AK SENATE BROADBAND PRESENTATION

- *Rural Alaska Today*
- *PDI Projects*
- *Challenges & Solutions*

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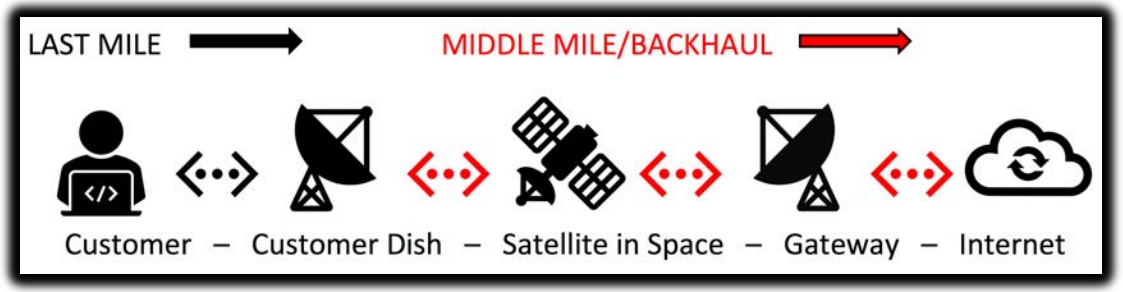
April 2021 | Pacific Dataport, Inc. | Anchorage, Alaska

BROADBAND IN RURAL ALASKA TODAY - FUNDING



- Three areas of funding:
  - Middle mile infrastructure (CapEx) – satellite, fiber or microwave
  - Last mile infrastructure (CapEx) – wireless broadband, coax cable or fiber
  - Last mile (user) subsidies (OpEx)
- Alaska telecoms rely on the Federal government for **~$380M/year** (total) in telecom and broadband subsidies
  - Alaska Plan USF Legacy Funding (FCC) – ~$150M/year
  - ACS USF Legacy Funding (FCC) – ~$20M/year
  - E-Rate Funds (FCC) – ~$90M/year
  - Rural Health Care Funds (USDA) – ~$120M/year
- ReConnect Grants (middle and last mile infrastructure) (USDA) – Varies: $18.8M in 2019; and $57.8M in 2020.

BROADBAND IN RURAL ALASKA TODAY - COST

- Three options for middle mile infrastructure in Alaska:
  - Microwave - ~$100k per mile – Useful life ~25 years
  - Terrestrial Fiber - ~$100k per mile – Useful life ~25 years
  - Submarine Fiber - ~$125k per mile – Useful Life ~25 years
- Middle mile infrastructure buildout is very expensive
- The USDA and FCC insist on deploying expensive fiber and microwave middle mile, which are not cost-effective for rural AK
- Expensive middle mile leads to expensive internet/broadband

PROJECT CAPITAL COST PER HOUSEHOLD COMPARISON			
PROJECT	COST PER HOUSEHOLD	TOTAL HOUSEHOLDS	IN SERVICE
Aurora Network	$1,274	156,989	2021/2023
Terra Network	$22,222	11,250	2010
AU-Aleutians Network	$31,182	1,860	2023
Quintillion Network	$69,079	3,619	2018
Yakutat Network	$92,592	270	2022

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MIDDLE MILE (BACKHAUL) & CONSUMER PRICING

MIDDLE MILE COVERAGE/PRICE/AVAILABILITY IN ALASKA (Q2 2020)				
Company	**AK Coverage**	**Cost per Mbps**	**Available Capacity (Mbps)***	**Type**
Aurora 4A	100%	<$500	~7,500	HTS
Aurora IV	100%	<$500	~100,000	VHTS
A	100%	$4,201	14	HTS
B	100%	$1,575	11.6	Ku
C	30%	$875	70	Ku
D	25%	$3,500	240**	HTS
E	20%	$3,500	0	HTS
TERRA**	6%	up to $6,00	0	Microwave

