Connecting Rural Alaska with LEO & GEO HTS Satellite Middle Mile

PACIFIC DATAPORT

May 2022 | Pacific Dataport, Inc. | Anchorage, Alaska

Building On Our Experience …

PACIFIC DATAPORT

Created by…

Microcom™ Communications Solutions

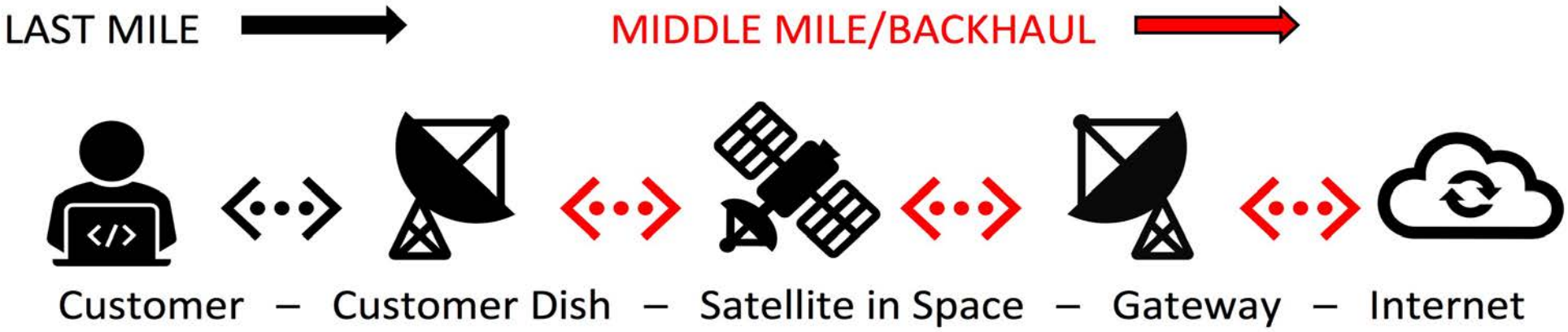
Partnering with…

OneWeb

Last Mile and Middle Mile

DEFINITIONS:

- Internet (less than 25X3)
- Broadband (25X3 and faster)
- 2.5 GHz Tribal Spectrum (Issued by the FCC)
- WISP (Wireless Internet Service Provider)
- Last Mile (community connection to the home)
- Middle Mile (Lower 48 Internet to community – could be fiber, microwave or satellite)



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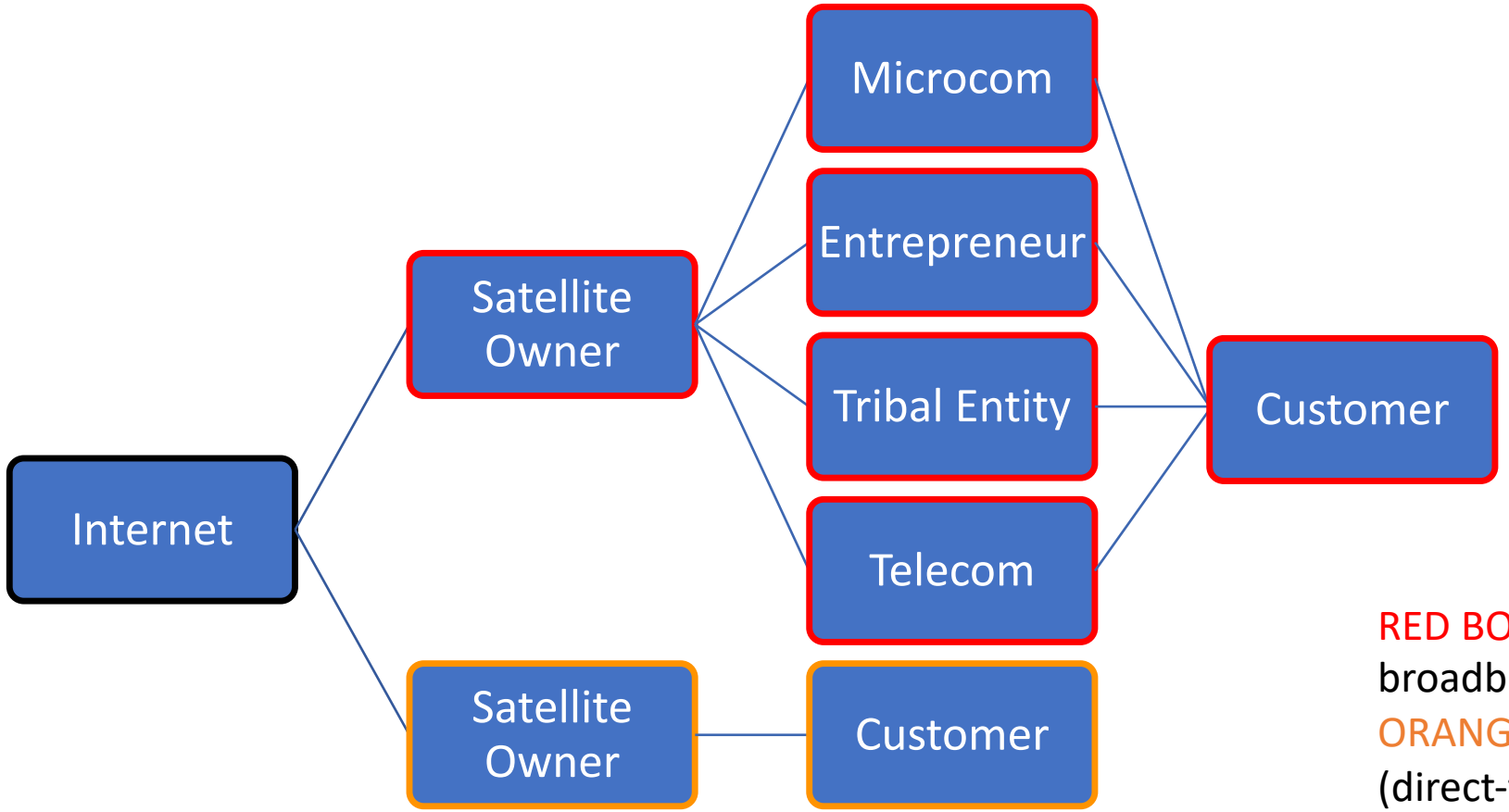
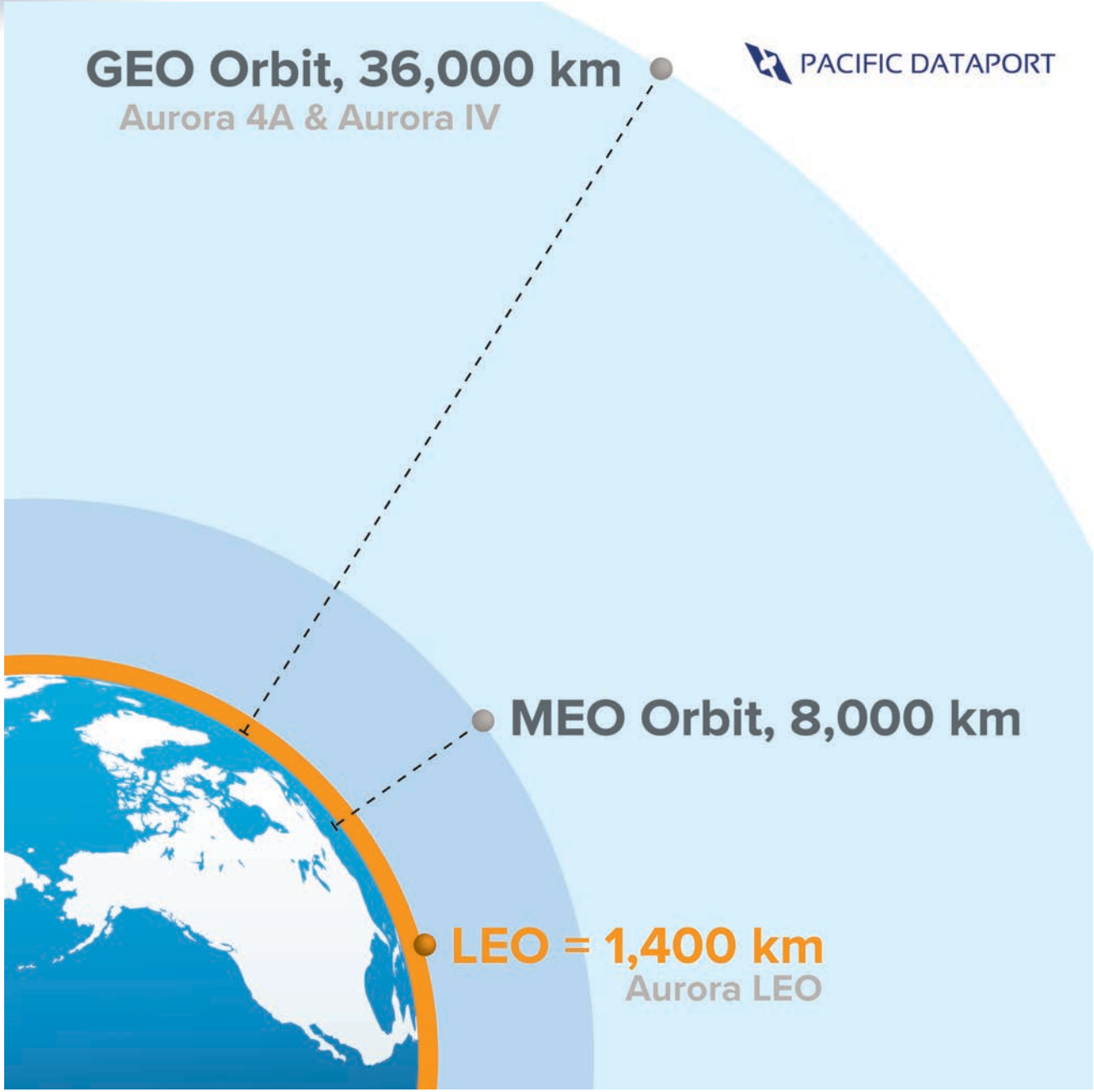
Internet Path to Customer



