

**ALASKA STATE LEGISLATURE  
HOUSE EDUCATION STANDING COMMITTEE**

March 24, 2017

8:05 a.m.

**MEMBERS PRESENT**

Representative Harriet Drummond, Chair  
Representative Justin Parish, Vice Chair  
Representative Zach Fansler  
Representative Ivy Spohnholz  
Representative Jennifer Johnston  
Representative Chuck Kopp  
Representative David Talerico

**MEMBERS ABSENT**

Representative Lora Reinbold (alternate)  
Representative Geran Tarr (alternate)

**OTHER LEGISLATORS PRESENT**

Representative Mike Chenault  
Representative Dean Westlake

**COMMITTEE CALENDAR**

PRESENTATION: BROADBAND

- HEARD

**PREVIOUS COMMITTEE ACTION**

No previous action to record

**WITNESS REGISTER**

TINA PIDGEON, General Counsel  
General Communication Inc.  
Anchorage, Alaska

**POSITION STATEMENT:** Responded to questions brought forward from a previous presentation to the committee on broadband usage in Alaska schools held on 2/15/17.

WILL JOHNSON, Representative  
Alaska Satellite Internet  
Fairbanks, Alaska

**POSITION STATEMENT:** Provided a PowerPoint presentation entitled, "Brief Summary of Satellite Internet," [undated].

KRISTINA WOOLSTON, Vice President for External Relations  
Quintillion  
Anchorage, Alaska

**POSITION STATEMENT:** Provided a PowerPoint presentation entitled, "Quintillion Subsea Cable System," dated 3/24/17.

PAUL BARTOS, Principal  
Star of the Northwest  
Northwest Arctic Borough School District  
Kotzebue, Alaska

**POSITION STATEMENT:** Provided a PowerPoint presentation entitled, "Star of the Northwest Magnet School," dated 3/24/17.

BRIAN ASHTON, HughesNet  
Wrangell, Alaska

**POSITION STATEMENT:** Testified and answered questions during the presentation on broadband.

MIKE COOK, Executive Vice President, Sales and Marketing  
Hughes Network Systems  
Germantown, Maryland

**POSITION STATEMENT:** Testified and answered questions during the presentation on broadband.

#### **ACTION NARRATIVE**

[8:05:34 AM](#)

**CHAIR HARRIET DRUMMOND** called the House Education Standing Committee meeting to order at 8:05 a.m. Representatives Drummond, Parish, Spohnholz, Fansler, Johnston, Kopp, and Talerico were present at the call to order.

#### **PRESENTATION: BROADBAND**

[8:06:50 AM](#)

CHAIR DRUMMOND announced that the only order of business would be a series of presentations on broadband access in Alaska, beginning with further discussion related to the previous presentation [at the meeting on 2/15/17].

[8:07:47 AM](#)

TINA PIDGEON, General Counsel, General Communication Inc. (GCI), offered to answer questions.

[8:09:00 AM](#)

The committee took a brief at-ease.

[8:09:06 AM](#)

REPRESENTATIVE KOPP recalled the Federal Communications Commission (FCC) [Connect America Fund] Alaska Plan included a financial commitment to GCI of about \$60 million per year, and asked where in rural Alaska this investment in fiber optics would be directed.

MS. PIDGEON said the funding under the umbrella of (High Cost) Universal Service has been supporting wireline services and wireless services for many years. In 2011, the FCC administration process changed to focus on the support and advancement of broadband services. Ms. Pidgeon pointed out the network is the network whether voice or broadband, and there is overlap between the services that has been supported by funding in the past; however, when FCC focused the funding initiative on broadband, it created risk to Alaska providers and changed the funding stream available to GCI. As a result, the money in the Alaska Plan that was historically being provided to Alaska was "frozen." Currently, providers must focus how funds are used in rural Alaska, without removing other service, while still expanding into others. She said FCC has established obligations providers must meet to keep their funding and avoid penalties under the Alaska Plan; for GCI, most of the funding is used to support the wireless services in rural Alaska, whether by microwave, fiber, or satellite. Further, the initial five-year commitment requires GCI to expand present [2 generation (2G)] services to either 3G or [Long-Term Evolution (LTE)], which would improve service levels for 20 percent to 30 percent of the population. Ms. Pigeon stressed the commitment requires maintaining the present level of service while increasing capabilities for a percentage of the population. Compliance also includes five-year planning for projects in the most economical way.