WITH THE AURORA NETWORK, OPERATORS PAY <$500 PER MBPS STATEWIDE

* Mbps to MHz conversion is 2:1; ** Retreived from: https://www.gci.com/-/media/files/gci/regulatory/20190517gciterrapostingeffective.pdf?mod=20190523233731 (1 yr Hub Port $864/1 yr Edge Port $7,344)

WITH THE AURORA NETWORK, CONSUMER PRICE IS ~$.66 PER GB STATEWIDE

CONSUMER PRICE PER GB & SPEED IN ALASKA		
Location	**Cost per GB**	**Down/Up (Mbps)**
Anchorage	$0.24	100X10
Aurora IV - Statewide	$0.66	100X10
Bethel	$3.15	10X2
Dutch Harbor	$5.95	4X1
Ft. Yukon	$6.55	1X0.5
Elim	$11.43	1X0.25
Savoonga	$11.50	1X0.25
McGrath	$16.54	1X0.25
Arctic Village	$16.54	1X0.25
Adak	$22.22	0.5X0.5

BROADBAND IN RURAL ALASKA TODAY - FACTS

- 36.3% of rural Alaskans have no wired broadband access*
- The only “plan” is the 2014 and 2019 Alaska Broadband Plans
  - Created to qualify the telecoms for more subsidies
  - No organization or authority is following these plans or monitoring suggested benchmarks
- There is no silver bullet in the room. Alaska must develop its own Alaska solution.
- Only MTA has built a middle mile connection in/out of Alaska in the last 10 years
- Two of four middle mile submarine fibers connecting Alaska were built in 1999, making them about 22 years old
- GCI continues to expand the Terra Network, adding more customers without adding more capacity
- Quintillion, with ASTAC and GCI, recently announced “affordable” broadband to North Slope at ~$499.99/month