RED BOXES indicate standard broadband business model.
ORANGE BOXES indicate DTC (direct-to-consumer) business model.

LEO MEO GEO Satellites



Reality Check…

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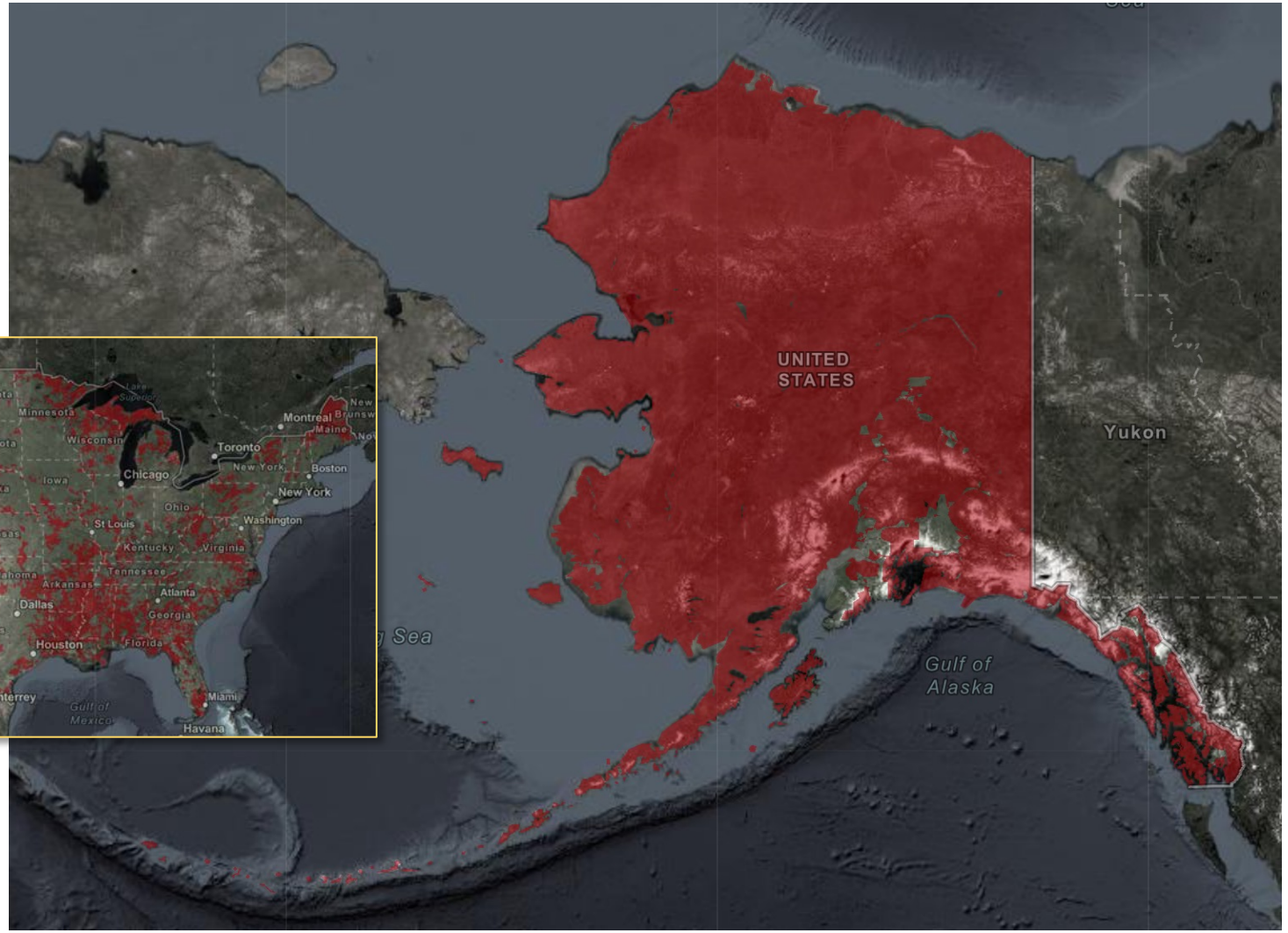
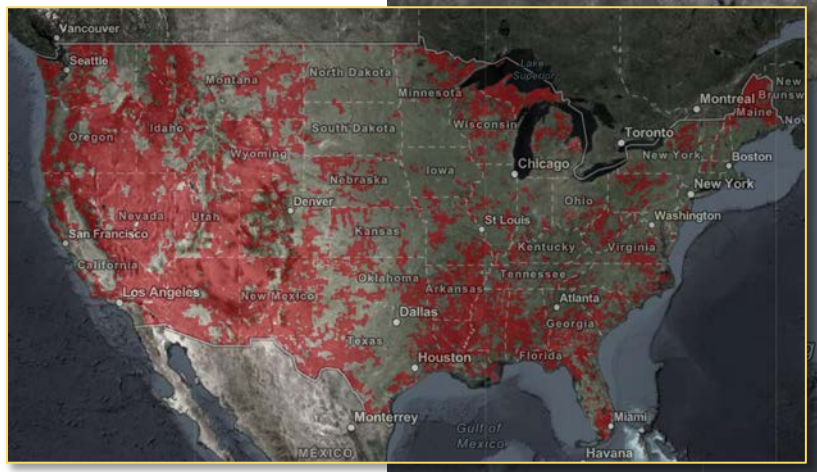
Alaska's Digital Divide in 2022





[Indicators of Broadband Need Map - FCC Form 477 – No Provider Reports Consumer Fixed Broadband Services at 25/3 Mbps (Census Block Level)]

Retrieved August 18, 2021 from https://broadbandusa.ntia.doc.gov/resources/data-and-mapping

Before broadband was delivered to their homes, kids hang-out near the school in Akiak, Alaska to access wireless internet through their phones. Courtesy of Katie Basile/KYUK

Today's Alaska Broadband Facts

- 36.3% of rural Alaskans still have no wired broadband (25X3 or faster) connection*
- No rural Alaska school meets the FCC's educational goals of 1 Mbps per student
- Anchorage pays ~$.24 for a GB of data – Adak pays ~$22.22
- Even where a fiber runs down the middle of the road, residents are often bypassed as potential customers
- Off the Northern coast of Alaska, 25X3 fiber broadband service is offered at $499 per month. Using satellite, Akiak is paying <$150/month for 75X15.
- Rural Alaska schools and health clinics often pay $40,000 to $60,000 per month for 25X3 service (each school)
- Approximately 90 rural Alaska villages are unserved (no internet) or underserved (less than 25X3)
- There is currently NO long-term plan to reach the remaining unserved and underserved in rural Alaska

