

Abstract

The U.S. Coast Guard (USCG), charged with upholding peace and facilitating safe navigation in the Arctic, will face challenges if satellite communication (SATCOM) limitations are not addressed. Current SATCOM being leveraged by major afloat assets in the USCG will not facilitate optimal operations in the Arctic given the service's dependence on geosynchronous satellite constellations for internet connectivity. This project developed a model for assessing emerging SATCOM technologies (such as Low- and Medium-Earth Orbit, LEO/MEO, solutions) and their ability to meet USCG's requirements and close the communications gap.

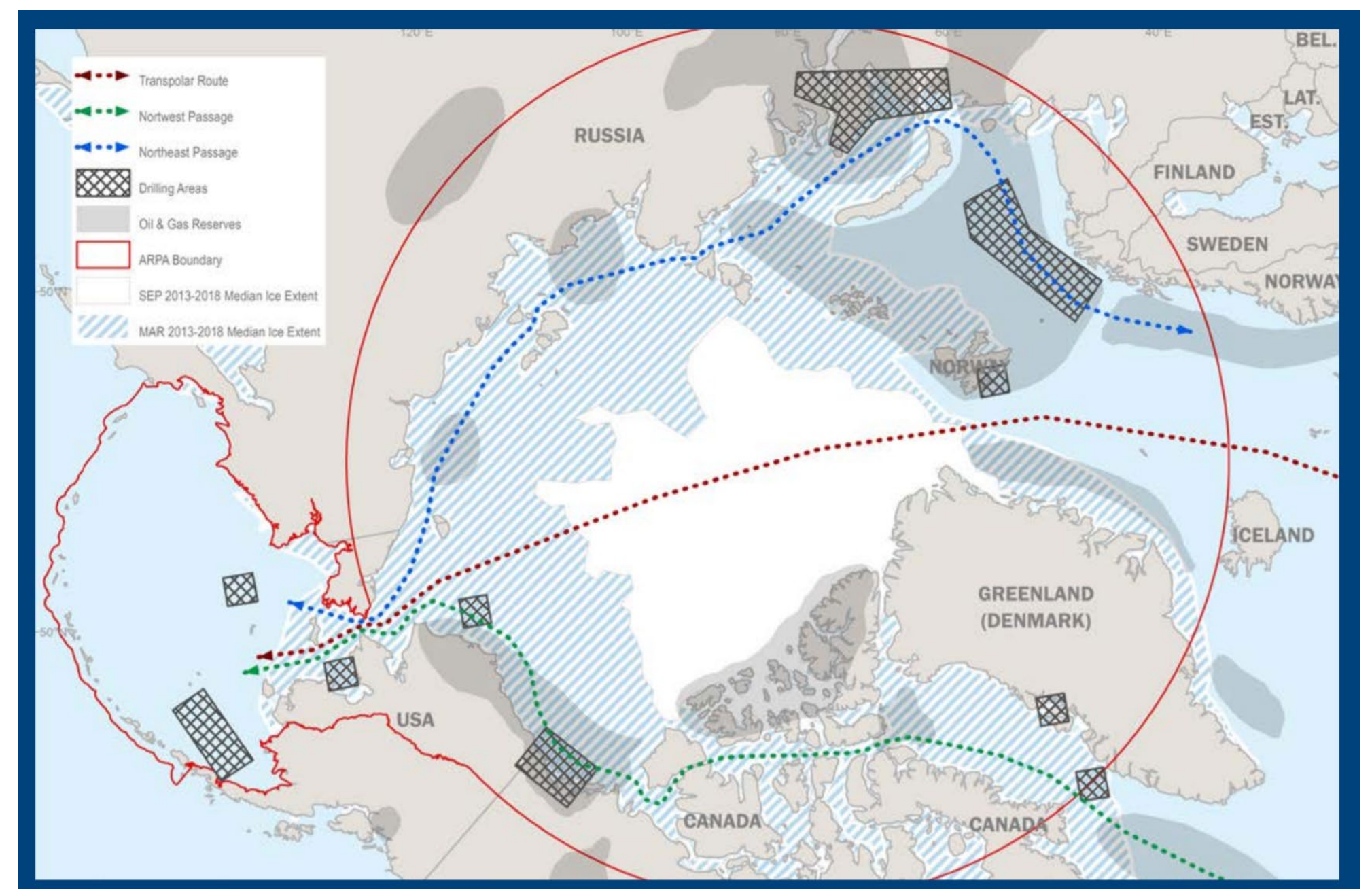


Diagram from U.S. Coast Guard Arctic Strategic Outlook
https://www.uscg.mil/Portals/0/Images/arctic/Arctic_Strategic_Outlook_APR_2019.pdf