** Source: 2021 FCC Broadband Report, Page 57, https://docs.fcc.gov/public/attachments/FCC-21-18A1.pdf*

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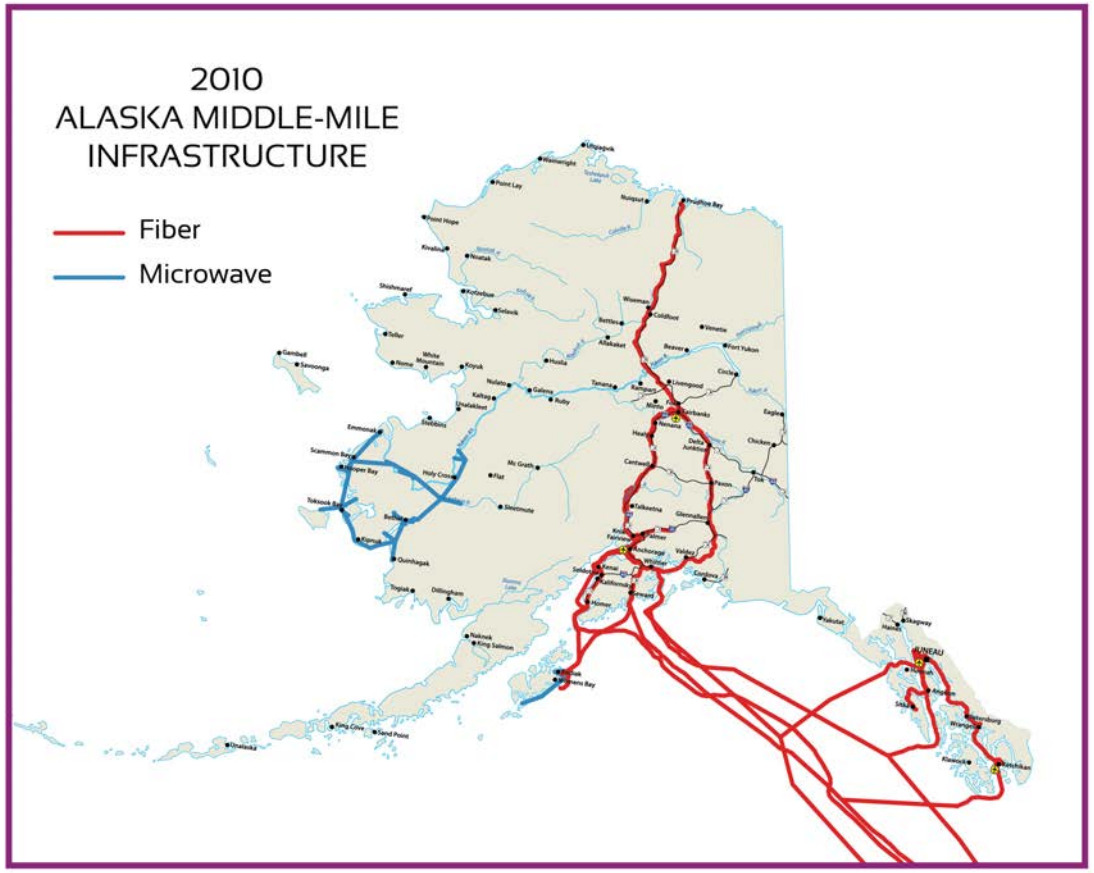
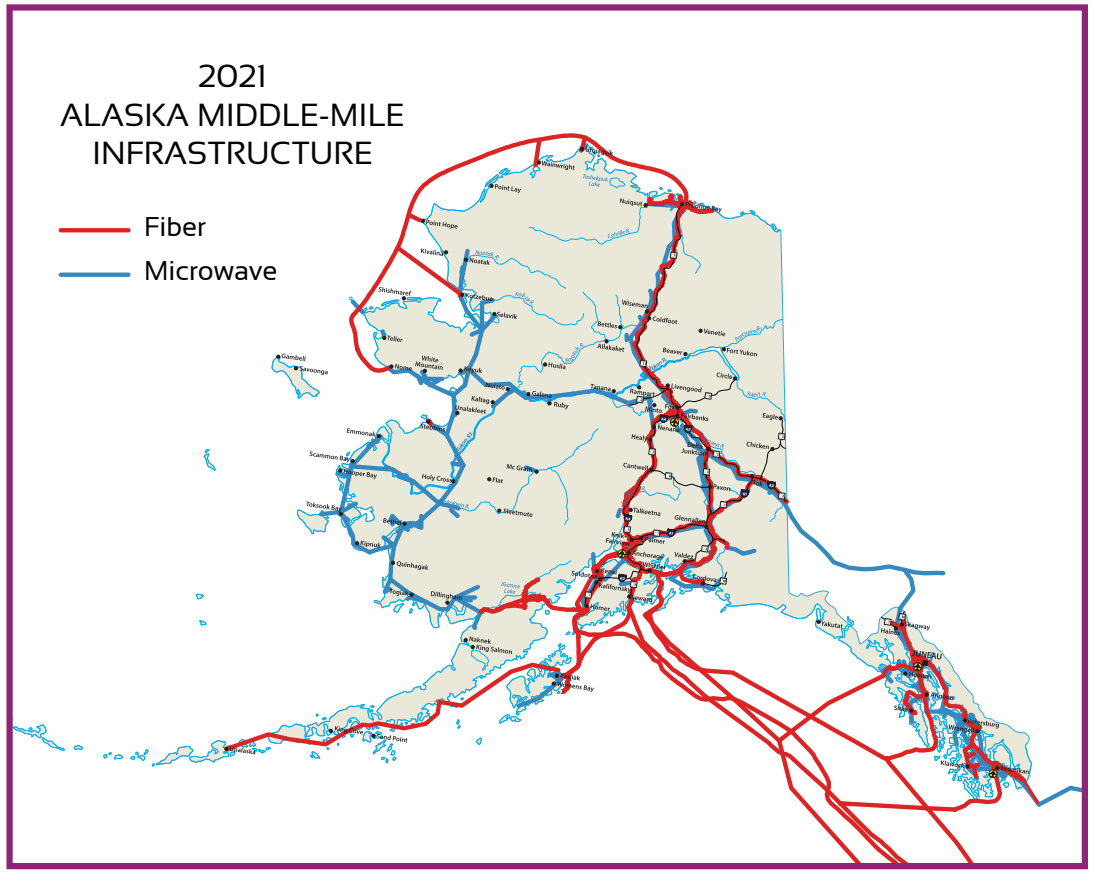
BROADBAND IN RURAL ALASKA TODAY - MAPS



Credit: Pacific Dataport, Inc.