* Retrieved from "FCC FOURTEENTH BROADBAND DEPLOYMENT REPORT" issued 1.19.21, page 57

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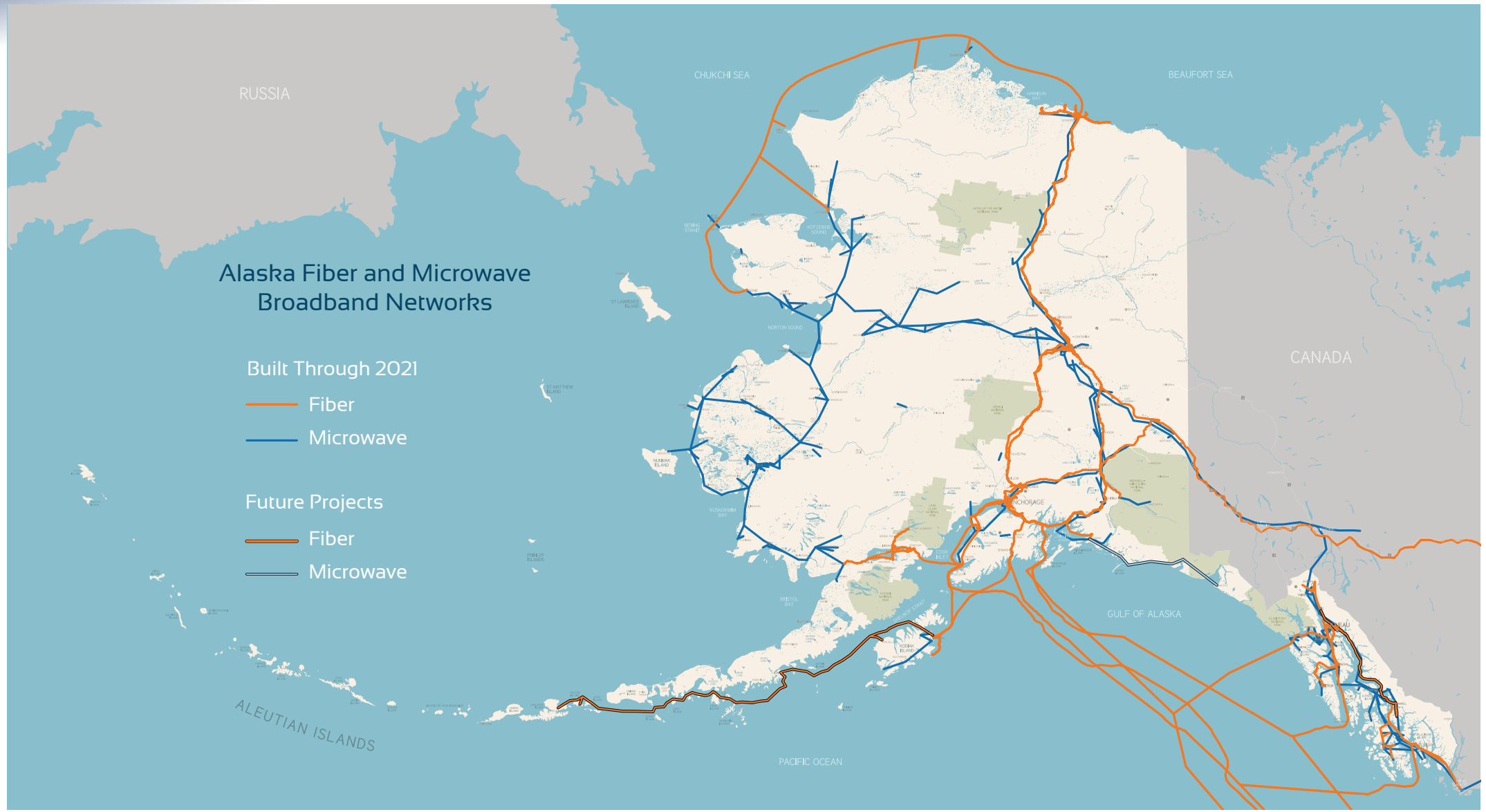

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MIDDLE MILE PRICING

MIDDLE MILE COVERAGE/PRICE/AVAILABILITY IN ALASKA (Q2 2020)				
Network	**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 $6,000	0	Microwave

WITH THE AURORA NETWORK, PROVIDERS 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)

RETAIL PRICING

WITH THE AURORA NETWORK, CONSUMER TARGET 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 Network - 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

How Much Time & Money to Cover Alaska with Broadband Quickly?

Which Method Can We Afford?

The “Fiber Telecom Method”: Using fiber or microwave, terrestrial or submarine (USDA Yakutat Project)

USDA U.S. DEPARTMENT OF AGRICULTURE

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USDA Invests $18.88 Million in Rural Broadband for Alaskan Families

CORDOVA, Alaska, Dec. 3, 2019 – Today, U.S. Department of Agriculture (USDA) Alaska State Director for Rural Development Jerry Ward announced USDA has invested $18.88 million in high-speed broadband infrastructure that will create or improve rural e-Connectivity for nearly 270 rural households in Yakutat. This is one of many funding announcements in the first round of USDA's ReConnect Pilot Program investments.

Press Release
Release No. 0194.19

Jacqueline Susmann, (202) 522-6184
jacqueline.susmann@usda.gov

“Geographic isolation should no longer be a barrier to economic prosperity, especially here in Alaska,” Ward said. “With ReConnect, we are bridging the so-called ‘digital divide’ and bringing modern communications to rural Alaskan communities like Yakutat. Under the leadership of President Trump and Agriculture Secretary Sonny Perdue, USDA is committed to being a strong partner to rural communities in deploying this critical infrastructure, because we know when rural America thrives, all of America thrives.”

Nathan Moulton, Executive Director of Yakutat Tlingit Tribe, added “The Yakutat Tlingit Tribe and our members are excited to work with Cordova Telecom to bring high-speed broadband to Yakutat. The USDA grant investment in Yakutat will positively impact lives and opportunities for everyone in our community.”

The project, dubbed NICEY (New Internet Communications for Everyone in Yakutat), will deliver broadband internet service to all 662 year-round residents and businesses in Yakutat via fiber-to-the-home (FTTH) connections. Yakutat will be connected to Cordova’s submarine fiber optics via a new microwave middle-mile network spanning 230 miles between the two communities.

- 270 Households for equipment and installing microwave, towers, shelters, etc.
- TOTAL Funding $25M or **$92,592 each household**
  - $18,800,000 or $69,629 each location USDA Funds
  - $6,2000,000 or $22,963 each location Cordova Telecom Cooperative Funds
- TOTAL time to deploy in Yakutat = **24-36 months**
- Community Benefits:
  - Able to cruise the Internet, streaming, and two-way video conferencing

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The “Akiak Tribe Satellite Method”: Using 2.5 GHz Tribal spectrum and satellite backhaul (LEO or GEO HTS)

- 105 Households
- TOTAL Funding = $610,000 or **$5,809 each household**
- TOTAL time to deploy in Akiak = **4 months**
- Community Benefits:
  - Minimum 25X3 service and maximum 170X35 service available
  - Quick deployment
  - Able to cruise the Internet, streaming, and two-way video conferencing
  - Affordable at ~$150 per month for broadband

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Which Method Can Alaska Afford?

USER SUBSIDIES / OPEX - comes to Alaska telecoms annually

- $360M
  - Alaska Plan FCC USF - $150M, E-Rate - $90M, Rural Health Care - $120M

MIDDLE MILE & LAST MILE FUNDS CAPEX - comes to Alaska telecoms annually

- $20M Annually for ACS FCC USF (last mile buildout grants)
- $46M Annually for USDA ReConnect (middle mile / last mile buildout grants)

INFRASTRUCTURE INVESTMENT AND JOBS ACT (Broadband = $65B total)

- $600M One-time bonding for buildouts, shared nationwide
  - Problem: AK NOT LIKELY TO SEE THIS FUNDING
- $1B One-time for NTIA middle mile, shared nationwide
  - Problem: MUST STAY WITHIN A CENSUS BLOCK
  - Problem: AK NOT LIKELY TO SEE THIS FUNDING
- $2B One-time for NTIA Tribal Connectivity Program, shared nationwide
  - $100M Annually coming to AK Tribes for 3 years
- $42B One-time BEAD Funding
  - $201M Alaska's share
  - Problem: BASED ON UNSERVED POPULATION

ONLY AFTER FCC MAPPING DATA HAS BEEN UPDATED WILL THIS FUNDING BECOME AVAILABLE

IT IS ESTIMATED ALASKA WILL SEE $500M TO $700M OF THE $65B NATIONWIDE INFRASTRUCTURE FUNDING

* Alaska Communications and AP&T are not part of the Alaska Plan.

