

Wireless Arctic Network (WAN)*

Outline

Quantitative arctic research is thwarted by the absence of data sharing and transfer infrastructure. Sub-par communications stymie arctic residents' participation in mainstream educational and cultural opportunities. This research and prototyping project directly addresses both problems.

Research and Goals:

The proposed Wireless Arctic Network will advance knowledge of robust network protocols, in particular the interoperability of networks composed of different transmission media with disparate latencies. The research goal is to design, build, and test a hybrid network integrating wired and wireless, terrestrial, airborne, and space-based communications technologies into a reliable distributed communications infrastructure. Accomplishment of this goal will be determined by measuring the efficiency and throughput of new NASA-developed network protocols for mixed-latency hybrid networks, and by carrying out and evaluating demonstration projects utilizing the network for communication, data collection, arctic scientific research, and collaborative distance education in science and technology.

Networking strategies successful in less extreme environments fail in the extreme climate, low population density and remote geography of the Alaskan arctic. The experiments and developments in this project are intended to overcome or circumvent obstacles that have so far precluded reliable or high bandwidth telecommunications in this and similar regions.

Broader Impacts:

The proposed Wireless Arctic Network is a partnership effort of university, private research laboratories, and government to develop the basis for a communications infrastructure to

- directly support arctic regions research (biological, climatic, geophysical) including remote instrumentation;
- integrate research into education in the Native Inupiat Eskimo village of Barrow to increase scientific and technological literacy of students;
- engage students at UAF and UC in front line research and collaboration;
- increase access by underserved minority population to network resources including telemedicine, network information resources in Alaska libraries and other sources, and

* Proposed by the University of Alaska

facilitate collaboration with residents of other regions;

- support reliable emergency and security services by maintaining more reliable and higher bandwidth communication links in the roadless Arctic;
- enhance teaching, training, and learning in underserved rural areas of Alaska populated largely by Alaska natives.

The infrastructure and demonstration applications will implement a key goal of the Arctic Research Consortium of the United States (ARCUS) recommendations for 21st Century strategies: "extend the infrastructure that supports communications among scientists to support communication between scientists and communities. Most important is assistance with the establishment of telecommunications-links and on-site equipment that will enable communities to send and receive electronic mail, data files, and documents, and to access the Internet."