Russian power will be growing with Siberia and Northern Ocean. Among other things, the Northern Ocean is a vast area where Russian glory may rise combined with unprecedented benefit through invention of East-Northern navigation.

Mikhail Lomonosov

Viacheslav Ruksha
Director General
ROSATOMFLOT
Already in 16th century Russian “route to India” was named the Northern Sea Route

**1525 year** – Dmitriy Gerasimov, the Envoy of Russian Tzar Ivan the III, compiled the first project of the Northern Sea Route and the map of the Arctic Ocean shores of Moscovia;

**50-s of the 16th century** – the first maritime expedition to discover sea route to China was organized in Moscow;

**1648 year** – researcher and seafarer Semen Dezhnev was the first to pass the straight that divides Asia and America;

**18th century** – Kamchatka expeditions were organized, the second of which made it into history as the Great Northern Expedition. The general map of the Great Northern Expedition was compiled in 1746;
In the beginning of the XX century development of the Northern Sea Route became an essential task for Russian economy.

May 21, 1919 – Russian Provisional Government of the Northern Area order “On establishing interdepartmental committee for organization of a maritime expedition to Siberia”.

July 02, 1918 – Order by Sovnarcom on appropriation of 1 mln. Roubles for the expedition to explore the Arctic Ocean.

1920 year – Kara expeditions put start to regular navigation through the Kara sea. 11 thousand tons of bread and other goods were exported from Siberia during the first expedition.

March 10, 1921 – Decree of Establishing Floating Maritime Science and Research Institute. The Institute’s area of operation was the Arctic Ocean with its seas and estuaries of rivers, islands and adjoining coast of Russian Soviet Federative Socialist Republic.

from 1923 during 10 years period 19 polar radiometeorological stations were built on the coast and islands of the Arctic Ocean. During this period previous name Northern East Passage was replaced by the Northern Sea Route.

1932 – the transit voyage of Otto Schmidt expedition onboard icebreaking steamship Alexander Sibiryakov was the starting point for transit navigation along the Northern Sea Route.
Lend-lease and repositioning of Pacific Fleet ships via NSR during World War II

Northern maritime transport routes: outer for transportation of cargoes to USSR from England and USA and inner via the NSR to provide supplies from USSR East and escort vessels from USA with lend-lease cargoes.

Northern Navy ships were escorting cargo vessels on particular parts of the NSR, especially in the Kara sea where 2568 vessels were escorted.

 Totally during the War period Arctic Convoys transported about 22% of lend-lease cargoes – 3,964,000 tons. Of them 120 vessels transited NSR with 450,000 tons of cargo.

Destroyers Baku, Razumniy and Razyarenniy transit from Vladivostok to the Kola Bay via the NSR 15.07 – 14.10.1942
First Atomic Icebreaker Lenin
December 03, 1959

Operational period: 1959 – 1989
Navigated: 654 400 nautical miles
Of which in ice: 560 600 nautical miles
Escorted: 3741 vessels

20.11.1953 – Council of Ministers of USSR adopt decision to built atomic icebreaker;
1953-1955 – atomic icebreaker designed by Central Construction Bureau-15 (Iceberg);
25.08.1956 – i/b laid at A. Marti Shipyard (from 1957 – «Admiralteyskiy Shipyard»);
05.12.1957 – i/b set afloat;
03.12.1959 – i/b commissioned to the Ministry of Maritime Fleet
The specialized low-draft atomic icebreakers Taimyr and Vaygach were designed and built to solve the problem of shallow water entrance to Dudinka port.

To fulfill the program of year-round navigation the state allocated about 200 bln. USD (1975 year prices).

To insure the transportation of Norilsk factory cargoes the ice reinforced vessels were built - atomic container carrier Sevmorput, vessels of Norilsk and Dmitriy Donskoy type. The navigation and hydrography system was reequipped with modern equipment, port of Dudinka was enlarged and reconstructed.

Atomic Icebreaking Fleet Development

The demand to provide functionality and development of Norilsk industrial region

The demand for year-round navigation in the Western Arctic
Northern Sea Route traffic in the period 1933-2013 (transits included)

3,93 mln. tons of cargo were transported via NSR in 2013 in total. Thus the general amount raised 2,7 times compared to 1998 when the traffic was at its lowest (1,46 mln. tons).

