A Ten-Year Projection of Maritime Activity in the U.S. Arctic Region, 2020–2030

U.S. Committee on the Marine Transportation System

AICCC Meeting
January 15 2020
About the CMTS

- Cabinet level committee established in 2004 and authorized in 2012
  - Chaired by DOT secretary
  - Members include over 25 MTS related agencies
- 2017 National Strategy for the MTS, 5 Priority areas:
  - System Performance
  - Safety
  - Security
  - Energy Innovation
  - Infrastructure Investment
Arctic Marine Transportation IAT

Purpose of the Arctic IAT

- Coordinate domestic marine transportation policies in the U.S. Arctic
- Address infrastructure requirements to support a safe and secure Arctic marine transportation system

Participating Agencies

- USCG
- NOAA
- MARAD
- DOT-OST
- USACE
- State
- TRANSCOM
- FAA
- DOI
- EPA
- DOE
- NMIO
- USARC
Report Overview


• Builds upon 2015 report
• In-depth analysis of past, present, and future vessel activity in and around Bering Strait
• Aim to inform Federal partners about the Arctic MTS and potential changes expected on commercial and/or other civilian operations through 2030
  • Does not include any policy or funding recommendations

Predicting vessel traffic is integral to waterway safety
2019 Projections Report

• What drives activity in the Arctic? (Section II)

• What does vessel activity look like in the U.S. Arctic region today? (Section III)
  • Who operates in the region?
  • Where?
  • When?

• Projection of Future Vessels out to 2030 (Section IV)
Report Findings

Current vessel traffic is complex and shifting away from regional operations

Composition of Vessels by Vessel Type

- Cargo: 31%
- Towing/Tug: 21%
- Fishing: 11%
- Tanker: 7%
- Offshore Supply Ship: 4%
- Research: 5%
- Adventure: 6%
- Gov't/LE/SAR: 6%
- Passenger: 3%
- Other: 5%
- Unknown: 1%

Composition of Vessels by Flag

- United States: 41%
- Russian Federation: 24%
- Panama: 6%
- Netherlands: 3%
- Canada: 3%
- Marshall Islands: 2%
- Singapore: 2%
- Liberia: 2%
- Other: 5%
- 29 Flags with <5 ships/year: 1%

- Cargo, tug, and towing vessels comprise over 50% of ships in study
- U.S. flag ships are the largest by flag, followed by Russia, but the number and diversity of flag states operating in the region is increasing
Report Findings

Highly seasonal navigation season grows longer each year

- The navigation season grew an average of 10-days longer increase each year from 2016–2018
- Further supported by independent data from the Marine Exchange of Alaska
Drivers of Vessel Traffic for 2019 Report

<table>
<thead>
<tr>
<th>Vessels used for Natural Resource Activities</th>
<th>Vessels used for Infrastructure Development</th>
<th>Vessels joining the ‘Arctic Fleet’</th>
<th>Vessels Seasonally Rerouted Through the Arctic via the Bering Strait</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Oil &amp; Gas</td>
<td>• Relocation</td>
<td>• USCG Polar Security Cutters</td>
<td>• Panamax sized vessels</td>
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<tr>
<td>• LNG</td>
<td>• Port development</td>
<td>• Canadian, Russian, Chinese ice breakers</td>
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<tr>
<td>• Mining Projects</td>
<td>• Reconstruction of roads &amp; airports</td>
<td>• Cruise and adventure ships</td>
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<td>• Offshore wind</td>
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<td>• Resupply</td>
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</table>

Drivers of Vessel Traffic for 2019 Report

- Oil & Gas
- LNG
- Mining Projects
Building scenarios

Assumption: An increase in operational certainty will result in an increase in vessel activity in the Arctic region.

- **Reduced Activity Scenario**: Low operational certainty, high risk operating environment.
- **Most Plausible Scenario**: High operational certainty, low risk operating environment.
- **Optimized Growth Scenario**: Optimized growth.
- **Accelerated, but Unlikely Scenario**: Accelerated, but unlikely.

Graph showing the projected Arctic vessel growth against operational certainty.
Projection Results

Historical and Projected Annual Vessel Counts by Scenario, 2008–2030

- Reduced Activity Scenario
- Most Plausible Scenario
- Optimized Growth Scenario
- Accelerated, but Unlikely Scenario
- Baseline from 2015-2017 AIS Data
- Historical Data
- Linear (Historical Data)
- Natural log. (Historical Data)
Questions, Comments, and Follow Up

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Context of Results

• Results suggest the region may enter a period of slower growth over the next decade

• Factors limiting growth include: infrastructure, investment, and regulatory and operational certainty

• Predicting vessel traffic is integral to waterway safety
Projection Methodology

Vessels used for Natural Resource Activities
(n=17)

Vessels used for Infrastructure Development
(n=12)