With the funding that's coming to Alaska, we cannot afford the time or money to deploy fiber statewide.

ALL UPCOMING FEDERAL FUNDS AVAILABLE FOR CAPEX						
SOURCE	**2022**	**2023**	**2024**	**2025**	**2026**	**TOTAL**
USDA RECONNECT	$46,000,000	$46,000,000	$46,000,000	$46,000,000	$46,000,000	$230,000,000
IIJA TRIBAL CONNECTIVITY	$0	$100,000,000	$100,000,000	$100,000,000	$0	$300,000,000
IIJA BEAD	$0	$201,244,608	$0	$0	$0	$201,244,608
TOTAL	$46,000,000	$347,244,608	$146,000,000	$146,000,000	$46,000,000	$731,244,608

AKIAK TRIBE METHOD

- TOTAL COST = $5,809 each household
- TOTAL TIME = 4 months once funded
- TOTAL COST TO ALL OF ALASKA'S 31,667 UNSERVED HOUSEHOLDS = **$183,953,603**

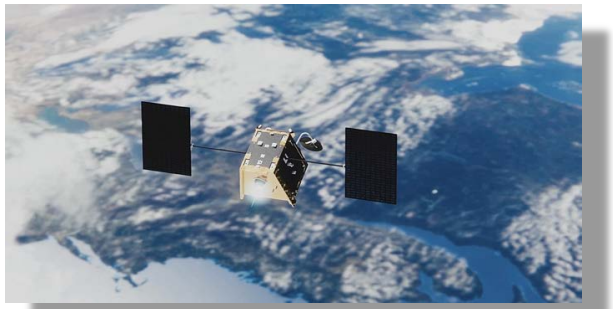
FIBER TELECOM METHOD

- TOTAL COST = $92,592 each household
- TOTAL TIME = 24 to 48 months once funded
- TOTAL COST TO ALL OF ALASKA'S 31,667 UNSERVED HOUSEHOLDS = **$2,932,110,864**

- 36.3% of rural Alaskans (~95,000) who have no wired broadband service (25X3), according to the FCC's Fourteenth Broadband Deployment Report (page 57) – 95,000 / 3 = 31,667 households

OneWeb Network

- ~15 Gbps
- LEO Satellite
- Statewide Coverage
- Operational Q4 2021
- ~15,000 Consumers



Aurora Phase I – Aurora 4A

- ~7.5 Gbps
- GEO HTS Satellite
- Statewide Coverage
- Operational Q2 2022
- ~10,000 Consumers
- Target Retail: 25/3 for $199/month

Aurora Phase 2 – Aurora IV

- ~100+ Gbps
- GEO VHTS Satellite
- Statewide Coverage
- Operational 2H 2024
- ~100,000 Consumers
- Target Retail: 25/3 for $99/month

More Affordable, Sooner Deployment & No Additional Subsidies Needed

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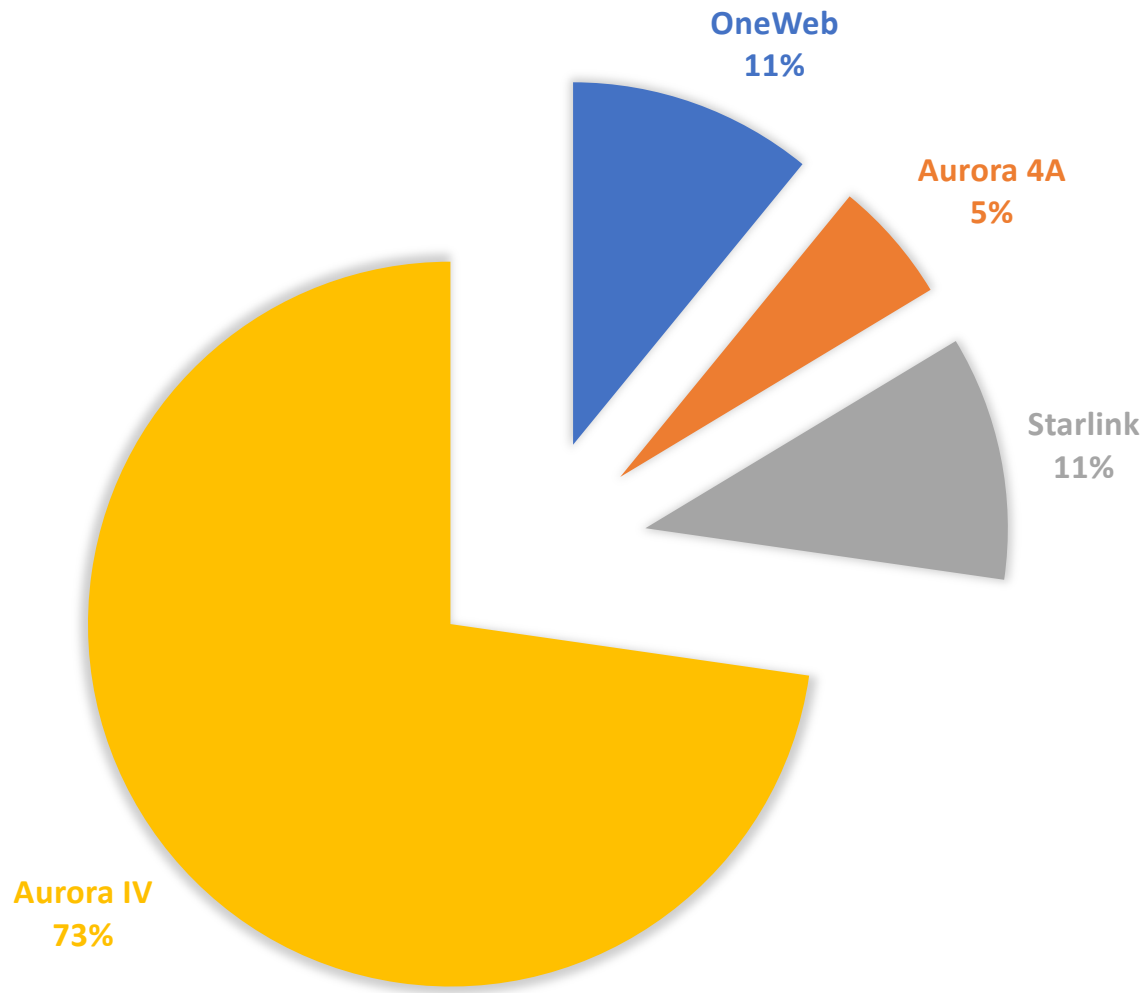
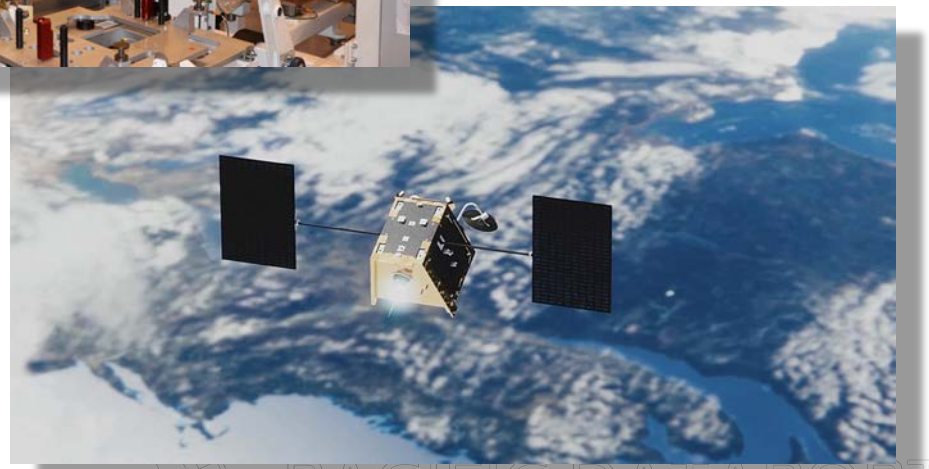
SATELLITE CAPACITY NEEDED TO SERVE ALL OF RURAL ALASKA'S UNSERVED/UNDERSERVED (~140 GBPS)



