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STATE OF ALASKA
OFFICE OF THE GOVERNOR

November 25, 2014

National Telecommunications and Information Administration
United State Department of Commerce
ATTN: Arctic NOI
1401 Constitution Avenue NW, Room 4898
Washington, DC 20230

Re: Notice of Inquiry Docket No. 140925800–4800–01

To Whom It May Concern,

The State of Alaska (SOA) submits the attached document as comments in response to the National Telecommunications and Information Administration (NTIA) Notice of Inquiry regarding the Implementation Plan for the National Strategy for the Arctic Region. We appreciate the opportunity and are encouraged to see the attention being trained on the Arctic.

The SOA has benefitted from the tremendous economic opportunities found in the Arctic. America is an Arctic nation because Alaska is an Arctic state. We are encouraged NTIA recognizes the value of the SOA's input on these issues and anticipates ongoing consultation as the implementation plan moves forward.

Communications in Alaska's remote areas have always been challenging, even more so in the Arctic. The distances are vast, the population is isolated with limited transportation connections, and the cost of energy is high. The SOA welcomes the opportunity to provide input on federal efforts to assess current telecommunication infrastructure and possible use of new technology to support improved communications in the region.

The responses which follow are regarding the specific sections related to SOA owned and operated systems only, and were prepared based on the knowledge of Alaska Department of Administration (DOA), Enterprise Technology Services (ETS) staff. Input was solicited and provided towards these responses by Major Matthew Leveque, Deputy Director of the Alaska Department of Public Safety (DPS) - a primary user of the Alaska Land Mobile Radio (ALMR) system. Also the Alaska Department of Environmental Conservation (DEC), Division of Spill Prevention and Response (SPAR), tasked with providing emergency response to spills of oil and hazardous substances, provided information regarding their communications in the region. In addition, the Alaska Department of Transportation and Public Facilities (DOT/PF) provided feedback on Arctic communications and weather information. As stated above, these comments focus on SOA-owned infrastructure and do not include local systems (i.e. North Slope Borough trunked radio system),

leased commercial network links providing communications to a single entity, or commercial cellular and satellite phones.

(5) Public Safety Services:
5A) Which Arctic Alaskan communities have access to, or lack access to, wire and wireless public safety communications systems used by law enforcement, fire emergency, and emergency medical first responders?
Currently, lack of telecommunications presents large challenges for emergency response in the Arctic. There are very limited SOA-owned public safety voice communications systems in locations north of the Arctic Circle. There is an analog voice radio system along the Dalton Highway used by DOT/PF. *(Note: The Dalton Highway is 414 miles long and connects Fairbanks to Deadhorse, which is located on the shore of the Arctic Ocean.)* Neither the Alaska State Troopers (AST) nor the North Slope Borough Police Department is able to access this radio system. However, there have been discussions on whether to allow these entities to access this system. There are isolated SOA repeaters located in the Prudhoe Bay Oilfield for spill response and environmental monitoring: one in Prudhoe Bay and one at the Kuparuk field. These repeaters have no linking ability at this time. SPAR is in negotiations now with ConocoPhillips Alaska, Inc. to allow installation of a third repeater at the Alpine field. In addition, SPAR is working with ETS to set up a system to link these repeaters together which would allow communications with staff located anywhere within the footprint of any of the three repeaters. All other responders' communications are limited to Very High Frequency (VHF) simplex handheld radios with interoperability frequencies programmed into them.

While cell phones do not work in most areas, VHF communications are mostly limited to line-of-sight and telecommunications sites which provide antenna towers, and power and shelters for equipment are few and far between. Most areas in the Arctic are not within the coverage footprint of these towers. Satellite phones give some relief to this issue; however, they have limitations due to the high latitudes of the Arctic. For example, the shared state agency Deadhorse office is able to use email, however, the speed is so slow that transmitting image files over 1 megabyte (MB) is virtually impossible. Furthermore, regarding satellite usage, the data transmission speed is far too slow to support even basic email much less image transmission.

5B) Are there plans to extend the Alaska Land Mobile Radio network (ALMR) and the State of Alaska Telecommunications System (SATS) to any Arctic Alaskan communities?
Currently there are no plans to extend ALMR or SATS to communities north of the Arctic Circle. State network communications to these communities are provided by leased commercial satellite or terrestrial facilities. The ALMR system works best with a terrestrial connection. It is technically possible to extend ALMR to communities where only satellite connections are available, but it would be prohibitively expensive and could have limitations due to very low latency connection requirements. The only locations north of the Arctic Circle that have terrestrial connectivity are the Deadhorse/Prudhoe Bay oilfield areas and the Alyeska Pipeline Service Company (Alyeska) pump stations. Alyeska built the microwave system along with the pipeline. More recently, fiber was also laid along the pipeline to provide communications to operate the pipeline and support the oil producers in the Prudhoe Bay area.

5C) What are the benefits and limitations of extending the ALMR and SATS networks to these communities and first responders and what key barriers may limit this extension?
The barriers and limitations to extending the ALMR and SATS networks are present for all communications and technological advances in our state. Alaska covers a very large geographical area, with varying terrain, and is not densely populated above the Arctic Circle except in key regional hubs. Particularly in these remote places, the population base is so small that constructing and operating these systems presents sustainability challenges.