The total amount of NSR traffic in 2013 constitutes 60% of 1986 year volume when 6,46 mln. tons were shipped.

Suez Canal transit in 2013 was 928 mln. tons and 16 596 vessels.
## Northern Sea Route is a highway to European and Asian Markets

### Oil and Gas from Murmansk

<table>
<thead>
<tr>
<th>Country</th>
<th>Via Suez Canal</th>
<th>Via NSR</th>
<th>+/- days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan (p. Kobe)</td>
<td>12291 miles</td>
<td>6010 miles</td>
<td>18,1 days</td>
</tr>
<tr>
<td>Korea (p. Busan)</td>
<td>12266 miles</td>
<td>6097 miles</td>
<td>18,4 days</td>
</tr>
<tr>
<td>China (p. Ningbo)</td>
<td>11848 miles</td>
<td>6577 miles</td>
<td>19,9 days</td>
</tr>
</tbody>
</table>

### From Rotterdam to Asian Markets

<table>
<thead>
<tr>
<th>State</th>
<th>through Suez Canal</th>
<th>through NSR</th>
<th>+/- days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan (p. Kobe)</td>
<td>10969 miles</td>
<td>7610 miles</td>
<td>-10,1</td>
</tr>
<tr>
<td>Korea (p. Busan)</td>
<td>10754 miles</td>
<td>7697 miles</td>
<td>-9.3</td>
</tr>
<tr>
<td>China (p. Ningbo)</td>
<td>10336 miles</td>
<td>8177 miles</td>
<td>-6.5</td>
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</table>
## Transit Voyages in 2010-2014

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<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014*</th>
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<tbody>
<tr>
<td>Total Volume of</td>
<td>111 000</td>
<td>820 789</td>
<td>1 261 545</td>
<td>1 355 897</td>
<td>657 697+ (gross tonnage)</td>
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<td>Transit Cargo, t</td>
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<tr>
<td>Total Number of</td>
<td>4</td>
<td>34</td>
<td>46</td>
<td>71</td>
<td>50+</td>
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<tr>
<td>Transit Voyages</td>
<td>(2 of them in ballast)</td>
<td>(10 of them in ballast)</td>
<td>(13 of them in ballast)</td>
<td>(22 of them in ballast)</td>
<td>(11 of them in ballast)</td>
</tr>
</tbody>
</table>

* on October 31, 2014
Pilot Voyages in 2013

mv Yong Sheng:
NSR period: 26.08 – 03.09.2013
(7,5 days)
Deadweight: 16651 tons
Cargo: general cargo & equipment
Owner: COSCO Shipping

mt Stena Polaris:
NSR period: 28.09 – 11.10.2013
Deadweight: 75 000 tons
Cargo: naphtha from Ust-Luga
Owner: Stena Shipping
Sponsored: Ministry of Ocean & Fisheries of the Republic of Korea
Charterer: Hyundai Glovis Co
Key transport components:
1. A fleet of 16 arctic LNG-tankers;
2. Sea port in the area of Sabetta town;
3. Port fleet consisting of 5 vessels of different type;
4. Support of atomic icebreaking fleet;
5. Navigation safety system;

<table>
<thead>
<tr>
<th>Year</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021-2038</th>
<th>2039</th>
<th>2040</th>
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<tr>
<td>LNG &amp; Gas Condensate export, thousands tons</td>
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<td>800</td>
<td>6100</td>
<td>11900</td>
<td>16700</td>
<td>17600</td>
<td>17400</td>
<td>16800</td>
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</table>
Port Sabetta Statutory Acts

- Order of the Government of Russian Federation dd. October 11, 2010 #1713-r About approval of a complex plan to develop production of liquefied natural gas on Yamal peninsula;
- Order of the Government of Russian Federation dd. November 10, 2011 #5724p-P16 About inclusion of the project Development of liquefied natural gas production on Yamal peninsula into the list of priority projects in the Ural Federal Area;
Year-round navigation assisted by Rosatomflot atomic icebreakers in Sabetta port opened on 09.12.2013
Novy Port Oil Field is the largest on the Yamal Peninsula by the volume of oil and gas condensate

- Is the basic project of JSC Gazprom Neft on the Yamal Peninsula;
- Located in Yamal-Nenets Autonomous District Region within 30 km of Obskaya bay coast and 250 km of town of Nadym;
- Extractable resources constitute 222 mln tons of oil, 211 billion m3 of gas, 17mln tons of condensate;
- Project is unique due to year-round export of oil by sea in harsh climatic conditions.