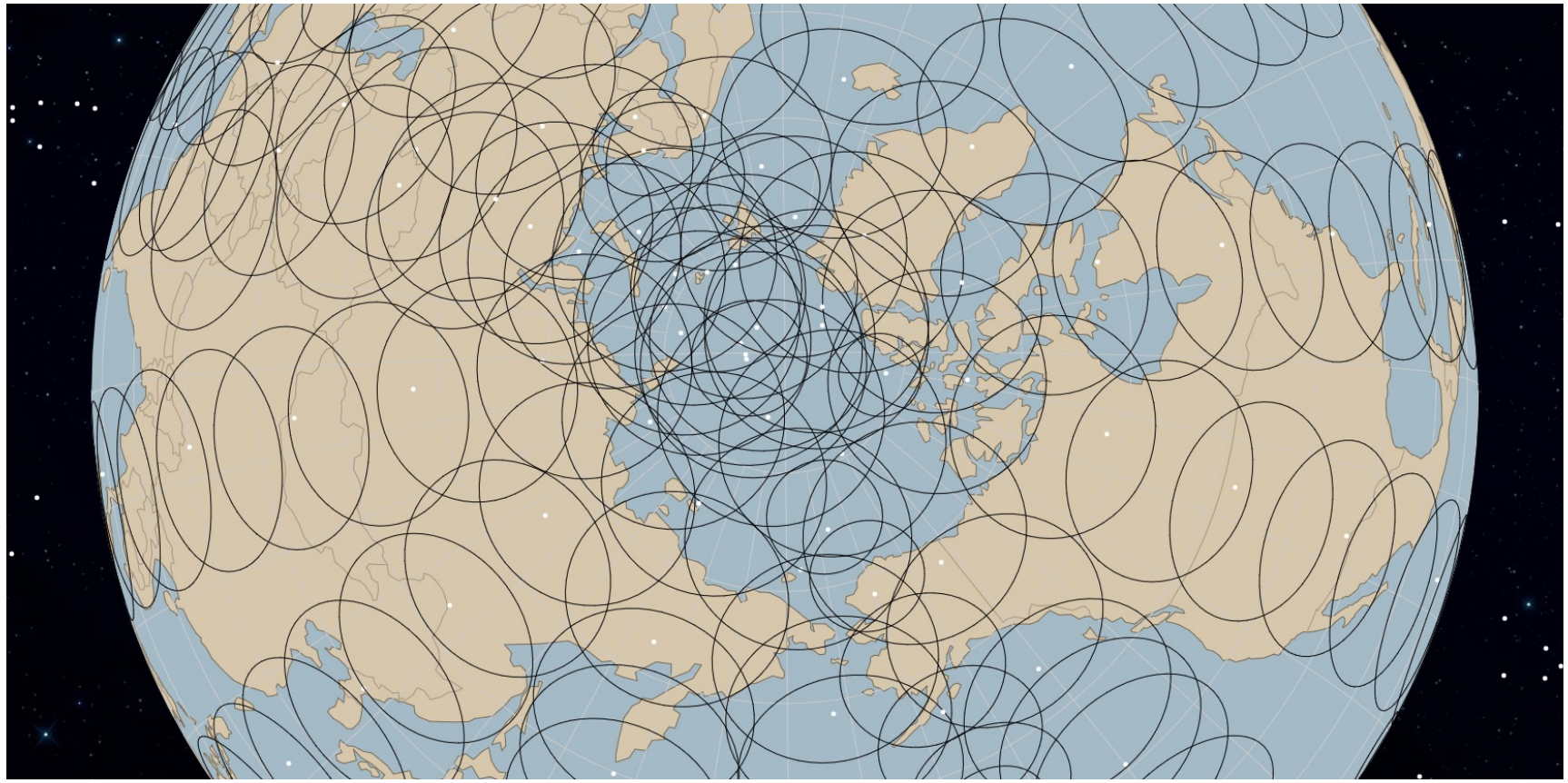
OneWeb

- Launched in 2015
- Internet access everywhere, for everyone!
- Geographically covering 100% of the WORLD
- Pacific Dataport is OneWeb's preferred distribution partner for Alaska and Hawaii
- 394 launched of 648 satellites
- Low latency solution
- Service in 2022



OneWeb LEO - Optimized for Alaska & Arctic Coverage

- Global coverage by Q4 2022
- Commercial availability within 30 days
- Speeds up to 195 Mbps
- Latency comparable to fiber
- Supports air, land, sea and space communications
- Secure network standards
- Multi-satellite system offers redundancy, resilience and diversity
- Capacity expansion as needed



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Microcom™
Communications Solutions

Talkeetna Alaska Teleport

- 90 Acre Site
- Able to host multiple gateway clients
- OneWeb first client with 29 gateways
- Statewide reach
- Redundant fiber and power
- Space for a data center, data processing and Internet exchange