Currently, first responders usually are limited to landline or cellular phones for communications and neither are available outside of established communities. In some cases, satellite phones are used, but the usage is limited by the cost of the phones, minute charges, and terrain masking. The ability to use a voice radio system would provide additional coverage area beyond the limited telephone and cellular coverage within and around the communities and would enable responders to connect to a dispatch center.

5D) Which other network technologies and services are used by public safety professionals (e.g., dispatch land mobile radio systems, commercial mobile radio, mobile satellite services, high-frequency), and what are the key strengths and limitations of these networks and services?
With the exception of a newly installed Cisco "Interoperability and Collaboration System" (IPICS) which includes an analog voice radio system installed by DOT/PF for use along the Dalton Highway, and is available to AST during emergencies, the only viable alternative is satellite phones. There are no other commercial mobile radio systems in this area. High Frequency (HF) communication is much more variable in the far north regions and is not readily portable for a responder to carry along. Travel to communities in the Arctic is usually done by aircraft, watercraft, or snow mobile, as the vast majority of communities are not connected to a road system. Other limitations on these systems are further enumerated in the response to question 5A.

5E) How is communications interoperability achieved among various first responders, and among federal, SOA, and local agencies?
SOA has established several VHF conventional simplex frequencies and included some of the National Interoperability Field Operations Guide (NIFOG) VHF simplex frequencies into a standard interoperability zone (group of channels) and placed them in all State radios. The SOA executes frequency sharing agreements with local responders so that they can program SOA interoperability frequencies into their radios.

5F) What network technologies and services are being planned for public safety communications, and what are the key enablers and challenges with regard to the rollout of these networks?
The SOA is not formally planning any systems at this time. The SATS engineering group is informally looking at several Radio over Internet Protocol (RoIP) solutions that will work over satellite links for very low density areas around Alaska including the area north of the Arctic Circle. Vendors are emerging and maturing with RoIP solutions. These and other radio technologies are also being reviewed to find a "slimmed down" trunking-like voice communications solution to support several remote users without the cost and complexity of implementing a full ALMR

trunking site. One technology that has promise is digital mobile radio (DMR), for example Motorola's "MOTOTRBO." These technologies could be enablers.

The challenges to implementation are extensive, as discussed previously: limited backhaul connectivity, low numbers/density of users, extremely large geographical coverage areas, and limited funding resources.

(6) Emergency Communications and Search and Rescue:
6A) What are the emergency wired and wireless communications services available within the listed Arctic Alaska communities, and other communities and locations, and near and far offshore areas?
There is no SOA-owned system. The landline, satellite, and cellular telephone systems, where available, provide some functionality. The Alaska Rural Communications Service (ARCS) system (see question 8 below) is a satellite-connected television broadcast system which can provide only situational awareness for the communities served by it.

6B) How would these communities connect into the overall Alaskan communications backbone network in case of a major emergency?
The Department of Defense has a satellite-connected transportable system. Almost all of the communities are only accessible by air, watercraft, or snow mobile as discussed above, and any emergency communications system must be able to be transported by those means. As a result, vehicle mounted systems are generally not useful above the Arctic Circle.

In some communities there may an amateur radio operator (HAM). Often these HAMs are school teachers who are not necessarily in the community year round. Residents of the communities sometimes talk between villages using Citizens Band or VHF Marine Radio.

The SOA has HF radio equipment in some communities, but it is not staffed or routinely used and may not be immediately usable.

6C) To what extent are there areas without any emergency communications services?
The vast majority of the area above the Arctic Circle has no emergency communications. Many communities have landline telephone service and possibly cellular service. Most of these communities cover less than one square mile. With only a handful of exceptions, there are no roads connecting any of the communities. Travel between these villages is by aircraft, boat, or snow mobile, with no emergency communications except satellite phones usable between villages.

6D) What communications services are used for search and rescue operations and what is their availability and reliability?
Search and rescue on the ground operations often use satellite phones or satellite-connected short messaging devices. They may also relay through support aircraft overhead. Search and rescue from the air can relay to other aircraft and sometimes may have a satellite phone integrated with the avionics.

6E) Are the existing communications services used for search and rescue operations adequate or are additional services necessary?
For the most part only simplex voice radios and satellite phones are available, which makes coordination of search and rescue missions difficult.

(8) Broadcasting and Broadcasting- Satellite Services:
Above the Arctic Circle, the SOA ARCS system currently operates in the communities of Allakaket, Ambler, Anaktuvuk Pass, Arctic Village, Atqasuk, Barrow, Bettles, Chalkyitsik, Fort Yukon, Kaktovik, Kiana, Kivalina, Kobuk, Kotzebue, Noatak, Noorvik, Nuiqsut, Point Hope, Point Lay, Selawik, Shungnak, Venetie, and Wainwright. These locations use a satellite feed television transmitter to provide a single channel service. There is an effort currently under way to convert these analog television transmitters to multi-channel digital operation.