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<th></th>
<th>2015</th>
<th>2016</th>
<th>2017 - 2027</th>
<th>2028</th>
<th>2029</th>
<th>2030</th>
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<tr>
<td></td>
<td>600</td>
<td>3000</td>
<td>5000</td>
<td>4000</td>
<td>3000</td>
<td>2500</td>
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</tbody>
</table>
Support Vessels Organization Strategy

- Судно снабжения и транспортно-буровое судно (ТБС) обеспечивают функционирование буровой установки
- Специализированное судно обеспечения БУ (Bothica)
- Суда ЛАРН и ЛЗ у буровой
- СЛЗ 1 – ледокол из РФ с расширенным госпиталем на борту
- СЛЗ 2, СЛЗ 3, и СЛЗ 4 – ледоколы для дальней разведки и слежения за льдами
- Судно смены экипажа перевозит 70 чел за рейс
- Предварительные планы
  - Отправка судна в Мурманск ~ 1 раз /2 сут
  - 3–сут переход в 1 сторону при V=12 уз.
  - 2 суток – разгрузка и патрулирование у БУ
  - 2 суток – загрузка и заправка в Мурманск
  - В среднем ~10 суток (туда/обратно) на 1 рейс
- Максимально используется многофункциональность судов; смена экипажа и заправка судов планируется в порту

12 support vessels + 1 oil spill response vessel in total

Ice Alarm Signal Area

www.rosatomflot.ru
Export of JSC Payakha products

- JSC Payakha is a part of JSC Independent Oil and Gas Company group and is 100% its subsidiary.
- JSC Payakha holds 2 licenses for geological study, search, field works and extraction of hydrocarbons on Payakhskiy (till 2024) and North-Payakhskiy (till 2035) areas of subsoil in Taimyrskiy Dolgano-Nenetskiy district of Krasnoyarskiy Region.
- The Fields are located in Eastern Siberia to the north of polar Circle (400 km), within 140 km north of Dudinka town which is a river and sea port supporting year-round navigation through the Northern Sea Route.
- Within 50 km north of the field on the banks of Yenisei river (cape Tanalau) there will be built an oil loading terminal (2300 km from port of Murmansk and 5400 km from port of Rotterdam) and preliminary cargo storage terminal to serve the fields. From there cargoes will be transported by trucks.

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<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018 - 2028</th>
<th>2029</th>
<th>2030</th>
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<tbody>
<tr>
<td>Oil Extraction, thousand tons</td>
<td>6</td>
<td>360</td>
<td>1388</td>
<td>3 000</td>
<td>1916</td>
<td>1809</td>
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</tbody>
</table>
Export of Norilsk Nickel products

- the world’s largest producer of nickel and palladium
- one of the world’s leading producers of platinum and copper.

The Company produces cobalt, rhodium, silver, gold, iridium, ruthenium, selenium, tellurium and sulfur.

The Polar Division is located above the Polar Circle on the Taimyr Peninsula (Krasnoyarsky Region). Its entities are connected to suppliers and buyers via the Yenisei river and the Northern Sea Route, as well as by air. Main port of export for finished product and delivery of supplies is the port of Dudinka located in the low reaches of Yenisei. Nautical navigation in the port is done year-round (provided by atomic icebreaking fleet in winter-to-autumn period).

FSUE Atomflot and Norilsk Nikel have signed a 3-year contract for icebreaking support. In 2014 another 3-year contact for the period 2015-2017 is planned to be signed.