[8:15:51 AM](#)

CHAIR DRUMMOND surmised the original network was established to provide telephonic services.

MS. PIDGEON concurred, and added the programs were established decades ago and formalized by the Telecommunications Act of 1996. At that time, the intent was to support networks and voice telephony services, but since the advancement of networks, the Universal Service program has changed to ensure the system allows consumers to benefit from new broadband services. Under the current plan formulations, there are specific goals related to broadband that are tied to the funding.

CHAIR DRUMMOND asked, "How is the network the network?" when phonelines have different capabilities than broadband, cable, and fiber.

MS. PIDGEON explained in many ways the same fundamental infrastructure is used to carry a broadband service or data bits; in fact, when transitioning from voice to broadband, the capability of an existing network is not removed, but improved.

CHAIR DRUMMOND observed once the network is extended to a community then it can be improved with new technology.

MS. PIDGEON agreed.

CHAIR DRUMMOND asked for further information on the funding that was frozen.

MS. PIDGEON said categories of funding have been [withheld] in response to a carrier's costs or level of service; however, the funding remains dedicated to the Alaska network. For example, funding may be subject to nationwide competition, and in head to head competition with other states, Alaska might have lost funding, thus FCC "froze the funding in place" and established commitments for carriers to reach, while providing a level of support so that carriers can plan to make advances in service over a certain period of time.

CHAIR DRUMMOND concluded instead of competing with Lower 48 providers, FCC made an effort to treat Alaska as a unique market.

MS. PIDGEON said correct. In further response to Chair Drummond, she said she would provide to the committee a set of firm commitments between GCI and FCC about improvements in service, both in network and levels of performance, and the percentages of populations benefitting from improvements at the five- and ten-year periods. She advised a map of which specific communities would be affected is unavailable.

8:23:55 AM

REPRESENTATIVE PARISH noted the cost of data varies widely and asked whether commitments have been made as to the affordability of communication services.

MS. PIDGEON acknowledged the affordability issue is a continuous challenge and the ultimate goal is to ensure that users have access to broadband. For mobile broadband, GCI offers statewide plans; however, wireline plans differ, and GCI seeks to address the affordability issue and to ensure reliable service.

REPRESENTATIVE JOHNSTON questioned how this situation is similar to the challenges overcome by the [Rural Electrification Act of 1936].

MS. PIDGEON was unsure. Regarding service to challenging locations, the situation is similar as to how to ensure the delivery and maintenance of services to rural areas. She suggested upcoming technological advancements that could make a difference are on the horizon.

REPRESENTATIVE JOHNSTON commented that rural electrification and improvements to broadband services both were initiated to serve communities that [did not or] do not have significant economic capacity.

CHAIR DRUMMOND pointed out the difficulties of a network connection to rural Alaska.

REPRESENTATIVE JOHNSTON suggested the use of satellites.

8:29:06 AM

REPRESENTATIVE KOPP asked whether GCI is exploring partnerships with Quintillion.

MS. PIDGEON declined to respond to decisions regarding arrangements with a particular company, but acknowledged that avenues for expansion and partnerships are routinely assessed.

REPRESENTATIVE KOPP noted GCI receives public funding and has commitments to expand; Quintillion offers huge capacity to villages in the northwest Arctic, and GCI could benefit.

8:31:12 AM

REPRESENTATIVE FANSLER recalled previous testimony that a regulatory structure within the state is inhibiting the buildup of the networks.

