Seminar report:

Arctic Telecommunications Infrastructure: Past, Present and Future

17-18 September 2025 at the Arctic Centre, University of Lapland

On behalf of the organizers, 29 September 2025:

Juha Saunavaara, Hokkaido University Arctic research Center

Arctic Telecommunications Infrastructure: Past, Present and Future'-seminar was held on 17-18 September 2025 at the Arctic Centre, University of Lapland (Rovaniemi). This event was organized by the 'Telecommunications infrastructure, time, community, and the Arctic environment'-project and supported by the UArctic Thematic Network on Arctic Telecommunications and Networking. The seminar consisted of four sessions: Arctic telecommunications infrastructure: local needs and local voices 1 and 2; The role of the Arctic in international and global telecommunications networks; Arctic telecommunications infrastructure and security.

The first session was opened by Heather Hudson (University of Alaska Anchorage), who gave a presentation focusing on digital connectivity in Alaska. In addition to discussing the role of local circumstances—ranging from a small population and limited infrastructure to the Arctic environment and severe climate—in shaping past and present developments, she highlighted the innovativeness of local people, particularly in areas such as telemedicine and online education. The remarks concerning the role of local (Indigenous) communities and challenges posed by climate change were followed by an introduction of opportunities presented by and obstacles related to new technologies (such a LEO satellites). Mette Simonsen Abildgaard (Aalborg University) continued with a presentation on the modernization of Greenland's telecommunications. She emphasized the importance of the (post)colonial context, the role of telecommunications as part of a broader welfare-state vision, and the impacts of uneven infrastructure development, which historically prioritized cities along the west coast.

Ritva Kylli (University of Oulu) focused on the environmental history of telecommunications infrastructure in the Arctic, with a particular emphasis on northernmost Finland. Through empirical case studies—especially related to the history of the telephone—she illustrated the mutual impacts and interactions between the environment and infrastructure. As in the previous presentations, special attention was paid to the perspectives of local Indigenous people, including their needs, aspirations, and concerns regarding telecommunications infrastructure. In the discussion that followed the three presentations, the challenges posed by the Arctic environment were revisited, including recent submarine fiber optic cable initiatives. Additionally, the relationship between telecommunications and immigration/population dynamics, as well as the division of roles between local and national, public and private actors, was actively debated.

The second session began with a presentation by Jaap van de Beek (Luleå University of Technology), which focused on the past and future of cellular networks. Using Sweden as a case study, he examined the relationship between national policies and connectivity in rural and remote areas, highlighting the issue of cellular coverage inequality. He also introduced research on autonomous remote hotspots, which provide connectivity in areas lacking roads, power grids, and fiber infrastructure. Hirley Alves (University of Oulu) followed with a talk on 6G resilience. He explored various interpretations of resilience and resilient networks, with particular emphasis on the Arctic and northern regions' environmental conditions and the growing cybersecurity threat landscape. He also addressed the importance of societal sustainability, noting the role of mobile networks as core components of critical infrastructure upon which modern societies increasingly rely.

In a joint presentation, Katri Kuusela and Juho Saavalainen (University of Lapland) focused on connectivity in extremely remote areas. They introduced the Mobile Technology Sleigh Project, developed in collaboration with the Sámi Educational Institute. This pilot project aimed to support the connectivity needs of reindeer herders, featuring a base station capable of operating in harsh environmental conditions and being transported by snowmobile. During the general discussion, participants drew attention to the behavior of mobile operators and regulators, both during the rollout of new generations of mobile technology and the decommissioning of older networks.

The third session featured three presentations focused on efforts to enhance fiber-optic cable networks in and through the Arctic. Juha Saunavaara (Hokkaido University) opened with an overview of past trans-Arctic submarine cable projects and introduced hybrid governance as a new analytical framework for understanding current developments. Steen Louis Hansen (Tusass) built on this foundation, sharing recent updates on the Pan-Arctic Cable System (PACS), which aims to establish direct and diverse connectivity between Europe and Asia via the Arctic. In addition to highlighting the importance of route diversification, he emphasized the need for coordination among different cable projects.

Juha Oinonen (CSC – IT Center for Science) concluded the session with a presentation on National Research and Education Networks (NRENs) and Arctic connectivity. After introducing Funet, Finland's NREN, and related infrastructures such as the LUMI supercomputer in Kajaani, he discussed the collaboration among Nordic NRENs and the role of NORDUnet. While NORDUnet has actively participated in several trans-Arctic cable initiatives, the Nordic network architecture and collaborative practices also offer a potential model for cross-border cooperation in larger international projects. The subsequent discussion addressed the technological and economic feasibility of Arctic cable initiatives, as well as the integration of local projects in Greenland with Canadian and other multinational efforts. The potential incorporation of SMART (Science Monitoring and Reliable Telecommunications) and DAS (Distributed Acoustic Sensing) technologies, and the need for technological coordination across various projects, were also explored.