Credit: Pacific Dataport, Inc.

WHAT PACIFIC DATAPORT IS DOING TO HELP

Launch TWO new networks and bring affordable solution for schools, health clinics, businesses & residents

- Aurora Project – Launch Q4 2021
  - 100+ Gbps of New Middle Mile Infrastructure
  - Two NEW technology GEO HTS/VHTS satellites will cover 100% of Alaska
  - Will lower the retail price of 25X3 (or faster) broadband in rural Alaska to $99 or less
  - Raised $50M for the smaller, first satellite, Raising $200M+ for the larger, second satellite
- OneWeb Project – Operational Q3 2021
  - LEO constellation of 648 satellites will cover 100% of the world, starting with Alaska
  - Owned by U.K. Gov. & Bharti Global
  - PDI has been working for several years to bring OneWeb technology to Alaska
- Microcom‘s Talkeetna Alaska Teleport – Currently Operational
  - For LEO and GEO HTS middle mile providers, including OneWeb
- Alaska Broadband Association
  - Started by PDI to notify rural Alaskans when broadband comes to their community
  - Purpose: Advocate for Alaskans and broadband policy improvement in Alaska
- Pacific Dataport and Microcom are also working with Tribes to deploy their last mile 2.5 GHz Tribal spectrum WISP (wireless Internet service provider) Systems
  - Many communities need a satellite middle mile connection to the Internet

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The OneWeb Network

- 648 LEO Satellites
- Statewide Coverage
- Schools, Health Clinics & Businesses
- In Service October 2021

The Aurora Network

- Both Satellites Have Statewide Coverage
- Serving Residents & Tribal Organizations

Phase I: Aurora 4A – GEO HTS

- ~7.5 Gbps
- Operational Q4 2021

Phase 2: Aurora IV – GEO VHTS

- 100+ Gbps
- Operational ~2023

OneWeb

A4A

Aurora

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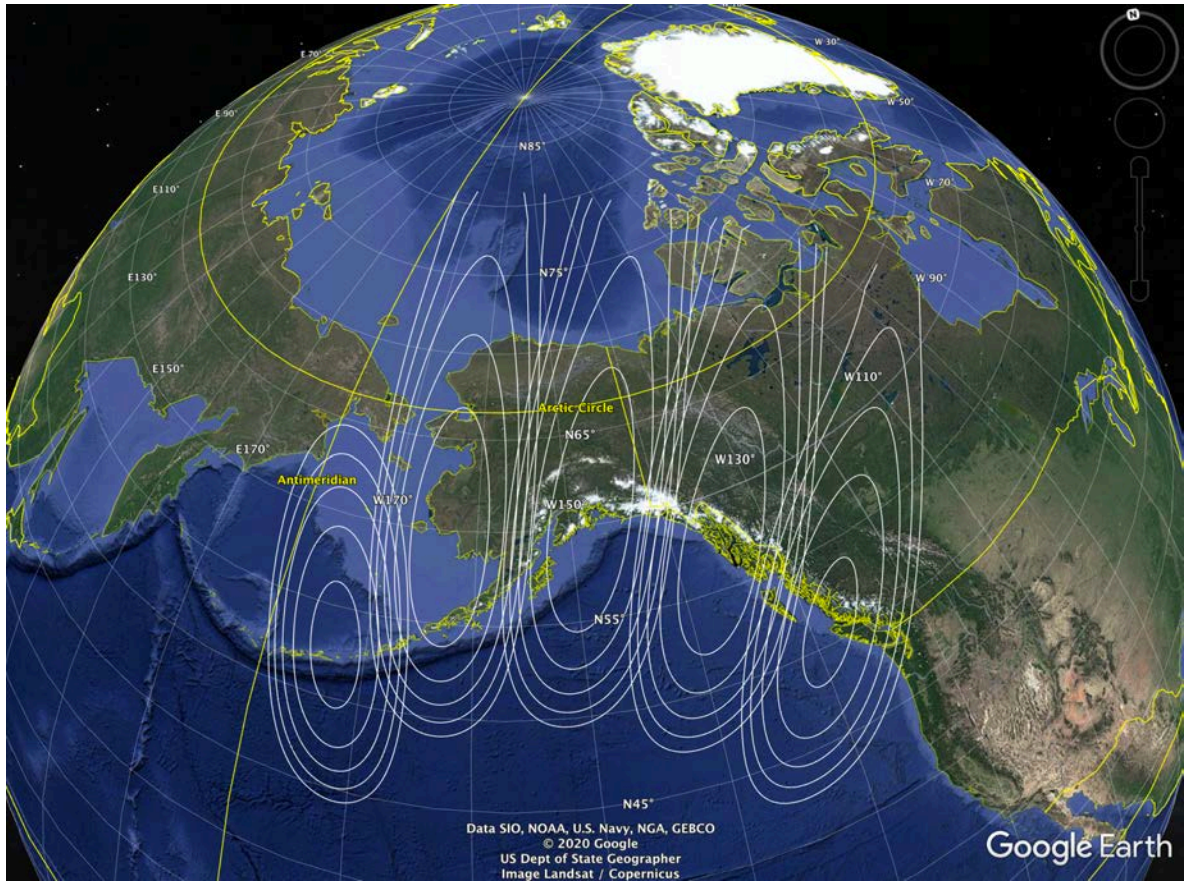