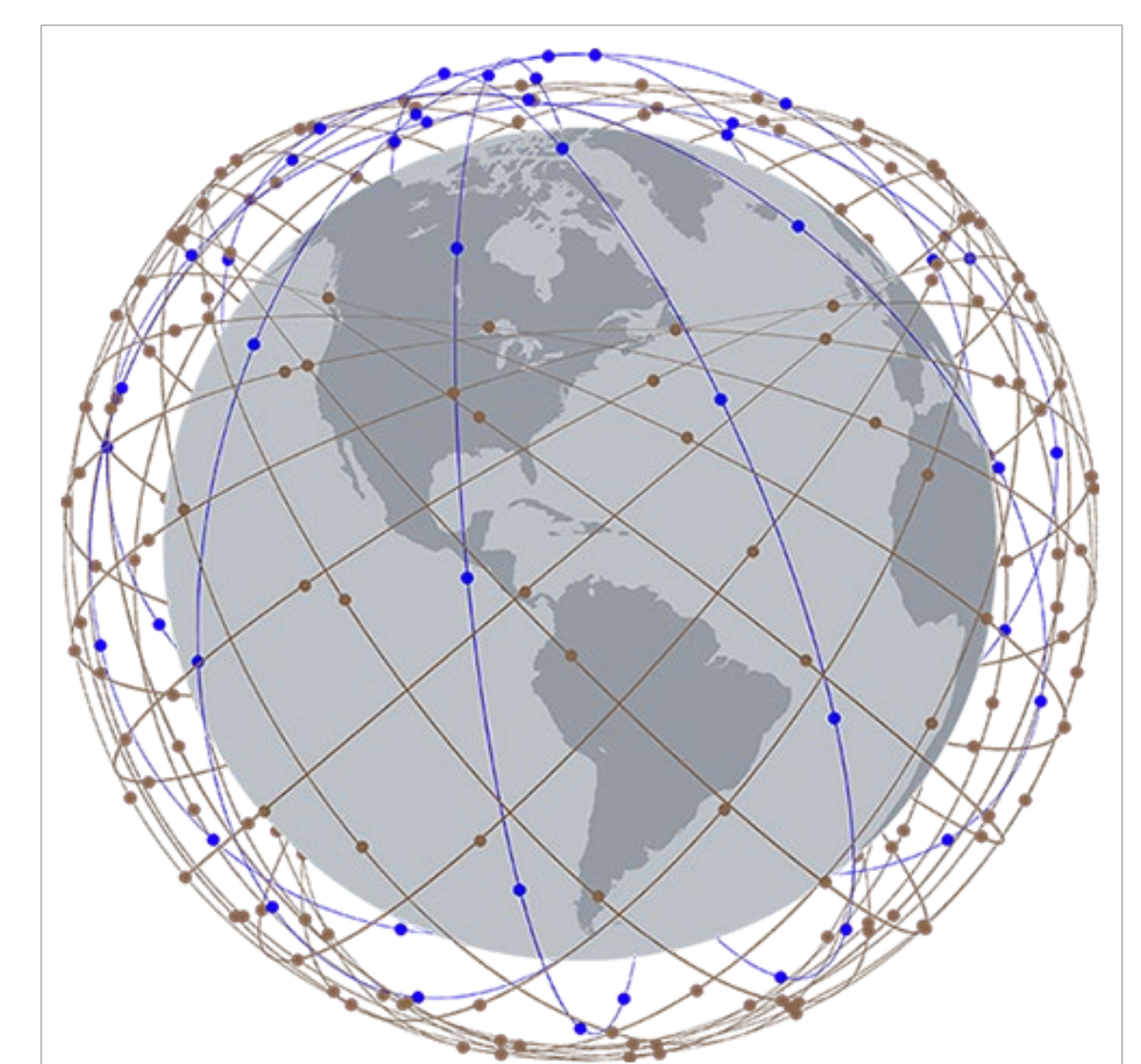
Artistic Rendering of Polar Security Cutter (PSC) by VT Halter
<https://www.workboat.com/news/government/vt-halter-awarded-746-million-icebreaker-contract/>

Methods

- Multiple objective decision making (MODM) was used to develop a decision model for evaluating a potential SATCOM provider.
- A hierarchy for the system was developed capturing key performance attributes, risk, and schedule.
- USCG subject matter experts were canvassed to develop appropriate weights for each of the attributes based off of service priorities.

Results

- USCG will need to balance SATCOM system attributes such as latency, bandwidth, and signal characteristics against service costs.
- The U.S. Navy has polar communications capabilities that could potentially be leveraged but may not be robust enough for emerging demand of USCG's new Polar Security Cutter (PSC) program. Furthermore, at least one of the Navy's communications capabilities that cover the Arctic region do not provide service to the south pole.
- The recent commercialization of space is likely to provide numerous SATCOM options for 100% global coverage. There are several companies making steady advances in this area. These developments could benefit the new PSCs and could be extended to the rest of the fleet.



Conceptual LEO Constellation from Telesat LEO
<https://www.telesat.com/leo-satellites/>

Recommendations

- Have the USCG further refine priorities with regard to Arctic/polar communication needs, providing more detail to the initial model.
- Have the USCG either initiate a program office for acquiring SATCOM or partner with the Navy to leverage DOD capabilities.