Annual total volume of finished product and supplies transhipped through port of Dudinka is **1,3 mln tonn.**
Atomic icebreaker 50 Let Pobedy delivered Olympic Flame to the North Pole on October 19, 2013
Rosatomflot icebreakers provide assistance to major scientific and research operations in Russian Arctic:

- definition of outer limits of Russian continental shelf;
- deployment and evacuation of drifting polar stations (‘‘North Pole’’);
- geological survey and seismic research, including hydrocarbon fields;

Main customers:
- State Research Navigation-Hydrographic Institute (GNINGI);
- State Research Center "Arctic and Antarctic Research Institute”
- JSC "SEVMORNEFTEGEOFIZIKA“ (JSC SMNG)
- JSC Arktikmorneftegazrazvedka (JSC AMNGR);
- JSC Marine Arctic Geological Expedition (JSC MAGE)
Main consumers of atomic icebreaking fleet services in 2000-2021

- Obskaya Bay (Yamal LNG & Gazprom Neft)
- Enisey (NorNickel)
- NSR Transits
- Expeditions
- North Pole Voyages
- White Sea
- Baltic Sea
- Total Per Year

Icebreaker/month

<table>
<thead>
<tr>
<th>Year</th>
<th>Obskaya Bay</th>
<th>Enisey</th>
<th>NSR Transits</th>
<th>Expeditions</th>
<th>North Pole Voyages</th>
<th>White Sea</th>
<th>Baltic Sea</th>
<th>Total Per Year</th>
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</table>
In 2013 ice area increased compared to 2012 by 40%
Ice Conditions by Periods

<table>
<thead>
<tr>
<th>Date</th>
<th>Ice Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>06-08.07.14</td>
<td>Ice Concentration 1-6 points</td>
</tr>
<tr>
<td></td>
<td>Extra Young Ice</td>
</tr>
<tr>
<td>27-29.07.14</td>
<td>Ice Concentration 7-10 points</td>
</tr>
<tr>
<td>10-12.08.14</td>
<td>Old Ice</td>
</tr>
<tr>
<td>14-16.09.14</td>
<td>Young Ice (0-30 cm)</td>
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<tr>
<td></td>
<td>Fast Ice</td>
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<tr>
<td>05-07.10.14</td>
<td>One-Year Ice (30-200 cm)</td>
</tr>
<tr>
<td>10-12.11.13</td>
<td>Clear Water</td>
</tr>
</tbody>
</table>

| Ice Area Border according to TV/IR/microwave |

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*www.rosatom.ru*
“Russia faces Arctic Ocean and no other nation needs icebreakers as much as we do. The nature shackled us in ice and the faster we drop these shackles, the sooner we let Russian power unfold”.

Vice-Admiral Stepan Makarov
Federal State Unitary Enterprise of Atomic Fleet

Atomic Fleet has 18 units:
Personnel: 1137
- Atomic Vessels - 10
  - Atomic Icebreakers – 9
    - Among them operational – 4 + 1 in reserve
  - Atomic container carrier - 1
- Special Vessels – 5
- Floating Port Crane
- 2 Floating Docks

Coastal Facilities:
Personnel: 851
- base for the atomic icebreaking fleet
- full complex of ship repair
- nuclear fuel handling
- radioactive wastes handling
Atomic Icebreaking Fleet

Atomic icebreakers of “Arktika” type:
- Propulsion Capacity – 54 MW
- Water displacement – 23000 t
- Draught – 11,0 m
- Icebreaking capability – 2,25 m

Fleet:
- i/b “Yamal” – 28.10.1992
- i/b “50 Let Pobedy” – 23.03.2007

Atomic Icebreakers of “Taimyr” type:
- Propulsion capacity – 35 MW
- Water displacement 21000 t
- Draught – 8,1 m
- Icebreaking Capability – 1,7 m

Fleet:
- i/b “Taimyr” – 30.06.1989
- i/b “Yaygach” – 25.07.1990

Universal Atomic Icebreaker Project 22220 (IB60)
- Propulsion Capacity– 60 MW
- Water displacement 33530 / 25 540 t
- Draught – 10,5 / 8,5 m
- Icebreaking capability – 2,9 m

Fleet:
- 1st IB60 – 31.12.2017
- 2nd IB60 – 25.12.2019
- 3rd IB60 – 25.12.2020
# Med-term Operational Period of Atomic Icebreakers
(with Nuclear Power Plant resource of 150-200 000 hours)

## Commission of universal atomic icebreakers IB60

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### Legend

- Linear icebreakers operational period
- Low-draught icebreakers operational period
- If prolonged up to 175 000 hours
- - prolonged to 175 000 hours
- New universal icebreakers operational period
- - If prolonged up to 200 000 hours
- Operational reserve
- Repairs
Atomic lighter Sevmorput

To be put into operation March 01, 2016 according to the Decision of State Corporation Rosatom
Thank you for attention!