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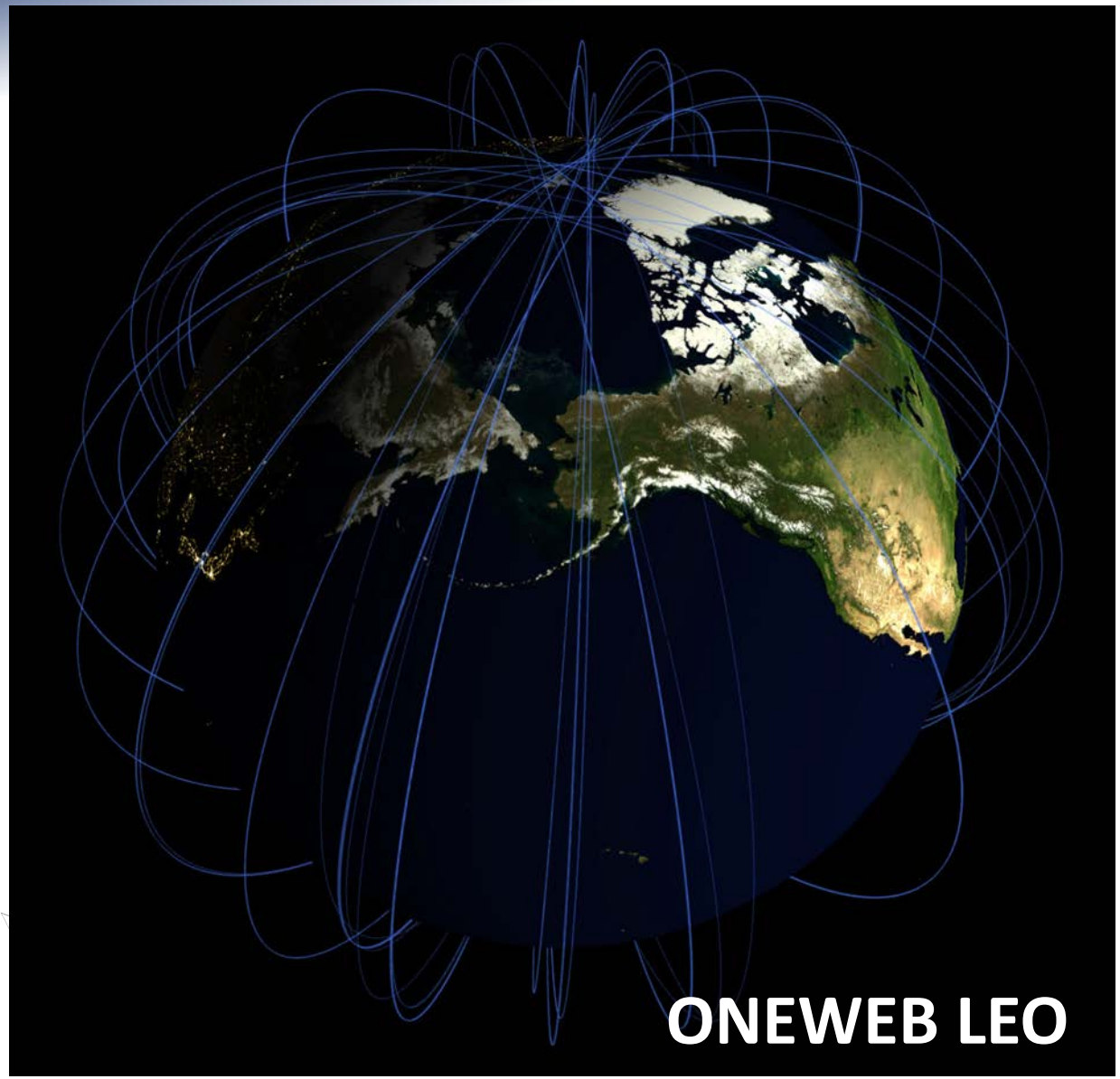
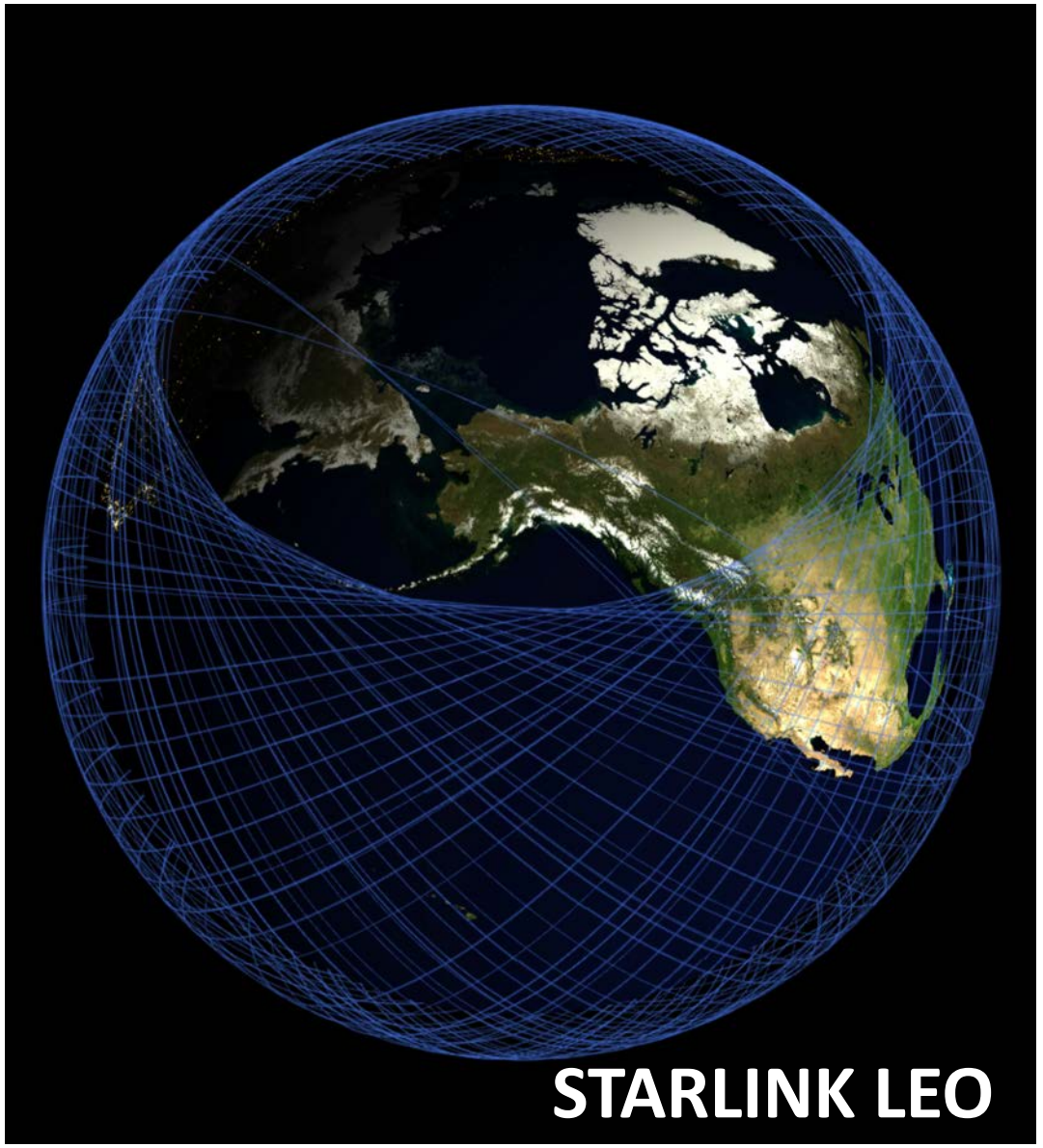
LEO COVERAGE OVER ALASKA





New Technology

Aurora Project Satellite Capacity Comparison

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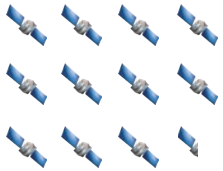
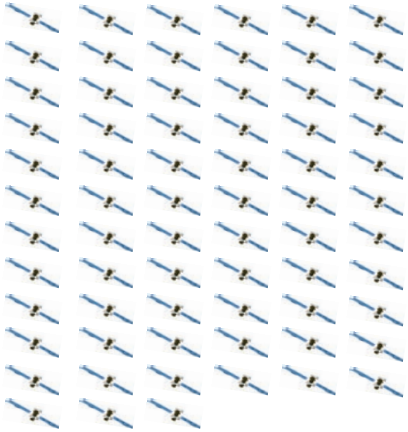
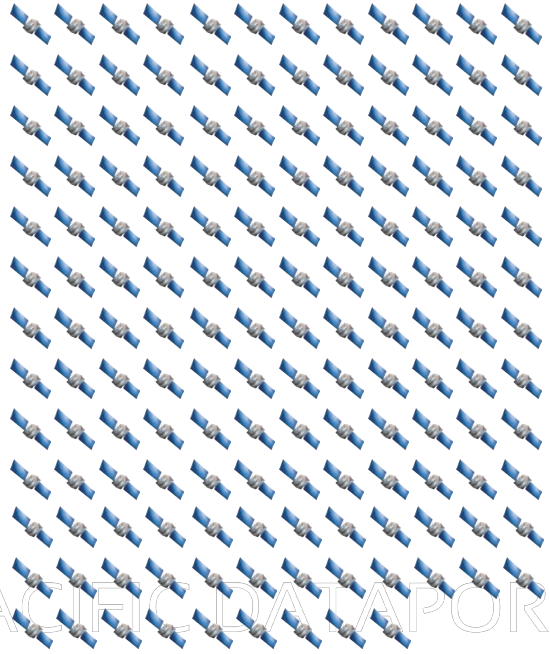
(1) Aurora 4A	=	(5.2) Ku Satellites	=	(11.5) C Band Satellites
(1) Aurora IV	=	(69) Ku Satellites	=	(153) C Band Satellites







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).

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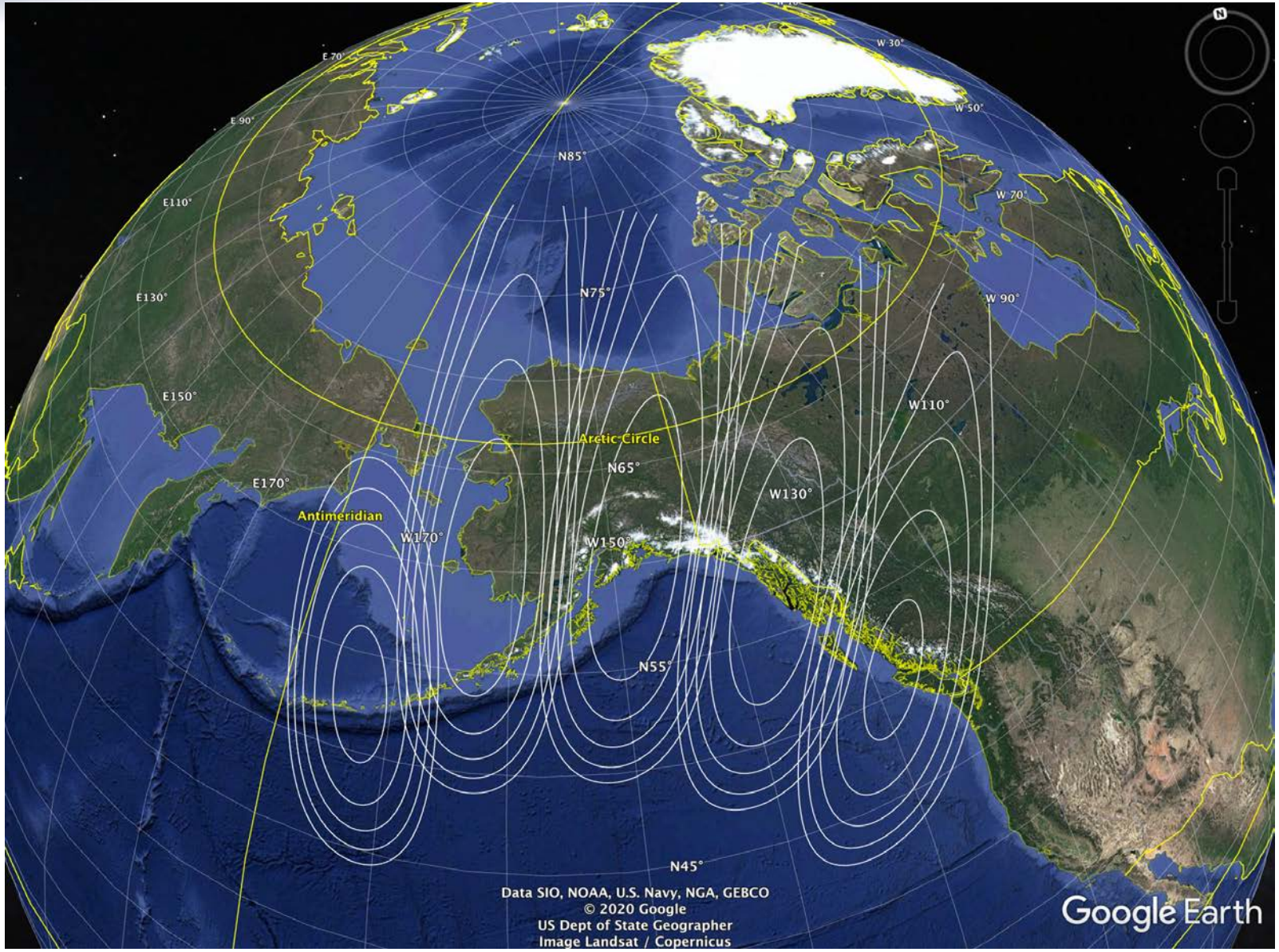
AURORA 4A COVERAGE