MS. PIDGEON was unsure of the specific reference, and added that there are varying levels of regulatory oversight related to permitting, siting, and the ability to deploy networks, thus providers seek a timely and reasonable [regulatory] process. In further response to Representative Fansler, she said regulations can at any time be improved to provide greater certainty; from GCI's perspective there are no particular regulations that have prevented GCI's progress. She cautioned although, in general, regulations need review over time, changes can introduce additional uncertainty.

[8:34:58 AM](#)

REPRESENTATIVE PARISH asked for a further description of the options available to GCI in a partnership with Quintillion.

MS. PIDGEON said network providers can arrange to "swap capacity."

REPRESENTATIVE PARISH observed electrical utilities are required to share capacity and asked whether broadband utilities do so.

MS. PIDGEON said there are different practices and standards of law that apply, but they may differ from that of electrical utilities.

[8:36:46 AM](#)

The committee took a brief at-ease.

[8:37:48 AM](#)

WILL JOHNSON, Representative, Alaska Satellite Internet, said he is a 30-year resident of Alaska. Mr. Johnson said the Jupiter II satellite was launched in December, [2016] and is in a successful final orbit. He provided historical background information on satellites, beginning in 1957 with the launches of Sputnik 1 and Sputnik 2 by Russia. He observed the first rockets and satellites were small (slides 1-3).

[8:42:42 AM](#)

The committee took a brief at ease.

8:43:43 AM

MR. JOHNSON said the U.S. unsuccessfully attempted to launch the Vanguard TV3, weighing only three pounds. On 3/17/58, a U.S. Vanguard satellite weighing 3.2 pounds was launched successfully and remains in orbit (slide 4). He provided the following definitions used to describe satellites (slide 5):

- Low Earth Orbit (LEO); 100-1,240 miles up
- Medium Earth Orbit (MEO); 1,240 miles up to below GEO
- Geosynchronous Orbit (GEO); 22,300 miles up
- Highly Elliptical Orbit (HON)

MR. JOHNSON directed attention to Iridium satellite phones that were first made possible by a 64 satellite [constellation] from Motorola. One satellite has been destroyed by a midair collision. The satellite phones provide text and phone, have international numbers, and relay signals from ground to satellite and then to the ground station. He described the cost and availability (slide 6).

8:48:35 AM

MR. JOHNSON said the next satellite for phone use in Alaska was provided by the Globalstar [constellation], which is currently available and provides text, voicemail, and Internet, and relays from ground to satellite and to a ground station. He described the cost and availability (slide 7). Both Iridium and Globalstar phones utilize LEO satellites. The GEO Inmarsat satellite phones provide clear audio, do not work near the North Pole or South Pole, are very expensive, and are not commonly used in Alaska (slide 8). He explained Globalstar then produced the Spot locating device for application in Alaska. The Spot devices can be used to locate someone in an emergency, can establish one-way communication, and are inexpensive (slide 9). Globalstar also has an asset tracking device available called Trace.

8:52:33 AM

CHAIR DRUMMOND asked for the range of the devices.

MR. JOHNSON explained the satellites are high enough to work very well in Anchorage. Spidertracks were developed for the aviation industry, provide text, global coverage, and are more

expensive (slide 11). A portable device for two-way communication is inReach, which provides text and email, emergency locating, and is relatively inexpensive (slide 12).

MR. JOHNSON informed the committee it is very challenging to provide satellite services in Alaska. Challenges to providing service include: logistics for shipping; large land mass; economics; FCC requirement for certified installers; ground movement, wind, and cold temperatures; environmental conditions; off grid power situations that are unstable; low look angles from satellites that are located at the equator; the O3B network is only available in the middle latitudes; TV dealers bundle with satellite Internet (slide 13).