Vessels joining the ‘Arctic Fleet’
(n=6)

Vessels Seasonally Rerouted Through the Arctic via the Bering Strait

Total Number of Additional Vessels

Current Number of Vessels in the Region
(Determined through AIS baseline analysis)

Total Number of Vessels Projected to be in the U.S. Arctic

Repeat for 4 scenarios:
- Reduced Activity Scenario
- Most Plausible Scenario
- Optimized Growth Scenario
- Accelerated, but Unlikely Scenario
Assumptions from 2015 CMTS Report

1) U.S. Arctic traffic would maintain pace with global growth
2) Oil and gas development would be a major driver of traffic
3) Vessels would diverge from traditional shipping routes at measurable levels
4) Tourism, research, government, and unknown activity would remain consistent

- Regional growth outpaced global growth predictors
- Tug and cargo traffic grew at a rate of about 17%, not 3%
- Shell pulled out of their Arctic exploration and development plans in late 2015
- Growth in research, cruise, and government traffic

Underlying assumptions are no longer accurate
## Scenario projections in 2030

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Reduced Activity Scenario</td>
<td>136%</td>
<td>11%</td>
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<tr>
<td>Most Plausible Scenario</td>
<td>215%</td>
<td>48%</td>
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<tr>
<td>Optimized Growth Scenario</td>
<td>255%</td>
<td>67%</td>
</tr>
<tr>
<td>Accelerated, but Unlikely Scenario</td>
<td>346%</td>
<td>110%</td>
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</table>
# Scenario projections in 2030

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Additional Vessels</th>
<th>Total Vessels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced Activity Scenario</td>
<td>29</td>
<td>284</td>
</tr>
<tr>
<td>Most Plausible Scenario</td>
<td>124</td>
<td>379</td>
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<tr>
<td>Optimized Growth Scenario</td>
<td>171</td>
<td>425</td>
</tr>
<tr>
<td>Accelerated, but Unlikely Scenario</td>
<td>281</td>
<td>535</td>
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</table>
# Drivers of Vessel Growth

<table>
<thead>
<tr>
<th>Type of Growth</th>
<th>Sources of Growth</th>
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<tbody>
<tr>
<td>Natural Resource Development</td>
<td>Offshore Geological and Geophysical Research (US)</td>
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<td>Liberty Hilcorp Development Project (US)</td>
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<td>Eni's Beaufort Sea Exploration from Spy Island Drillsite (US)</td>
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<td>Oil and Gas Activities in the Willow Prospect within the National Petroleum Reserve (US)</td>
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<td>Oil and Gas Activities in the Arctic National Wildlife Refuge (US)</td>
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<td>LNG Production on the North Slope (US)</td>
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<td>Yamal LNG Project (Russia)</td>
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<td>Arctic LNG 2 Project (Russia)</td>
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<td>Ob LNG Project (Russia)</td>
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<td>Transshipment Facilities at Kamchatka and Murmansk (Russia)</td>
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<td>China’s Icebreaking LNG Tankers</td>
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<td>Expansion of the Red Dog Mine (US)</td>
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<td>Graphite One Project in Nome (US)</td>
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<td>Hope Bay Gold Mine (Canada)</td>
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<td>Back River Gold Mine (Canada)</td>
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<tr>
<td></td>
<td>Mary River Mine (Canada)</td>
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<tr>
<td></td>
<td>Offshore Geological and Geophysical Research for Offshore Wind Development (US)</td>
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</tbody>
</table>

| Infrastructure Development     | Relocation of Kivalina, AK                                                                                                                             |
|                                | Relocation/Protection-in-Place of Shishmaref, AK                                                                                                      |
|                                | Relocation of Newtok, AK                                                                                                                                |
|                                | Modification of the Port of Nome                                                                                                                       |
|                                | Lower Yukon River Regional Port and Road Project in Emmonak, AK                                                                                         |
|                                | Construction of the Kotzebue to Cape Blossom Road                                                                                                       |
|                                | Road Improvements in Utqiagvik, AK                                                                                                                      |
|                                | Road Improvements in Nome, AK                                                                                                                           |
|                                | Road Improvements in Selawik, AK                                                                                                                         |
|                                | Airport Repair in Alaska                                                                                                                                |
|                                | Onshore Renewable Wind Development Projects                                                                                                               |
|                                | Expanded Services for Community Resupply and Waste Removal                                                                                             |

| Expansion of the Arctic Fleet | USCG Polar Security Cutters                                                                                                                                 |
|                               | Russian Icebreakers                                                                                                                                     |
|                               | Canadian Icebreakers                                                                                                                                     |
|                               | Chinese Icebreakers                                                                                                                                    |
|                               | Expansion of Polar Class Cruise and Adventure Ships                                                                                                   |

| Seasonally Rerouted Shipping   | A Panamax-sized Fleet of Select Vessel Types                                                                                                           |