Policy Brief

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Expert Perspectives on Arctic Communications: Resilience, Infrastructure Vulnerability, and Selective Interoperability

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This policy brief examines communications systems as a foundational enabler of Arctic security and maritime operations, drawing on an original survey of experts across industry, policy, academia, and defense. While existing literature emphasizes infrastructure gaps and technical constraints, it rarely captures how experts assess communications in the High North in operational terms. The survey reveals three policy implications. First, satellite-enabled systems are viewed as essential for overcoming persistent connectivity limitations, particularly through hybrid, multi-orbit architectures. Second, vulnerability across the Arctic is unevenly distributed, with undersea communication cables and other fixed infrastructure identified as the most exposed to disruption. Third, experts anticipate a future communications environment that is neither fully integrated nor fragmented, but selectively shared among like-minded states, including Sweden and its Nordic partners. This policy brief argues that Arctic communications policy for Sweden, the Nordics, and their European partners should prioritize resilience, redundancy, and mission-specific interoperability rather than full system integration in order to maintain connectivity under conditions of stress.

- Arctic-facing states—especially Sweden, the Nordic countries, and their NATO and EU partners—should invest in polar-capable satellite communications systems, including LEO, highly elliptical orbit, and hybrid multi-orbit architectures.
- Policymakers should treat undersea communication cables, landing points, and ground stations as critical infrastructure not only for Arctic operations, but also for wider Nordic and European security.
- Sweden and its Nordic and European partners should develop selective data-sharing frameworks focused on mission-critical functions such as search and rescue, vessel monitoring, environmental response, fisheries monitoring, and civil contingency coordination.
- Governments should invest in technical literacy and cross-domain expertise so that policymakers and operators can assess and deploy complex communications architectures across civil, military, and dual-use settings.

Introduction

Arctic security is often discussed in terms of defense, presence, and access. Yet the more immediate constraint is often simpler: whether actors can communicate, coordinate, and respond across a vast, remote, and infrastructure-poor environment. Rising activity along the Northern Sea Route (NSR), including increased Chinese commercial shipping linked to Russian energy exports, underscores how quickly the Arctic is shifting from a peripheral space to an operational maritime environment. As traffic grows, so too do the demands placed on communication systems that enable command and control (C2), navigation, surveillance, and emergency response across ice-filled and remote areas. Whether coordinating search and rescue (SAR), monitoring vessel movements, or supporting military and coast guard operations, reliable connectivity forms the delicate backbone of human activity in the High North. Yet this infrastructure remains uneven, fragile, and often highly exposed to disruption. In practice, Arctic connectivity remains a patchwork of systems that vary significantly by geography, population density, and economic viability.

This matters for Sweden, the Nordic states, and Europe more broadly. Arctic, North Atlantic, and Baltic security spaces are becoming more tightly connected, while infrastructure resilience, civil preparedness, and NATO-EU coordination increasingly overlap. Results from a recent expert survey—part of an ongoing research project on Arctic security—show that the Arctic security problem is not only about presence or access, but about whether actors can communicate, coordinate, and respond effectively under extreme conditions.[*]

Communications are critical in the Arctic because they underpin operational, safety, and governance functions in a region defined by remoteness, environmental volatility, and limited infrastructure.

* Our expert survey forms part of a broader research project examining Arctic security through three interrelated domains: commercial shipping, communication infrastructure, and military surveillance. It analyzes how these systems interact to shape the ability of Arctic-facing states to pursue, obtain, conserve, and defend their interests in the High North. Within this framework, communications infrastructure emerges as the connective layer linking safety, response, and coordination.