[8:58:40 AM](#)

MR. JOHNSON reported Starband was one of the first satellite networks for consumers in Alaska but is no longer available, however, several of its antennas have been repurposed for other satellite services (slide 14). With the exception of the Aleutian Islands and the Pribilof Islands, available today in Alaska is the HughesNet Gen2. The HughesNet Gen2 was the first "two-way," and the satellite returns the signal to the Internet. He said the satellite is a Horizons 1 GEO satellite that uses a reflector and provided more information as to cost and availability (slide 15). Mr. Johnson advised consumers seek unlimited access over speed. Slide 16 was a map depicting the coverage of the Horizons 1 satellite, and he advised for a large part of Alaska, the Horizons 1 is "all we have." Another consumer satellite for Internet access in Alaska is Exede, and the characteristics include: high and in a good location for Alaska; band of coverage from Prince William Sound to Kotzebue; good performance, relatively; price range from \$60-\$150 per month; speed increase expected; easy to install and service, but a certified installer is required due to the possibility of damage to the satellite; .74 meter antennas work in the beam and larger antennas work outside the beam (slide 17). Slide 18 was a map that depicted the Exede spot beam.

[9:07:00 AM](#)

MR. JOHNSON continued to the HughesNet Gen5 satellite which is the most powerful broadband satellite launched to date, and he provided further information on pricing and specifications (slide 19). Slides 20-22 depicted Hughes Jupiter 1 and Jupiter 2 spot beams. For schools and libraries, Ku band Enterprise Services are intended for larger entities where cable is not

available; specialized options that are not available through consumer services are also possible (slide 23). Enterprise Service providers include: Hughes HX, Switch, Galaxy, iDirect, Exede Business, Starband, and Network Innovations (slide 24). Innovations coming in the future to Alaska include new types of antennas, and LEO and GEO satellites working together to facilitate low latency applications, so every customer will have the benefits of two satellites (slide 25).

[9:11:16 AM](#)

REPRESENTATIVE SPOHNHOLZ asked Mr. Johnson to clarify low latency.

MR. JOHNSON explained there is a time delay when data travels through space and returns to earth; the time delay is latency, which is affected by the speed of the connection: high latency and low speed creates a poor connection, and the roundtrip time is approximately one-half second. Mr. Johnson turned attention to concerns about whether low altitude satellites work and pointed out they already service satellite phones that currently carry data and voice. Many more satellites will be needed, and there are big companies with "big money" interested in providing satellite coverage. He expressed confidence that as early as 2018, satellites will be in place. Future satellites will be mass-produced and inexpensive; polar orbiting satellites could possibly launch from Alaska (slide 25). Slides 26 and 27 were images of antennas. Slide 28 was a list of LEO satellite providers.

[9:15:44 AM](#)

KRISTINA WOOLSTON, Vice President, External Relations, Quintillion, provided brief personal background. She informed the committee Quintillion is headquartered in Anchorage, is a privately funded company, and its project is privately funded by investors including Alaska investors such as Arctic Slope Regional Corporation. Quintillion is building and will operate a multi-phase fiber optic cable network that will begin in Alaska and subsequently connect Alaska with Asia, Arctic Canada, and Europe. Quintillion will sell wholesale capacity on its system that will encourage competition and participation by multiple telecom service providers. Capacity will be delivered at 50-90 percent price reductions - when compared to microwave and satellite - and service will begin in and around Alaska in 2017 (slide 2). Slide 3 was a map which showed the three phases of expansion: Phase 1 is almost complete; Phase 2 will expand

the network from Nome to Asia; Phase 3 will expand from Prudhoe Bay through the Northwest Passage to Europe. She pointed out each phase is financially independent and viable, and the system is designed as a trunk and branch configuration. Slide 4 provided a view of the Alaska system, and she explained a trunk and branch configuration means each branch moves into a community; for example, routes into Nome and Kotzebue are completely independent of other branches, unlike a "daisy chain" configuration. Phase 1 is anchored by a system from Fairbanks to Prudhoe Bay, and in 2016 most of the work was completed. Ms. Woolston stated this is the beginning of the Quintillion system in Alaska and there are plans for expansion.