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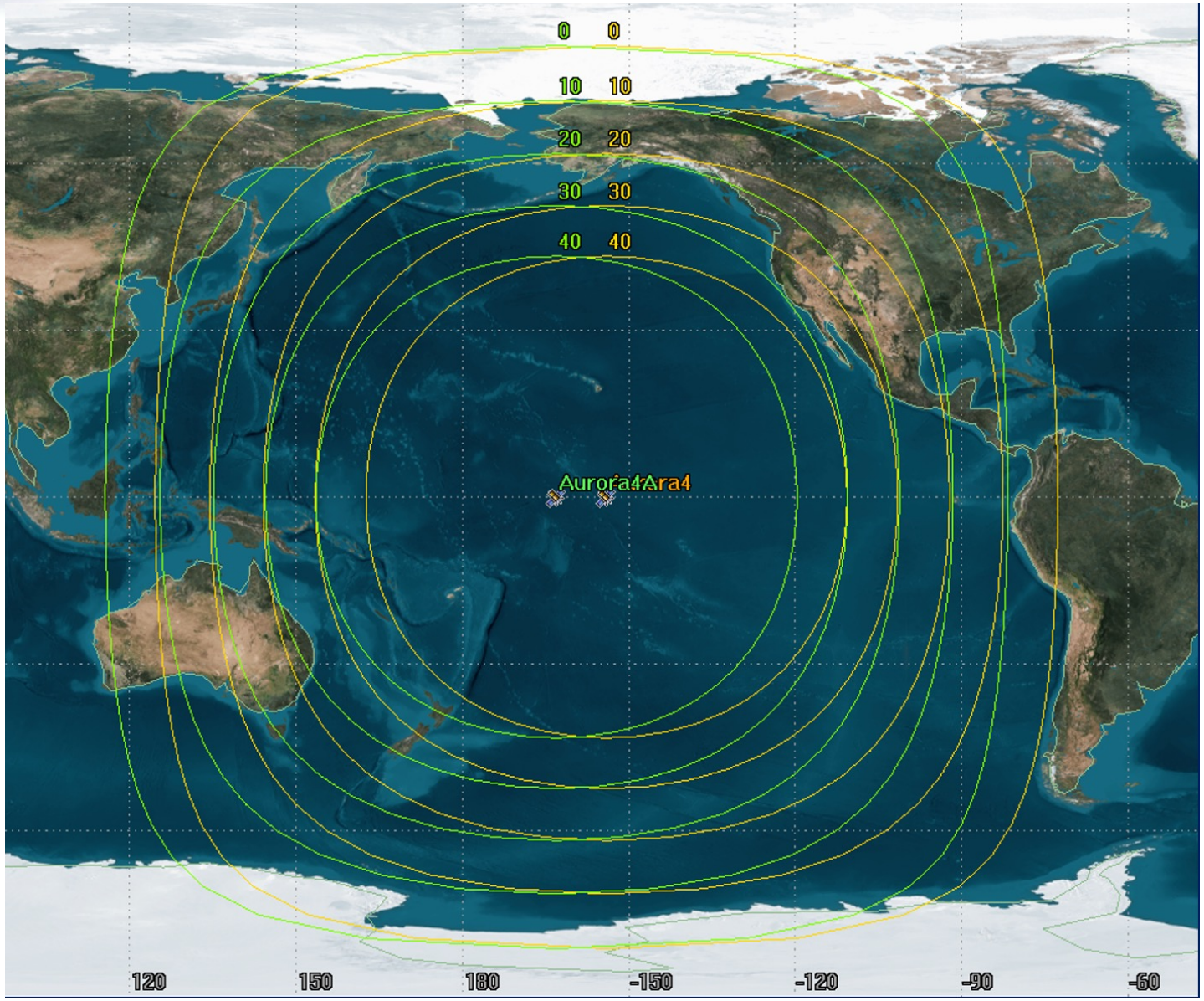
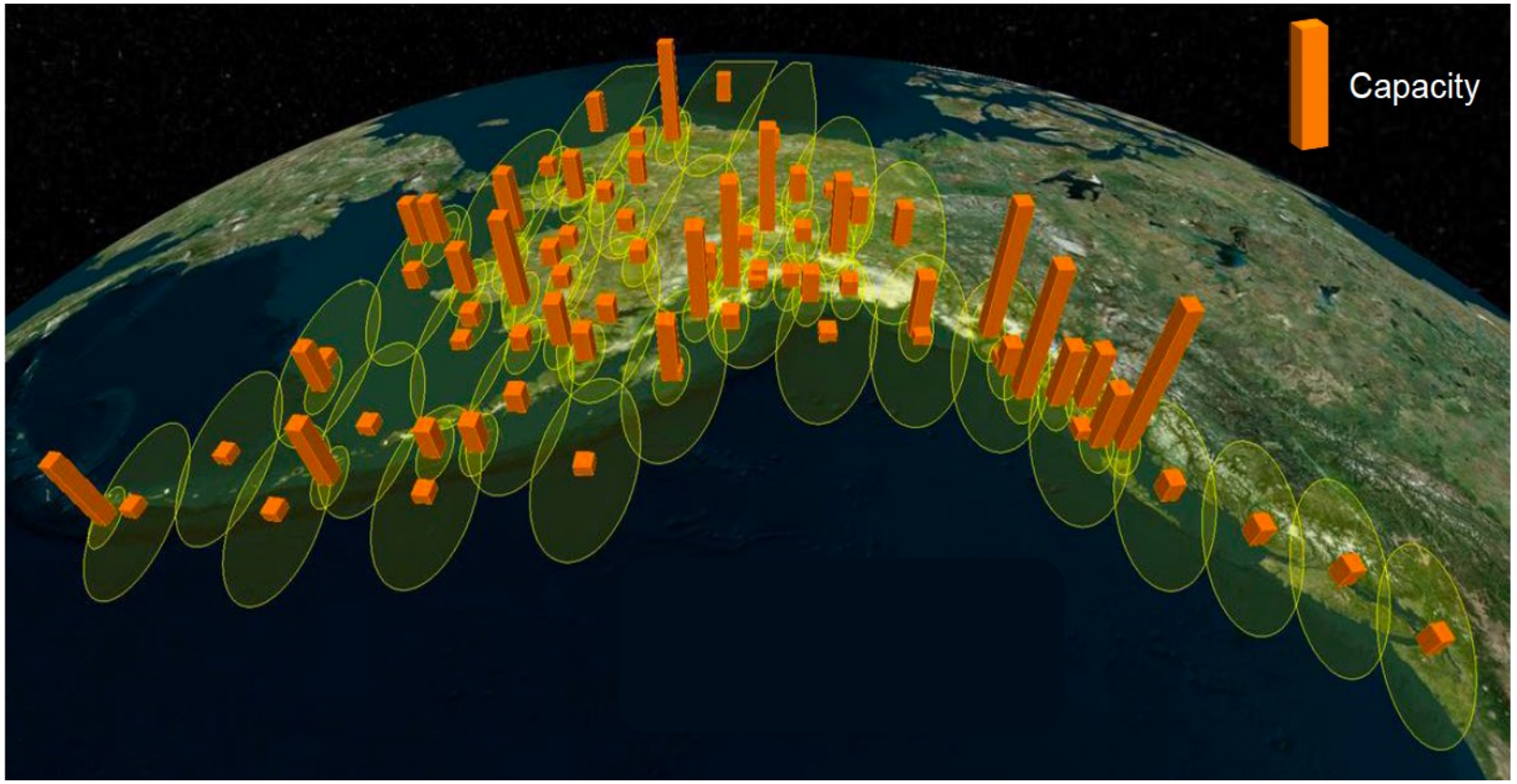
AURORA IV COVERAGE