8A) What methods are used to receive radio and television broadcast signals in Arctic Alaskan areas? What improvements can be made if such signals are not readily available?
All television service north of the Arctic Circle is delivered by satellite. ARCS uses a C Band Television Receive Only (TVRO) and television transmitter combination in each community that it serves. Commercial subscription satellite television is now generally available to individuals with the advent of more and higher powered Ku Band satellites.

8B) Does the Alaska Rural Communications System (ARCS) provide adequate broadcasting coverage in the Arctic Alaskan communities?
ARCS has been the only television available to these communities for many years. The programming is taken from a number of Alaska broadcasters. ARCS is currently limited to one analog television channel. A proposed upgrade to multi-channel digital transmissions may improve user satisfaction.

8C) To what extent do the broadband speeds of other terrestrial and satellite networks enable the delivery of high-quality video?
There are no terrestrial networks in the Arctic region to carry television. The new higher powered Ku Satellites with spot beam have enabled subscription providers to cover the Arctic regions.

(10) Aeronautical and Maritime Communications *(Note: The following responses address aeronautical communications only.):*
10A) What communications systems and technologies support aircraft and maritime voice and data communications?
While land-based cell communications sites are generally found in the few remote communities in the Arctic, the existing ground based communication systems are robust and reliable. In general, the telecom systems are configured with satellite dish technology and support voice and data communications. However, electric power is sometimes a limiting resource.

10B) What are the key strengths and limitations of these networks?
The main limitation is that there are few communities in the Arctic, and therefore there is very limited infrastructure for communication systems.

(11) Aeronautical and Maritime Navigation *(Note: The following responses address aeronautical communications only):*

11A) What radionavigation systems are currently used by commercial ships and aircraft in the Arctic region?

The FAA prototyped the "NextGen" GPS navigation system in Alaska. FAA is removing much of the legacy navigation systems such as VOR/DME, NDB, ILS/Localizer systems in anticipation of deploying the GPS/Area Navigation (RNAV) system.

11C) What new satellite-based navigation systems are being planned, and what are their comparative advantages relative to current systems?

The Wide Area Augmentation System (WAAS) satellite navigation systems have wide coverage across the Arctic. The satellite systems are generally reliable and available approximately 98 to 99 percent of the time. However the bandwidth is somewhat limited and, therefore, constrains communication.

(12) Weather and Other Information Services:

12A) How effectively do broadcast and other networks support the delivery of weather monitoring alerts (including warnings, watches, and forecasts) and non-weather hazard alerts across Arctic Alaska and the pan-Arctic region, especially with regard to speed of delivery and service reliability?

Currently, there is limited support for weather monitoring and hazard alerts in the Arctic. This is due to the scarcity of weather infrastructure in the region.

12B) How do Arctic broadcasts and other information reports for weather monitoring compare to those services in other parts of Alaska?

The few Arctic installations of FAA Weather Cameras, Automatic Weather Observation Systems (AWOS), and NextGen Ground Based Transceivers (GBTs) use satellite dish infrastructure generally found in remote, off-the-road system communities. However few Weather Cams, AWOS, and GBTs are dispersed over vast Arctic geography, which creates a challenge. Very few AWOS are installed in Alaska in general and in the Arctic specifically because the infrastructure is expensive and there is no federal agency tasked with the development and ownership of these devices. Neither the FAA nor the National Weather Service "owns" the responsibility to buy, install, and operate AWOS. The limiting issue seems not to be speed of delivery or reliability of service. When an AWOS is installed at an airport, connectivity and speed appear to be of an acceptable quality. Weather information is much less available in the Arctic than in the more populated areas of the state and the populated areas of Alaska have far less weather information infrastructure than is found in the other 49 states.

(13) High Frequency Radio Communications (3–30 MHz):

How do high frequency (HF) radio systems serve Arctic Alaskan end-users and to what degree are they used especially for emergency and search and rescue communications? What are the comparative advantages and limitations of HF radio relative to other technologies, especially with regard to reliability, privacy, and degree of availability after considering seasonal and temporal variances? Which frequencies are currently used and

which ones offer the highest quality of service? What improvements have been made, or are planned, on HF radios to improve communications?
The SOA has maintained authority to operate on several public safety HF frequencies. The use of HF has been reduced and replaced with primarily satellite-based services. In general the advantage of HF is the ability to operate without any infrastructure. The limitations are the more variable propagation and increased sensitivity found in polar regions.

In closing, I appreciate the opportunity to provide information on the communications availability in the Arctic regions of our state. The Arctic region of Alaska promises continued and increasing opportunity for Alaskans. I welcome continued consultation with the SOA as the Implementation Plan moves forward because Alaskans are best able to articulate the unique challenges and potential present in their Arctic communities. Please feel free to contact me at kip.knudson@alaska.gov, or the Governor's federal Arctic Policy Advisor, Stefanie Moreland, at stefanie.moreland@alaska.gov, should you have further questions.

Sincerely,

Kip Knudson
Director of State and Federal Relations