Aurora Project Satellite Capacity Comparison

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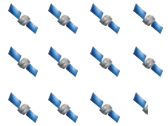
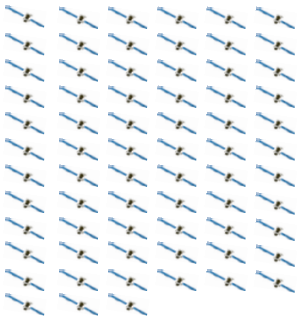
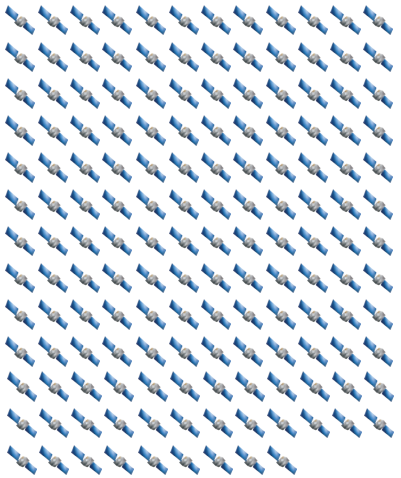
(1) Aurora 4A = **(5.2) Ku Satellites** = **(11.5) C Band Satellites**



(1) Aurora IV = **(69) Ku Satellites** = **(153) C Band Satellites**





Comparison is based on the following technical capacity parameters.
Aurora 4A = 7.5 Gbps (7,500 Mbps) • Aurora IV = 100 Gbps (100,000 Mbps) • Ku Satellite = 1.448 Gbps (1,448 Mbps) • C Band Satellite = .650 Gbps (650 Mbps).

Microcom™
Communications Solutions

Talkeetna Alaska Teleport

- 90 Acre Site
- Able to host multiple gateway clients
- First client is OneWeb
- Statewide reach
- Redundant fiber and power
- Space for a data center, data processing and Internet exchange