Aurora IV GEO HTS - Optimized for Rural Alaska

- Capacity ~110+ Gbps
- Sized to provide every residence in rural Alaska with 25/3 Mbps or better
- Enables a target retail price of $99
- Multi-satellite system offers redundancy and diversity
- Fully sustainable without future subsidies
- Capacity expansion as needed



Aurora System Ready to Launch!


Aurora 4A Satellite


Aurora 4A Gateway

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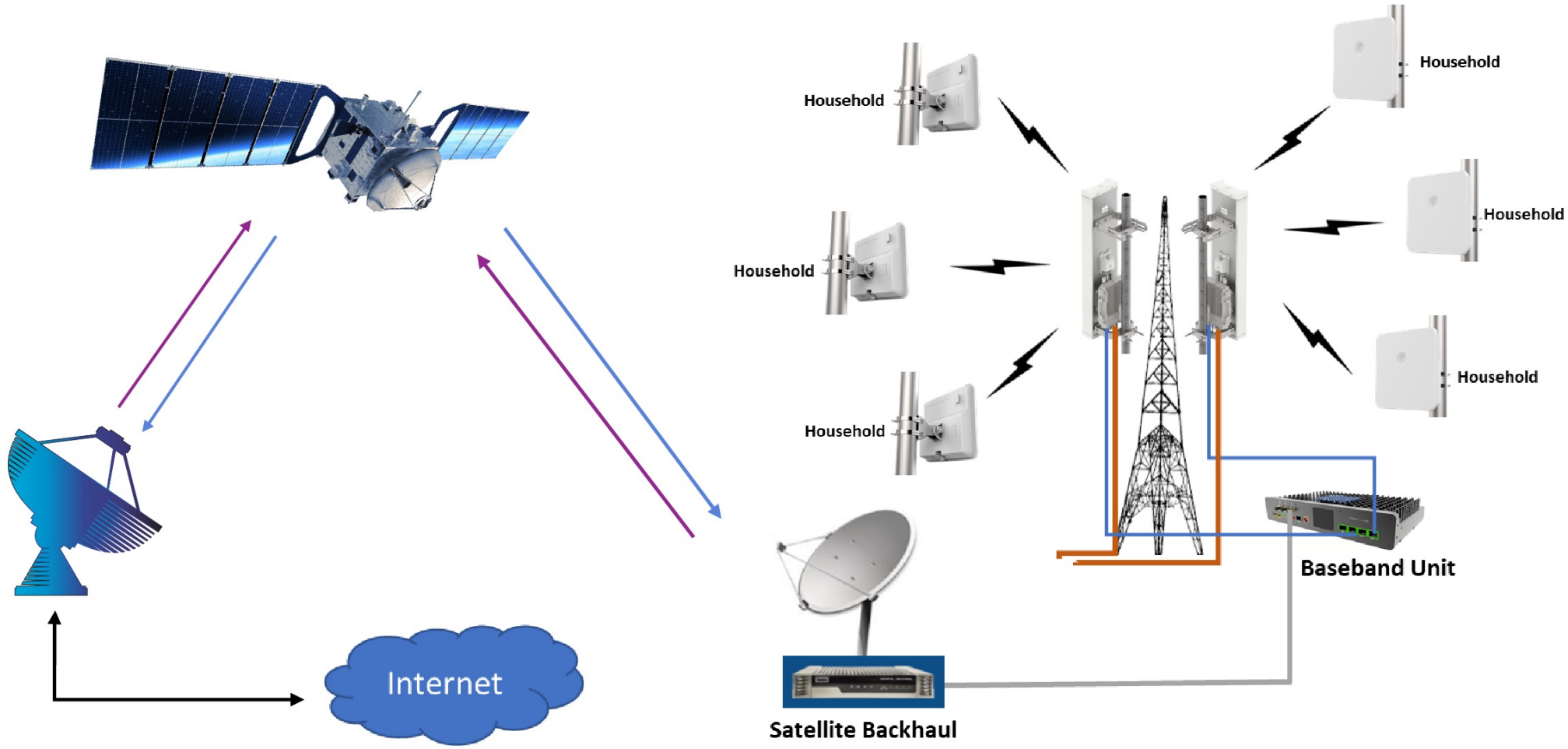
Microcom™ Communications Solutions

2.5 GHz Tribal Spectrum WISP System



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Microcom™
Communications Solutions

2.5 GHz Tribal Spectrum WISP System

Access Point Sector Antenna

Subscriber Module

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2.5 GHz Tribal Spectrum WISP System "broadband-in-a-box"

PATH TO DEPLOYMENT	VENDOR DIRECT
#1 – FEASIBILITY STUDY (PLANNING)	MICROCOM
#2 – EQUIPMENT & INSTALLATION (CAPEX)	MICROCOM
#3 – MONTHLY CAPACITY (OPEX/BACKHAUL/MIDDLE MILE)	PACIFIC DATAPORT
#4 – MANAGED SERVICES (OPEX/BILLING & MAINTENANCE)	MICROCOM

VILLAGES PLANNING TO USE SATELLITE MIDDLE MILE FOR THEIR 2.5 GHZ TRIBAL SPECTRUM WIRELESS BROADBAND SYSTEMS

AURORA SYSTEM ALASKA COVERAGE

Akhiok
Akiak
Akutan
Alakanuk
Alatna
Aleknagik
Allakaket Village
Anvik Village
Atka
Atmautluak
Belkofski
Bill Moore's
Canyon Village
Chignik Bay Tribal
Council
Chignik Lake Village
Chuloonawick
Clarks Point
Crooked Creek
Eek
Egegik Village
Ekuk
False Pass
Georgetown
Goodnews Bay
Hamilton
Hooper Bay
Iliamna
Ivanof Bay Tribe
Kalskag
Kaltag
Kanatak
Karluk
King Cove
King Salmon Tribe
Kipnuk
Kongiganak
Kotlik
Kwethluk
Kwigillingok
Lake Minchumina
Larsen Bay
Levelock Village
Lime Village
Lower Kalskag
Manokotak Village
Mekoryuk
Napaimute
Napaskiak
Nelson Lagoon
New Koliganek Village
Council
New Stuyahok
Newhalen Village
Newtok
Nightmute
Nikolai Village
Nikolski
Nondalton Village
Nunam Iqua
Nunapitchuk
Ohogamiut
Old Harbor
Oscarville
Ouzinkie
Pedro Bay
Perryville
Pilot Point
Pitka's Point Traditional
Council
Platinum
Port Lions
Portage Creek Village
(aka Ohgsenakale)
Red Devil
Russian Mission
Saint George Island
Scammon Bay
Sleetmute
South Naknek Village
Stony River
Telida
Togiak
Tuluksak Native
Community
Twin Hills
Tyonek
Ugashik Village
Unalaska
Unga

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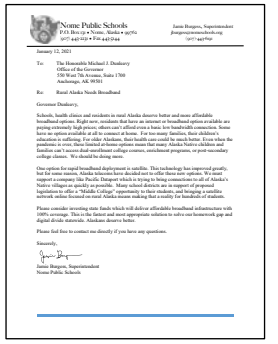
LEADERS VOICE THEIR CONCERNS

"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



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

Thank you!

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