[9:20:38 AM](#)

MS. WOOLSTON turned attention to pricing and noted the challenges of bringing fiber optic cable (fiber) to certain areas; however, fiber is the best backhaul [transporting data to a distribution point] option because it has unlimited capacity. The Quintillion system is designed for 10,000,000 megabits per second (Mbps) per fiber pair, with the ability to triple capacity. The cost of construction is higher, particularly in Arctic regions, but due to the design and longevity of the system, the cost of operation and maintenance is lower and drives down the total cost of fiber. In addition, the system is complementary with existing communications infrastructure in rural Alaska (slide 6). Ms. Woolston said the benefits and applications for fiber include: education; health care; government; economic development; emergency response; public safety; national strategy (slide 7).

[9:23:27 AM](#)

MS. WOOLSTON informed the committee the investors in the project directed Quintillion to build and operate the system, so Quintillion acquired the assets of Arctic Fibre for the construction phases; design and installation take about 4.5 years. Construction and installation into [Utqiagvik], Wainwright, Point Hope, Kotzebue, and Nome is complete, except for a small segment, and the system will be monitored over the winter for risk factors (slide 9). As part of risk-mitigation, she described how cable landings are bored and drilled, beginning at the shore, and the fiber is buried in conduit to minimize shoreline disruption to the communities. The cable is made of high quality glass and is protected by coating and armoring. Many local companies have been contracted to install the system such as New Horizons Telecom, Inc., and others.

Alcatel-Lucent Submarine was chosen to design, build, and construct the subsea system due to its success with repeaters that mitigate latency (slide 10). Slide 11 was a diagram of the fiber to illustrate how it is constructed.

9:27:00 AM

MS. WOOLSTON addressed the time and planning required for the project. Two years of marine surveys with geotechnical and geophysical studies have revealed risk factors along the cable route such as gold dredges in Nome and ice scouring off the Arctic coastline. Also, a significant amount of time was invested in permitting and easements, and Quintillion was the first to complete this process (slide 12). Slide 13 listed typical risks and mitigation plans. Although human interaction is the biggest risk to subsea cables elsewhere, subsea ice gouging is the greatest risk in Alaska. For example, off the North Slope ice breaks and gouges the seabed; after mapping historical gouging, Quintillion designed its system with a cable buried deeper than any historical ice gouging. Also, the system has dual redundant network equipment that can be repaired if necessary. Ms. Woolston provided slides of ships laying cable and digging a cable trench (slides 14 and 15). Slides 16 and 17 showed tug boats moving ice during cable installation. Slides 18 and 19 showed cable-laying ships.

9:31:20 AM

REPRESENTATIVE FANSLER surmised Quintillion will provide infrastructure, and then sell or lease capacity to providers.

MS. WOOLSTON said correct. Quintillion does not provide telecommunication services to consumers.

REPRESENTATIVE FANSLER asked at what point the cable system would reach maximum capacity.

MS. WOOLSTON said Quintillion believes there is unlimited capacity for the Alaska market.

REPRESENTATIVE FANSLER commented that there is enthusiasm for the project with hope that further expansion into Western Alaska is planned.

REPRESENTATIVE SPOHNHOLZ asked in what quarter of 2017 Phase 1 will come online.

MS. WOOLSTON said Phase 1 is expected to be operational in the 4th quarter [of 2017]. Construction will begin in August, followed by confidence testing, and finally service providers would have access.

[9:35:33 AM](#)

PAUL BARTOS, Principal, Star of the Northwest Magnet School, Northwest Arctic Borough School District, provided a PowerPoint presentation entitled, "Star of the Northwest Magnet School."

The committee took an at-ease from 9:35 a.m. to 9:36 a.m.

