arctic region becomes an important source of LNG, crude oil and condensate for China’s expanding industrial base and domestic consumers, the Chinese will want to ensure the security of this supply stream. In the eyes of the Chinese government, this — like other maritime trading routes — will be best secured via collective international security means and regimes. However, the leadership will also want to ensure the ability to act militarily to protect strategic petroleum streams and trading links if it were to become necessary.

6. Can usage be expanded and how?

As with virtually all complex economic-environmental geo-spaces, there are numerous economic benefits and logical strategic reasons for developing them and promoting their wider utilization. However, these arguments are always balanced with concerns over potential environmental damage and habitat disruption, technical and operational obstacles, safety concerns, and geopolitical and security challenges. Not only is the NSR no exception to this, it arguably exemplifies this dynamic.

The NSR, and its expanded development as a trading route and as a means of access to high-latitude offshore exploration and production, has clear utility for international trade and increased access to hydrocarbon energy sources. These positives are manifested in forms such as reduced transit times between the North Atlantic and north-western Pacific ports and markets, potentially reduced transport costs, avoidance of insecure waters in the Indian Ocean and South China Sea, and the development of valuable stranded oil and gas deposits. Notwithstanding the environmental concerns surrounding greater exploitation of the NSR, the expanded use of the NSR can only be realized if key technical, operational and regulatory deficits are addressed.

Problem/Deficiency	Solution/Remedy/Initiative
<ul style="list-style-type: none"> Lack of search & rescue (SAR) capacity (sea area monitoring & aerial/vessel response) 	<ul style="list-style-type: none"> Greater airborne area surveillance and development of fleet of high-performance (ice breaking, endurance & speed) salvage/rescue tugs Expanded high definition coastal radar coverage
<ul style="list-style-type: none"> Gaps in satellite communications. NSR is only partially covered by two INMARSAT geostationary satellites; gaps in coverage 	<ul style="list-style-type: none"> Launch additional INMARSAT geostationary satellites

<p>occur in the Laptev Sea & north of Severnaya Zemlya. [INMARSAT is used to transmit digital ice data & forecasts to vessels]</p> <ul style="list-style-type: none"> • 2 satellite communication systems can support NSR operations: INMARSAT & Russia's OCEAN system • Few INMARSAT receivers compatible with OCEAN system & critical communication gaps remain along NSR with these systems 	<ul style="list-style-type: none"> • Develop compatibility hardware/software upgrades to enable greater interoperability of INMARSAT & OCEAN systems
<ul style="list-style-type: none"> • Insufficient numbers of icebreakers to accompany increasing number of transiting vessels 	<ul style="list-style-type: none"> • Expansion of internationally-flagged, operated and owned/funded modern icebreakers (these vessels could also double as SAR vessels)
<ul style="list-style-type: none"> • Comparative lack of reliable charts 	<ul style="list-style-type: none"> • Incentivise new polar hydrographic survey campaigns – oceanographic knowledge acquisition & UN funding
<ul style="list-style-type: none"> • Insufficient aids to navigation 	<ul style="list-style-type: none"> • Internationally funded expansion of installed aids to navigation - charting, radar, buoyage, Arctic region notice to mariners service
<ul style="list-style-type: none"> • Lack of officers qualified to operate vessels in ice-covered waters 	<ul style="list-style-type: none"> • Modifications to/expansion of STCW and deck officer training to cover icebreaking and polar navigation/seamanship
<ul style="list-style-type: none"> • Insufficient sea ice oil spill response technology and resources 	<ul style="list-style-type: none"> • Extensive scientifically-driven and oil company funded R & D to develop any and all necessary safeguards and response requirements for oil spills in ice covered waters
<ul style="list-style-type: none"> • Lack of sufficient satellite-based synthetic aperture radar (SAR) [used in detection and monitoring of sea ice and pack ice] • Currently coverage by high definition SAR is not sufficient and there are particular gaps in the Laptev Sea 	<ul style="list-style-type: none"> • In order to provide endemic coverage, European Space Agency (ESA) is proposing to build new SAR receiving station in the Russian Arctic to cover gap • Launch of additional SAR satellites to monitor ice coverage patterns to enable short, medium and long-term forecasting
<ul style="list-style-type: none"> • Lack of suitably equipped merchant vessels configured for operating in extreme polar conditions (deck machinery, sea water induction, hull strength, propulsion & manoeuvre) 	<ul style="list-style-type: none"> • This will only be addressed and driven by economic and trading imperatives. When and if the NSR is viewed as a mainstream viable trading route, then owners will order suitably configured vessels
<ul style="list-style-type: none"> • Lack of holistic, internationally sanctioned regulations and best practices for polar shipping 	<ul style="list-style-type: none"> • IMO is currently developing a draft international code of safety for ships operating in polar waters, - The Polar Code • Code will cover design, construction, equipment, operational, training, SAR & environmental protection matters relevant to ships operating in high latitudes