From shipping and offshore energy to fisheries, research, and security operations, reliable connectivity is required to support C2, navigation, environmental monitoring, and emergency response across vast distances. Arctic operations depend on timely data exchange, including weather and ice information, vessel tracking, and SAR coordination, all of which require sufficient bandwidth and reliability to function under rapidly changing conditions. At the same time, growing demand for these services is already outpacing available communications capacity, while high deployment costs and limited user bases continue to constrain infrastructure development, making many Arctic connectivity projects dependent on state support or public-private partnerships.[1]

Much of the literature focuses on infrastructure gaps, geopolitical competition, or technical capabilities rather than how practitioners themselves assess the relative value and vulnerability of different communications systems.[2] Existing work has highlighted technical limitations on Arctic communications, including coverage gaps, latency constraints, and reduced satellite effectiveness at high latitudes.[3] Few studies, however, have systematically captured how experts themselves prioritize communications capabilities in operational terms. Our survey addresses this gap by asking Arctic experts to evaluate the effectiveness, vulnerability, and likely future configuration of key communications technologies. The results reveal three clear findings. First, experts regard satellite-enabled systems as essential for improving secure communications and C2 capabilities. Second, they differentiate among infrastructure types in terms of vulnerability, identifying undersea communication cables as the most exposed to disruption. Third, they anticipate a future Arctic communications environment that is neither fully integrated nor fully fragmented but selectively shared among like-minded states, including Nordic and European partners.

Communications as Operational Infrastructure

The survey's first major finding is straightforward: experts assign high importance to improved communications capabilities for Arctic operations, especially those that enable secure, real-time coordination across vast and remote maritime spaces. This reflects a structural constraint. Unlike lower latitudes, conventional geostationary satellites provide limited or unreliable coverage in the high Arctic due to their equatorial positioning. Communication gaps therefore persist precisely where operational demands—from navigation to surveillance and emergency response—are most acute. Notably, survey responses revealed no meaningful skepticism about the value of satellite-enabled communications, with none of the experts indicating that such systems would provide little or no improvement.

What the survey adds is not simply confirmation that communications matter, but a clearer indication of how practitioners rank these capabilities relative to other investments. Experts consistently treated communications not as a supporting function, but as a foundational enabler of Arctic operations— on par with other enabling infrastructure such as ports or logistics hub. In doing so, the results challenge prevailing narratives that frame Arctic security primarily in terms of defense, presence, and access.[4] For a Swedish and European audience, the implication is clear: northern security should be understood not only in terms of forward posture, but also in terms of whether civil and military actors can actually communicate and coordinate across Arctic, North Atlantic, and Nordic spaces.

Recent technological developments are beginning to address this limitation. Survey respondents overwhelmingly identified satellite-enabled systems as the most critical means of overcoming Arctic connectivity constraints. Arctic-specific systems such as the Arctic Satellite Broadband Mission (ASBM) use highly elliptical orbits to provide continuous coverage above 65°N, while LEO and MEO constellations such as Starlink and OneWeb offer low-latency, high-bandwidth connectivity across polar regions. In much of the Arctic maritime domain, particularly beyond coastal zones, satellite communications are not simply advantageous but often the only viable means of maintaining connectivity, as terrestrial and fiber-based solutions are either unavailable or prohibitively costly to deploy at scale.[5] For Sweden and the Nordic states, the implication is that Arctic preparedness increasingly depends on understanding and integrating these space-enabled systems into both civil contingency planning and allied operations.

The survey also suggests that no single system can resolve Arctic communication gaps. Instead, respondents point toward hybrid, multi-orbit architectures that combine LEO, MEO, GEO, and highly elliptical systems to balance coverage, latency, and resilience. This aligns with emerging practitioner assessments and technological developments, which increasingly emphasize layered and flexible architectures rather than single-orbit solutions.[6] These are precisely the kinds of dual-use capabilities that matter for Nordic and EU actors seeking to link civil resilience, environmental monitoring, and security cooperation. At the same time, a considerable share of respondents expressed uncertainty regarding these systems, suggesting uneven familiarity with their capabilities and underscoring the need to integrate satellite-enabled communications more fully into Arctic operational workflows.