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BROADBAND CHALLENGES

- No State broadband organization to help develop state and Federal policy. To date, federal policy is predominately being made by a trade association that controls the vast preponderance of federal subsidies, grants, or loans coming to state for broadband. Alaska residents are not represented in this process.
- 90% of federal funding for telecommunication/broadband comes in the form of subsidies, not infrastructure.
- Building out fiber and microwave middle mile infrastructure in Alaska is expensive and time consuming due to permitting.
- The USDA and FCC loan and grant programs specify engineering outcomes (not functional outcomes) and focus exclusively on last mile.
- The State of Alaska and its residents have no say in where Federal broadband funding goes.
- The current FCC Alaska Plan legacy funding program discourages competition, eliminates market entry and disincentivizes expansion to new areas.
- One major telecom receives more than 50% of all telecom and broadband subsidies coming to Alaska, resulting in a government-sponsored near-monopoly.
- Alaska's two largest telecoms are now owned by Outside investing firms. Guaranteed subsidies and hundreds of millions per year in profit makes them valuable as an investment.
- Alaska must stop hoping someone from outside the state will provide a broadband "silver bullet" or expect Federal agencies to organize multiple federal funding programs.
- There is not one single idea or concept that will solve the Alaska Problem. The solution must be multi-faceted and organized at state level.

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BROADBAND SOLUTIONS

- Support the only HYBRID satellite project currently developing affordable middle mile infrastructure that will deliver reliable broadband to rural Alaska for $99 or less (Aurora Project)
- Use GEO HTS satellite middle mile to “fill the gaps” as 2014 and 2019 Alaska Broadband Plans suggest
- Require 20% of ALL Federal broadband funds coming to Alaska go to new middle mile infrastructure
- Allow up to three middle mile providers access to Federal funds to encourage competition
- Require these agency heads to visit Alaska and see how remote communities
- Require 25X3 deployment to 100% of Alaska BEFORE requiring any faster broadband
- Use satellite as a redundant source (or backup) where fiber is currently deployed as the 2014 and 2019 Alaska Broadband Plans suggest
- Remove ALL barriers that may prevent market entry or favor terrestrial technology (FCC, USDA, NTIA)
- Allow broadband providers access to ALL Federal funds (regardless of ETC status)
- Require federal broadband funding given to the State to provide grants or loans to middle mile programs meet all four of these economic criteria:
  - Provides the greatest breadth of coverage of Alaska
  - Provides middle mile capacity at the lowest cost per unit
  - Can be available within 2-3 years
  - Has a long-term plan that is sustainable and plans for growth
- Use FCC, USDA, NTIA broadband funds to deploy 2.5 GHz Tribal spectrum last mile WISP systems in rural Alaska

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BROADBAND SOLUTIONS

- Establish an official, authoritative Alaska Broadband Office:
  - Housed in the SOA Department of Commerce, DCRA or Denali Commission
  - Must be a politically neutral and independent office, without exposure to undue influence
  - Require broadband provider reporting to The Office
- Establish “build once” policy along all new roads and public right of ways: Allow providers access to lay their own fiber.
- Stop accepting a lower benchmark for the definition of broadband in Alaska. This should be 25X3 or what the FCC defines as broadband in the Lower 48.
- Utilize satellite middle mile to implement hybrid systems and lower telecom middle mile costs, therefore making middle mile much more affordable. The Aurora GEO HTS and OneWeb LEO is the perfect example of this new method.
- Change statute to give AIDEA the ability fund satellite broadband infrastructure projects.
  - Definition of “project” and project location limitations restrict AIDEA’s ability to support this kind of project

SUGGESTED FCC ALASKA PLAN MODIFICATIONS (Write a declaration to the Alaska Delegation and the FCC):

- Immediately allow new members to join and access Alaska Plan funds, regardless of non-ETC or broadband-only provider status
- Provide funding for middle mile infrastructure to meet the needs of Alaskans and Alaska telecoms
- Establish middle mile pricing benchmarks as the Alaska Plan requires
- Require all members to access new sources of lower-cost middle mile, regardless of latency as the Alaska Plan requires
- Provide a comprehensive report on what the first $750M delivered: new infrastructure, pricing, speeds and number of new broadband customers as the Alaska Plan requires