7. Conclusion and outlook

This paper has attempted to provide a holistic snap-shot of the NSR through a series of carefully chosen and informative lenses, including a review of key historical events illustrating the exploration and eventual first complete transit of the NSR; an overview of the NSR's utilization by the USSR during the 20th century; a discussion of the contemporary commercial status of the route; the NSR's relevance to Arctic oil and gas exploration, development and production; geopolitical and security issues effecting the region; and an examination of the outstanding technical and operational challenges that will determine if and how the NSR's utilization can be expanded.

It is true to say that further net polar ice margin retreat in the decades to come (if indeed this occurs) will have the obvious effect of making greater use of the NSR a practical reality as it will greatly reduce the need for an expanded ice breaker fleet and specialized merchant vessels and crew training. However, if the environment remains largely as it is for the next 10 to 20 years, increased international use of the NSR will be contingent upon the implementation of some of the improvements listed in the previous section, an increasing awareness of its economic benefits to some shipping lines with northern hemisphere hubs, routes and markets, and the expansion of offshore oil and gas exploration and production.

With regards to the short and medium-term fortunes of the NSR, the jury is still out. Valentin Davydants, the captain of Russia's Atomflot fleet of nuclear-powered icebreakers, argues that by 2021 some 15 million tonnes of cargo will be lifted via the NSR, in addition to 15 million tonnes of LNG and over 10 million tonnes of crude oil. According to this optimistic view, NSR utilization will continue to grow. However, others are less convinced of the route's comparative importance over the established east-west liner belt via the Indian Ocean. AP Moller-Maersk CEO, Nils Anderson, remarks that "The way global warming is going, of course there is the opportunity in a very far, very distant future that the northern sea route will open up and it will be a major shipping route. But it will definitely not be within the next 15 to 20 years in our opinion so it's far too early to start constructing vessels for it."⁸ Environmentalists will very likely have some impact upon the future commercial trajectory of the NSR, but in the end, the expansion of the route as a maritime highway and offshore exploration region of global significance will be driven fundamentally by economic variables, commercial drivers, technology and funding.

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¹ "Chinese cargo ship sets sail for Arctic short-cut," *Financial Times*, 11 August 2013, <http://www.ft.com/cms/s/2/05daa11e-0274-11e3-880d-00144feab7de.html#axzz2cnZvxsaT>

² Federal State Institution: The Northern Sea Route Administration.

³ IDSA Comment, "Northern Sea Route: Humming with Activity," August 2013 at <http://www.idsa.in/node/13451/33576>

⁴ "Arctic oil exploration: Potential riches and problems," *BBC News*, <http://www.bbc.co.uk/news/business-14728856>

⁵ “Yamal to Drive Northern Sea Route Development,” *Interfax*, <http://interfaxenergy.com/natural-gas-news-analysis/russia-and-the-caspian/yamal-to-drive-northern-sea-route-development/>

⁶ “Russia’s Arctic Seas,” Rosneft, http://www.rosneft.com/Upstream/Exploration/arctic_seas/

⁷ “In remotest Russian Arctic, a new Navy base,” *Barents Observer*, <http://barentsobserver.com/en/security/2013/09/remotest-russian-arctic-new-navy-base-17-09>

⁸ “Arctic shipping routes still a long-term prospect,” *Financial Times*, 6 October 2012
<http://www.ft.com/cms/s/0/f44bd53a-2e74-11e3-be22-00144feab7de.html#axzz2h7njR936>

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