Real-world incidents reinforce this point. The grounding of the Akademik Ioffe in the Canadian Arctic in 2018 required long-range coordination between rescue authorities and assets across vast distances, with communication central to the response. Yet the incident also exposed structural Arctic constraints, including delayed response times, limited connectivity, communication "dead zones," and low-bandwidth satellite links.[7] These problems are not confined to North America. In the European High North, repeated disruptions to GNSS and GPS signals in northern Norway and Finland—widely attributed to Russian electronic warfare activity—have affected both aviation and maritime navigation, demonstrating how communication and positioning systems can already be degraded in practice.[8] For Sweden, such incidents underscore that communications resilience is not an abstract Arctic concern but part of the wider operational reality of the Nordic region.

Vulnerability and Uncertainty in Arctic Communications

The survey's second major finding is that vulnerability is not evenly distributed across Arctic communications systems. Undersea cables—fiber-optic lines laid on the seabed that carry the vast majority of global data traffic—

are clearly perceived as the most exposed infrastructure type, receiving the highest number of "high exposure" assessments among respondents. In the Arctic, such infrastructure remains sparse, with only a limited number of systems traversing or approaching the region, such as the Svalbard fiber cables connecting mainland Norway to the archipelago or the cable connection from Iceland to Greenland. More broadly, responses indicate a consistent pattern: fixed, geographically anchored infrastructure is viewed as more significantly vulnerable to sub-threshold interference than distributed or space-based systems.

For Sweden, the Nordics, and the EU, this is particularly salient because Arctic cable security cannot be separated from wider concerns about northern European critical infrastructure and digital resilience. Undersea cables are physically accessible yet difficult to monitor continuously across vast maritime areas, meaning that disruption can occur covertly and may be difficult to attribute to a specific actor. They also represent critical nodes in global data transmission, so even localized damage can produce wider strategic and economic consequences.[9] Arctic environmental conditions, including ice cover, harsh weather, and limited monitoring capacity, further complicate detection and protection. Taken together, these characteristics make undersea cables particularly attractive targets for gray-zone activity below the threshold of conventional conflict. Control over such digital infrastructure also carries broader strategic implications, as states that build, finance, or manage connectivity networks can shape data flows, technical standards, and governance models in the Arctic and beyond.[10]

This vulnerability extends beyond cables to include landing stations and satellite ground terminals, which serve as critical gateways linking subsea and space-based systems to wider networks. By contrast, commercial satellite systems are generally perceived as less exposed because distributed constellations offer greater redundancy, though respondents still identify moderate vulnerability reflecting the risks posed by jamming, spoofing, cyber intrusion, and escalation associated with direct attacks on space-based systems. The Nordic GNSS disruption cases noted above are instructive here. They show that communications vulnerability in the Arctic and European High North extends beyond physical sabotage to the electronic degradation of key systems in real operational settings.

The survey also reveals a secondary but important finding: uneven familiarity with more specialized communications technologies. Systems such as troposcatter and hardened terrestrial links generated a high proportion of "I don't know" responses, suggesting both the technical complexity of Arctic communications and a gap between emerging capabilities and broader expert understanding. For Nordic and EU policymakers, this implies that infrastructure investment alone will not be sufficient. Institutional familiarity with how systems function under degraded, contested, or hybrid conditions will be equally important. Taken together, these findings suggest that strengthening Arctic communications resilience will require not only investment in new technologies, but also greater emphasis on monitoring, attribution, and rapid restoration capabilities for vulnerable fixed infrastructure, alongside improved operational understanding of less familiar systems.