[9:36:55 AM](#)

MR. BARTOS informed the committee the Star of the Northwest school (Star) is located above the Arctic Circle in Kotzebue, which is the hub community for the Northwest Alaska region (slide 2). In its second year of operation, Star is a fulltime boarding school for Alaska high school students primarily in eleventh and twelfth grades (slide 3). The students at Star are supported by the University of Alaska (UA) and - through the UA system - are provided dual enrollment. Star students can also take courses through the Alaska Technical Center and Kotzebue High School. He said one of the ways Star utilizes technology is by streaming important basketball games through its home page to all villages and communities in the region. Further, Star school is supported by the Northwest Arctic Borough School District, which provides video teleconferenced instruction from teachers throughout the district.

MR. BARTOS continued to explain Star offers its students fulltime enrollment and noted nine of its twelve graduates are continuing to higher education at UA Fairbanks and UA Anchorage. Also offered to students are ReadySTAR programs that are two-week intensive courses which provide exposure and focus on four topics, and he gave an example of the school's use of technology in support of a hearing-impaired student. Mr. Bartos advised the dorm at the school is utilized year around; during the summer the Alaska Native Science and Engineering Program (ANCEP) will have a program in Kotzebue for sixth-grade students, and also teachers new to the region will attend camp there. He further explained the structure of Star school offers students four pillars [of high-paying career choices]: education, process technology, culinary arts, and healthcare (slide 4). A partnership with the U.S. Coast Guard (USCG) provides opportunities for students to explore unique job placements.

Star also offers certifications, such as safe food handler, that can be used to obtain summer employment. Mr. Bartos stressed the component of relevancy: motivation for students to attend school and reap the rewards of their work (slides 5-6). For example, the education pillar is offered to address the lack of teachers in the state. He related fifteen Star students are participating in a competition in Anchorage using technology. The Northwest Arctic Borough School District (NWABSD) will be offering three video conferencing classes statewide this fall, and Mr. Bartos advised Star seeks to expose students to the latest curriculum and the latest technology with customized schedules; in fact, two students from Kivalina have completed a millwright program and will be employed at the Red Dog mine (slide 6).

[9:44:08 AM](#)

MR. BARTOS advised Star is fortunate to have industry-qualified certificated instructors working with and supporting its students. He turned to Internet technology and related PowerSchool is Star's interface for day-to-day operations such as attendance and academics, and the system would not work efficiently if there were latency in the connection. Students use the Canvas learning systems, which can be accessed in the dorm, thus learning continues even when students are not in the classroom (slide 7). Further, the school provides the same Internet services as urban districts with .015 percent of Internet strength by filtering firewalls. Students are currently provided 69 kilobits per second (Kbps) and the school seeks to provide 100 Kbps; to reach this goal NWABSD would accrue additional costs of \$164,000 per month (slide 7). He noted the school has grown from zero students and applications in fiscal year 2015 (FY 15), to twenty applications and twenty-five fulltime students in FY 17; Mr. Bartos stated his pride in Star school and its programs (slide 8).

REPRESENTATIVE PARISH pointed out Kotzebue will be served by the Quintillion fiber network, and asked how the new connection would affect the schools Internet speed and cost.

MR. BARTOS advised the Kotzebue Internet connection is currently slower because Kotzebue has more students than other areas. The new connection will provide equal Internet usage for Star students.

REPRESENTATIVE KOPP asked if there could be additional federal communications partnership opportunities should USCG expand its operations in Kotzebue.

MR. BARTOS said Star school seeks to grow and add a fifth pillar for career opportunities in transportation, both maritime and aviation that would utilize a partnership with USCG.

REPRESENTATIVE JOHNSTON inquired as to the possibility that Star school may consolidate with Chukchi College.

MR. BARTOS deferred the question to his supervisor.

CHAIR DRUMMOND returned attention to slide 7 which indicated \$164,000 per month is needed to bring NWABSD up to the FCC 2014 short term goal. She asked for the school's present cost [for Internet access].