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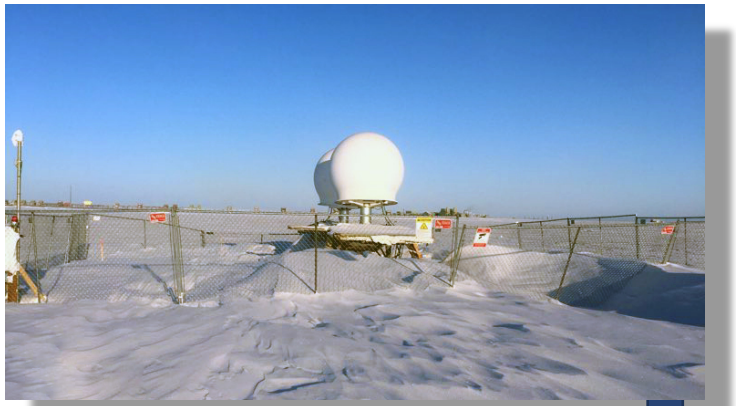
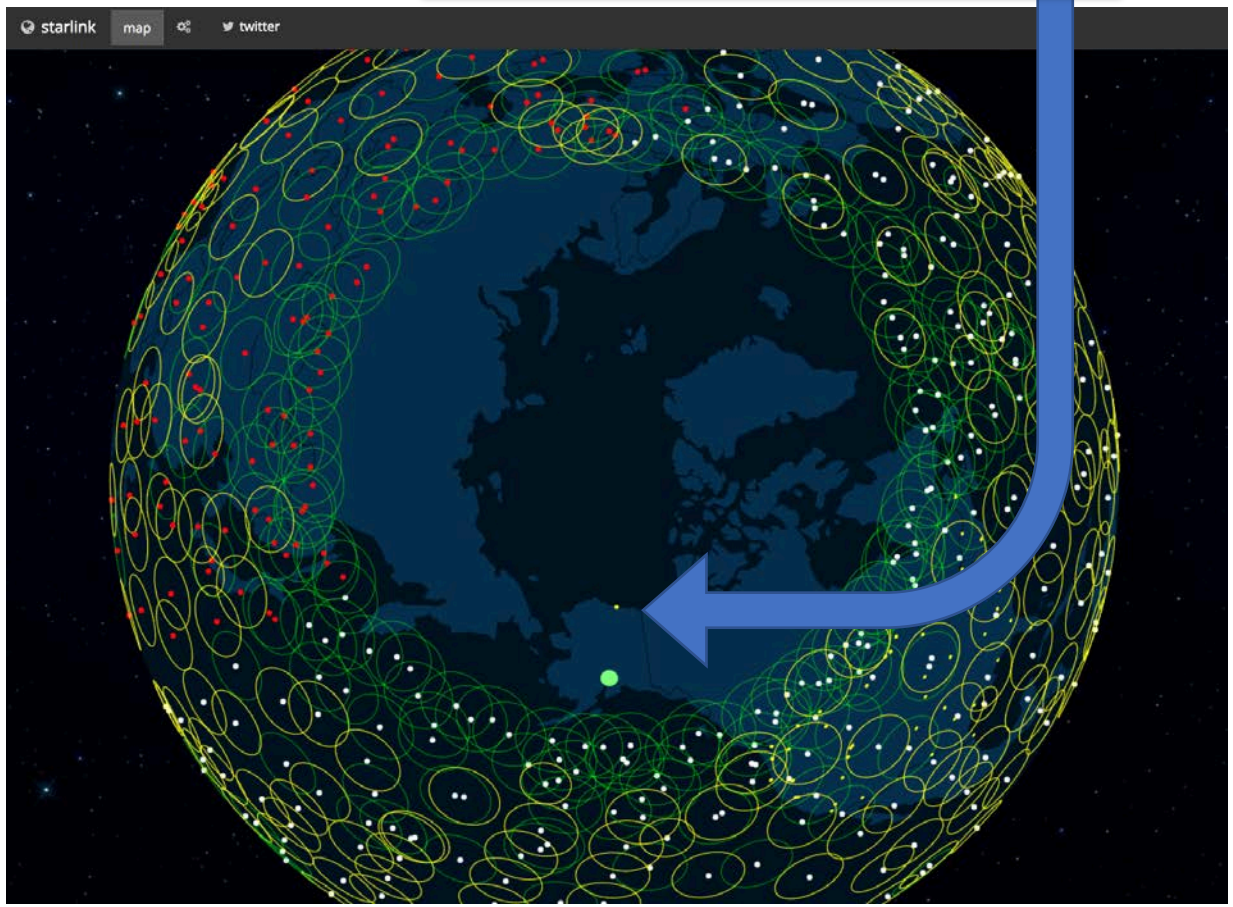
STARLINK SYSTEM ARCTIC COVERAGE