A Selectively Shared Communications Future

The survey's third major finding is that experts do not expect Arctic communications to evolve into a fully integrated system. Instead, the dominant expectation is a hybrid model in which communications infrastructure is shared selectively among partners while remaining fragmented at the system level. This matters especially for Sweden, the Nordic states, and the EU, all of which must make policy in the absence of a unified Arctic communications architecture. Rather than planning around an idealized region-wide system, policymakers should expect a patchwork of systems shaped by geography, cost constraints, uneven infrastructure deployment, and political alignment.[11]

This reflects both political and technical realities. Differences in national interests, governance frameworks, and security concerns limit the prospects for full integration, while high deployment costs and uneven demand further constrain coordinated development. At the same time, operational requirements—particularly in areas such as search and rescue, vessel monitoring, environmental response, and fisheries monitoring—create incentives for targeted cooperation. This pattern mirrors broader Arctic governance dynamics, where collaboration tends to emerge in function-specific domains without producing fully integrated regional systems.[12] For European policymakers, this is a familiar pattern: Nordic, NATO-based, and EU-compatible arrangements often advance faster than broader regional institutional solutions.

The result is likely to be a layered communications environment in which interoperability exists where operationally necessary rather than universally. From a resilience perspective, such selective interoperability among trusted partners may be preferable, preserving redundancy and limiting the risks of tightly coupled networks. This is where the survey has particular policy value. Rather than treating fragmentation as a failure, it suggests that partial, mission-specific, trusted cooperation may be the most realistic and functional path forward. For Sweden and its Nordic partners, this means preparing for a communications environment in which cooperation will be real but partial, and in which trusted cross-border arrangements may matter more than universal architectures.

Policy Implications

Taken together, the survey results point toward a clear strategic implication: Arctic communications policy should prioritize resilience, redundancy, and mission-specific interoperability rather than full integration. For Sweden, the Nordic countries, and their NATO and EU partners, this means treating Arctic communications not as a niche technical issue, but as part of a wider agenda of northern European resilience, civil preparedness, infrastructure security, and allied coordination.

First, Arctic-facing states—especially Sweden, the Nordic countries, and their NATO and EU partners—should invest in polar-capable satellite communications systems, including LEO, highly elliptical orbit, and hybrid multi-orbit architectures. These systems are essential to ensuring reliable high-latitude coverage where terrestrial infrastructure remains sparse and geostationary limitations persist. For Sweden and the Nordics, this also means paying closer attention to European and allied systems already emerging in the region, including those linked to Space Norway and broader northern European space-enabled connectivity efforts.

Second, policymakers should treat undersea communication cables, landing points, and ground stations as critical infrastructure not only for Arctic operations, but also for wider Nordic and European security. This requires stronger monitoring, physical protection, attribution capabilities, repair capacity, and traffic rerouting options in the context of sub-threshold or gray-zone disruption. Given the strategic salience of northern European maritime approaches and the wider sensitivity of cross-border digital infrastructure, this recommendation should be understood as relevant to EU resilience and regulatory planning as much as to Arctic operations narrowly defined.

Third, Sweden and its Nordic and European partners should develop selective data-sharing frameworks focused on mission-critical functions such as search and rescue, vessel monitoring, environmental response, fisheries monitoring, and civil contingency coordination. These arrangements should operate under pre-agreed protocols and privilege operational effectiveness among trusted actors rather than attempting comprehensive institutional integration. This is the practical policy translation of the survey's third finding: the future of Arctic communications is likely to be selectively shared, not seamlessly unified.

Fourth, governments should invest in technical literacy and cross-domain expertise so that policymakers and operators can assess and deploy increasingly complex communications architectures across civil, military, and dual-use settings. As Arctic systems become more layered, effective governance will depend as much on institutional capacity and cross-border coordination as on technology itself. For Sweden and the Nordic states, where civil preparedness and allied coordination are increasingly intertwined, this is likely to be decisive.

Conclusion

Ultimately, the survey suggests that the future of Arctic security will depend less on the expansion of physical presence than on the resilience of the communications systems that enable coordination across a vast and unforgiving environment. For Sweden, the Nordics, and Europe more broadly, the key lesson is to prioritize practical resilience and trusted interoperability over ambitions for full system integration. In a region defined by distance, volatility, and infrastructural constraint, ensuring that communications systems remain functional under stress may prove more consequential for Arctic stability than efforts to build fully integrated networks.