MR. BARTOS offered to provide the requested information.

[9:51:30 AM](#)

BRIAN ASHTON, HughesNet, informed the committee he helped introduce the HughesNet company into Alaska about 10 years ago. He advised a new Internet satellite just coming online is the most powerful in the world, although there are many areas in rural Alaska the satellite will not reach because of its position. However, HughesNet plans on launching additional satellites about every three years and for 20 percent of the funding FCC has for Alaska, HughesNet could launch a new satellite as powerful as Jupiter II to cover all Alaska, and exceed FCC's goal. He stressed legislators should ask FCC to update its Alaska Plan, look at all the options available, and find the best infrastructure design for Alaska at the best price.

REPRESENTATIVE JOHNSTON asked whether Mr. Ashton is aware of low orbital satellite technology usage related to social media.

MR. ASHTON said yes.

[Mr. Aston repeated comments for the benefit of upcoming speakers.]

[9:55:53 AM](#)

REPRESENTATIVE JOHNSTON restated her question, suggesting that Alaska could participate in pilot projects since there are fewer satellites in place in the Northern Hemisphere.

[9:56:19 AM](#)

MIKE COOK, Executive Vice President, Sales and Marketing, Hughes Network Systems, informed the committee Hughes Network Systems (Hughes) is the operator of the HughesNet satellite Internet service which is available across the U.S. and elsewhere in the world. HughesNet has about one million subscribers and provides direct Internet access to homes. Currently, Hughes is activating HughesNet Gen5 service using an Echostar 19 satellite launched December, 2016. The satellite is the biggest data communications satellite in the world, and he described the satellite's capabilities that will result in service plans for Alaska that will meet FCC broadband specifications.

MR. COOK, in response to Representative Johnston, referred to lower orbiting systems, and advised Hughes is building infrastructure for the OneWeb system which is a system of hundreds to thousands of constantly orbiting satellites that work together to always keep subscribers' devices within range. He further explained lower orbiting systems provide coverage for the entire globe, and an additional benefit to Alaska from the OneWeb system is that the satellites are in polar orbits. Additional benefits of lower orbiting systems are greater coverage and less latency, however, the capacity of each LEO satellite is not as great as that of a larger satellite. Mr. Cook said the OneWeb system has funding and will use the newest technology in its system, which is expected be operational before 2021.

[10:02:15 AM](#)

MR. COOK continued, noting the current state of communication satellite technology also provides for large satellites with 300 gigabits per second capacity. Future technology will make the system much more capable than the service plans are offering, and the capabilities are expected to increase further within 5 years. Service can be delivered directly to consumers' homes or can provide backhaul links to local areas that are not connected by cable.

REPRESENTATIVE SPOHNHOLZ asked how the cost of launching a new satellite compares with other broadband services, and how the speed of the data compares.

MR. COOK responded satellites come in various sizes; a LEO satellite is relatively inexpensive, but many are needed to provide service. In terms of order of magnitude, a satellite that cost \$500 million is expected to operate for about 15 years and will deliver about 220 gigabits per second, or roughly \$200 million per gigabit. However, a satellite for Alaska could be built to concentrate the available capacity and be the right size, capacity, and cost, or an Alaska entity could acquire a "hosted payload" on another company's satellite. Mr. Cook said there are several options to deliver the desired service at an acceptable cost.

[10:08:55 AM](#)

REPRESENTATIVE PARISH asked whether the typical life span of the Echostar 19 is about 15 years.

MR. COOK said yes, for a geostationary satellite; however, the orbit decays more quickly for lower orbit satellite systems. In further response to Representative Parish, he clarified a satellite should be launched as close to the equator as possible for optimal launch characteristics, although, a satellite could be designed to best meet the needs of the market in Alaska.

[10:11:25 AM](#)

#### **ADJOURNMENT**

There being no further business before the committee, the House Education Standing Committee meeting was adjourned at 10:11 a.m.