- Currently NO Ability to Cover Alaska
- No announced plan to offer service to all of Alaska (covering one area is insufficient)
- Launched 1,000 of 4,400 satellites
- Launched 10 experimental satellites in polar orbit (needed to serve AK) and a small gateway
- Still developing cost-efficient laser interconnectivity
- Will need to build and launch 500-1,000 into polar orbit AFTER getting FCC permission
- Still navigating orbital debris and 12 GHz spectrum sharing challenges



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LEADERS VOICE THEIR CONCERNS

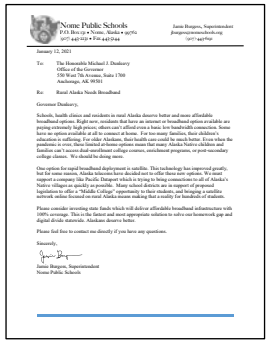
"A cash economy and high-speed internet has changed the way we live, work, and socialize. While many rural Alaskans enjoy the advantages of urban living, it is easy to see in an emergency, like the one we currently and collectively face, those privileges, sometimes life-saving, do not benefit Alaskans and rural Americans equitably…. The cost of 6Mbps download residential service with a 40GB monthly data cap in Bethel is $165/month and in Kotzebue $150/month. In Dillingham the cost is $165/month for 6Mbps download and 100GB data cap. ***This makes it cost-prohibitive for the average family in rural Alaska to purchase high-speed Internet. That can leave 82 percent of Alaskan communities without an affordable option to provide distance education to children or the option to telework****."* Robert Beans, Chair – Andrew Guy, President/CEO at Calista Corporation – March 20, 2020

"SWAMC recognizes the great value of a project like PDI's, given the strong need for broadband access is critical to enhance economic development and support ongoing educational efforts as well as other business opportunities in our region. Much of our region will not see this occur without the Aurora HTS system as they are not, nor will they be, served by the GCI undersea cable project that will connect 7 of our 55 communities to the critically needed service. ***There is no one size fits all solution to Alaska's broadband needs, and the PDI project is clearly the answer to much of our region and the State****."* Shirley Marquardt, Executive Director at SWAMC – January 10, 2021

*"****We're looking for solutions to deal with the needs of the customers we have today and we really feel an urgency to get to solutions, because they can't wait. And we can't wait because C-Band infrastructure is going to dissolve****."* Greg Chapados, President and COO at GCI Liberty (2020 AFN Annual Convention) – October 16, 2020


Frank H. Murkowski


Northwest Arctic Borough


Nome Public Schools


OptimERA Inc.


SWAMC Southwest Alaska Municipal Conference

Former Governor Murkowski
Alaska Tribal Broadband
OptimERA
SWAMC
Alaska Village Initiatives
Northwest Arctic Borough
Nome Public Schools

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Thank you!

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Additional Documents Submitted:

Master Broadband Plan to Connect Alaska: PDI White Paper 2021
Clearing the LEO Fog in Alaska: PDI White Paper 2021
Middle Mile in Rural Alaska: PDI White Paper - 2020
Satellite Will Solve the Digital Divide in Rural Alaska: PDI White Paper - 2020
FCC Alaska Plan Order - 2016
2014 Alaska Broadband Plan
2019 Alaska Broadband Plan
Alaska's Broadband and Telecom Funding Circle - 2020
Legislative Report: Alaska's Current and Future Broadband Coverage – 2017
LEO/GEO Hybrid Demo: PDI White Paper - 2020