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Endnotes

1 Fritz Bekkadal, "Arctic communication infrastructure," *Marine Technology Society Journal* 48, no. 2 (2014): 65–74; Michael Delaunay and Mathieu Landriault, "Connectivity and infrastructure—The Arctic digital divide," in Joachim Weber (ed.), *Handbook on Geopolitics and Security in the Arctic* (Cham: Springer, 2020): 231–248.

2 Martti Kirkko-Jaakkola, Laura Leppälä, Giorgia Ferrara, Salomon Honkala, Maija Mäkelä, Heidi Kuusniemi, and Seija Miettinen-Bellevergue, *Challenges in Arctic navigation and geospatial data: User perspective and solutions roadmap* (Helsinki: Ministry of Transport and Communications, 2020); Heather A. Conley, Sophie Arts, Kristine Berzina, and Frida Rintakumpu, *Protecting Undersea Infrastructure in the North American Arctic: Lessons from Incidents in the Baltic Sea and High North* (German Marshall Fund, 2024), 1–23.

3 Arctic Council, *Arctic Marine Shipping Assessment 2009 Report* (Tromsø: Arctic Council, 2009); Fritz Bekkadal, "Arctic communication infrastructure," *Marine Technology Society Journal* 48, no. 2 (2014): 65–74; Karen L. Jones and Lina M. Cashin, *Space-enabled capabilities for connecting and collaborating in the Arctic* (Center for Space Policy and Strategy, The Aerospace Corporation, 2024).

4 Mathieu Boulègue, Minna Ålander, Charlotta Collén, Edward Lucas, Catherine Sendak, and Krista Viksnins, Up North: *Confronting Arctic Insecurity—Implications for the United States and NATO* (Center for European Policy Analysis, 2024); Jennifer Spence and Christopher Conway, *Arctic Security: Power Shifts and Transformational Change* (Workshop Report, Belfer Center for Science and International Affairs and Fridtjof Nansen Institute, January 2026).

5 Rasmus G. Bertelsen, "Space Science & Technology in the Arctic: Promises of Cooperation and Development amid New Security Challenges," IFAC-PapersOnLine 54, no. 13 (2021): 19–22.

6 Karen L. Jones and Lina M. Cashin, *Space-enabled capabilities for connecting and collaborating in the Arctic* (Center for Space Policy and Strategy, The Aerospace Corporation, 2024).

7 Jinho Yoo, Floris Goerlandt, and Aldo Chircop, "Unmanned remotely operated search and rescue ships in the Canadian Arctic: Exploring the opportunities, risk dimensions and governance implications," in A. Chircop et al. (eds), *Governance of Arctic Shipping* (Cham: Springer, 2020): 83–102.

8 Mathieu Boulègue, Minna Ålander, Charlotta Collén, Edward Lucas, Catherine Sendak, and Krista Viksnins, *Up North: Confronting Arctic Insecurity—Implications for the United States and NATO* (Center for European Policy Analysis, 2024); Jennifer Spence and Christopher Conway, *Arctic Security: Power Shifts and Transformational Change* (Workshop Report, Belfer Center for Science and International Affairs and Fridtjof Nansen Institute, January 2026).

9 Brendon J. Cannon, "Undersea cable security in the Indo-Pacific: Enhancing the Quad's collaborative approach," *Marine Policy* 171 (2025): 106415.

10 Michael Delaunay and Mathieu Landriault, "Connectivity and infrastructure—The Arctic digital divide," in Joachim Weber (ed.), *Handbook on Geopolitics and Security in the Arctic* (Cham: Springer, 2020): 231–248.

11 Ibid.

12 Arctic Council, *Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic* (Tromsø: Arctic Council Secretariat, 2011); Heather Exner-Pirot, "Canada's Arctic Council chairmanship (2013–2015): A post-mortem," *Canadian Foreign Policy Journal* 22, no. 1 (2016): 84–96.