The content of the fourth session was revised due to the cancellation of Mirva Salminen's (UiT – The Arctic University of Norway) presentation and the addition of a talk by Kîsta Bianco Kjær (Aalborg University). Michael Delaunay (Observatoire de la politique et la sécurité de l'Arctique – OPSA) opened the session with a presentation focusing on the historical development of telecommunications networks in northern Canada. His study, which spanned technologies from the telegraph to Starlink, paid particular attention to the role of the military and illustrated how dependencies, patterns of interaction, and ownership structures between government/military and private actors have evolved over recent decades.

Kîsta Bianco Kjær then shifted the focus back to the unique characteristics of telecommunications in Greenland. She introduced her forthcoming research on digital breakdowns in remote Greenlandic communities that rely on satellite connectivity, and emphasized the complex challenges that arise when connections are lost or become too slow—leading to frustration, stress, and feelings of inequality among residents. The discussion that followed ranged from the availability of Starlink capacity in Arctic Canada to broader methodological questions and source material relevant to researching telecommunications in the Arctic.

The official program concluded with a special session that provided a platform for wrap-up discussions and the exchange of ideas for future collaboration. Following a brief project introduction by Pilvi Taskinen (Lapland University of Applied Sciences) and a presentation on the UArctic Thematic Network on Arctic Telecommunications and Networking, participants discussed opportunities for collaboration between industry and academia, as well as the current interest of the Arctic Council and the Arctic Economic Council in telecommunications-related issues. The upcoming UArctic Congress (to be held May 26–29, 2026, in Tórshavn, Faroe Islands) was identified as one potential venue for continued collaboration. In addition, the possibility of organizing sessions at major recurring Arctic events—such as the Arctic Circle Assembly and Arctic Frontiers—or hosting dedicated seminars focused on Arctic telecommunications was also acknowledged.

While there was a shared recognition of the importance of continued collaboration, participants also discussed next steps, including the sharing of information about upcoming events, publications, and planned projects. Attention was further given to potential sources of external funding for future international projects related to Arctic telecommunications.

Arctic Telecommunications Infrastructure: Past, Present and Future

Timing: 17-18 September 2025

Place: Arctic Centre, University of Lapland (Rovaniemi

Language and format: English, onsite event

Registration: Free of charge, pre-registration is needed

https://forms.gle/4KwDmpch3rwGstZp6

Organized by: Telecommunications infrastructure, time, community, and the Arctic environment-project

Supported by: UArctic Thematic Network on Arctic Telecommunications and Networking

17.9.2025:

12:00 Opening remarks and introduction

12:15-13:45 Session 1: Arctic telecommunications infrastructure: local needs and local voices 1

Speaker 1: Heather Hudson, Internet and Broadband in Rural Alaska: Innovation and Challenges for Indigenous Development

Speaker 2: Mette Simonsen Abildgaard, Pacing Modernity: Infrastructure Time in Postwar Greenland

Speaker 3: Ritva Kylli, Telephone Infrastructure Changing the Environment in the Arctic

13:45-14:15 Coffee break

14:15-16:15 Session 2: Arctic telecommunications infrastructure: local needs and local voices 2

Speaker 4: Jaap van de Beek, Past and future of cellular networks; Are we all covered?

Speaker 5: Hirley Alves, The path toward 6G Resilience

Speaker 6: Katri Kuusela and Juho Saavalainen, Mobile technology sledge

Speaker 7: Kîsta Bianco Kjær, At the End of the Infrastructure: Stories of Connection in Digital Breakdowns

18:00 Self-paid dinner

18.9.2025

09:00-10:30 Session 3: The role of the Arctic in international and global telecommunications networks

Speaker 8: Juha Saunavaara, Trans-Arctic submarine cable projects: past developments and a word about hybrid governance

Speaker 9: Steen Louis Hansen, Arctic Connectivity between Europe and Japan/Asia through PACS

Speaker 10: Juha Oinonen, Funet and Research Networking in Arctic

10:30-11:30 Session 4: Arctic telecommunications infrastructure and security

Speaker 11: Michael Delaunay, The history of the development of the telecommunication network in northern Canada: a military oriented network?

Speaker 12: Mirva Salminen: Telecommunications infrastructure shaping everyday security in the European Arctic

11:30-12:30 Lunch

12:30-13:30 Wrap-up discussion and ideas for future collaboration

16:00 Opening of a special exhibition on telecommunications in Northern Finland.

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