

The Growth of Telecommunications

Alaska has faced a series of obstacles to better connectivity

Alaska is still playing catch-up in developing telecommunications infrastructure on par with the rest of the country, but we've made major strides in recent years and are better connected than ever. Five years ago, most of rural Alaska was largely without cellular phone service; now, wireless providers plan to connect Alaska villages to high speed mobile broadband networks.

For the majority of Alaskans who live in urban and suburban areas, the differences between their connectivity and their Lower 48 kin are small. In general, Alaskans pay more and get slower download speeds than the rest of the country, but broadband has become mainstream in urban areas and is spreading into rural Alaska. "Broadband" encompasses any consistent fast connection to the

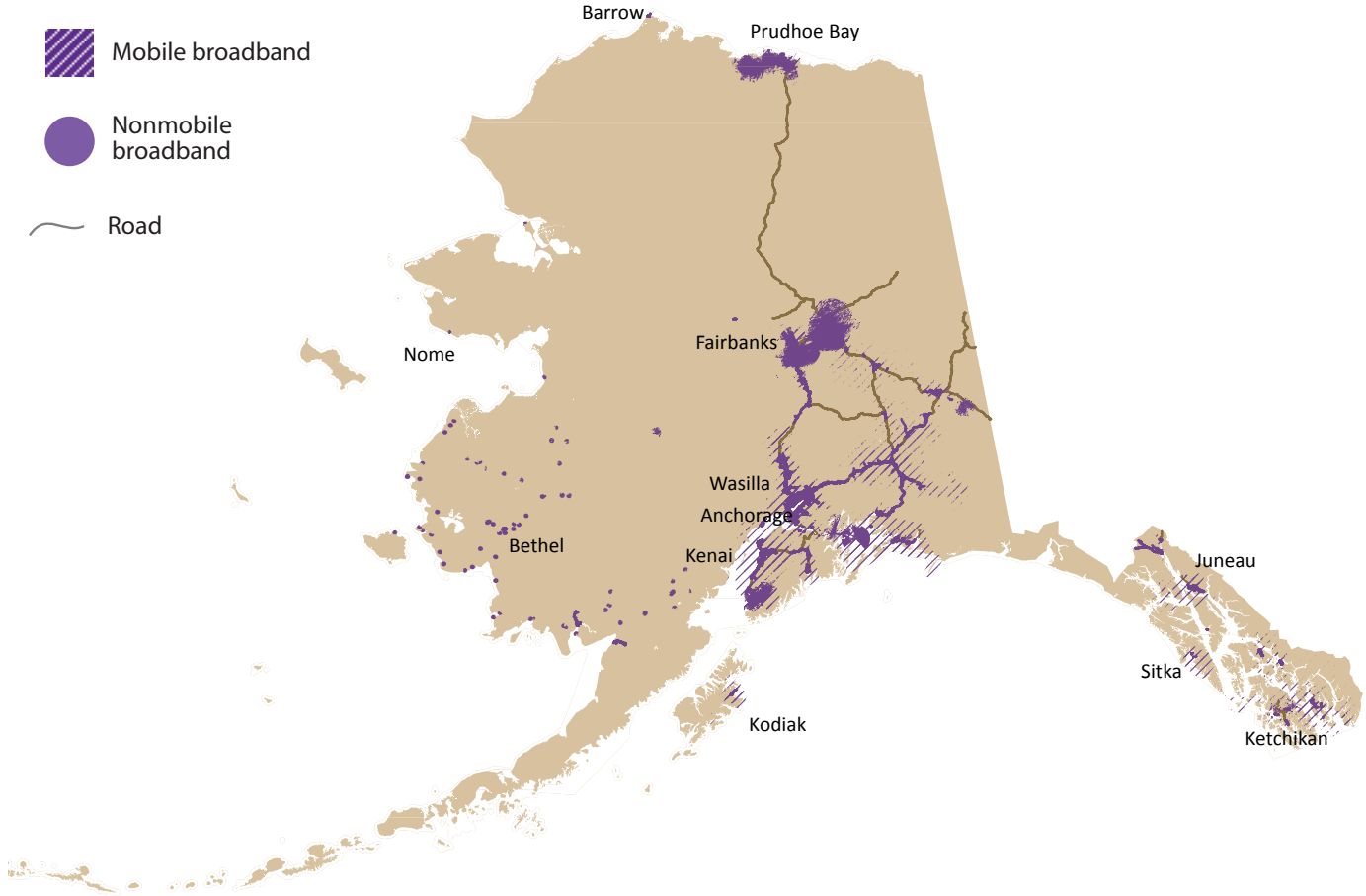
Internet, whether accessed with a computer or a mobile device.

Nonetheless, Alaska's communication network still lags behind most of the developed world, placing us among the lowest-ranked states in terms of access, speed, and cost. The remoteness of Alaska communities has long been a challenge in developing infrastructure of any kind, but with communications, the vast distances and obstacles to travel posed by weather and terrain make digital communication even more important. Remote Alaskans could reap some of the largest benefits of broadband access by improving tele-health and distance education networks, enhancing public safety and emergency response systems, and generating economic activity through Internet access.



Above, the now-defunct radar station LIZ-2 at Point Lay was one of 30 stations under U.S. Air Force control on the Distant Early Warning Line that ran approximately 3,600 miles from Alaska across Northern Canada to Greenland. The curved White Alice antennae are shown on the left. LIZ-2 was commissioned in 1955 and dismantled in 1989. Photo by Air Force Tech. Sgt. Donald L. Wetterman

1 Sparse Broadband Coverage in Alaska 2013



Note: This map excludes satellite coverage, which could be available statewide.

Sources: Connect Alaska; Alaska Department of Labor and Workforce Development, Research and Analysis Section

Early communications in Alaska

Throughout Alaska's post-settlement history, geography has been an obstacle to long-distance communication. Post was the first communication network, and it was rudimentary in the early years. In the early 1800s, sending a letter to Seattle from interior or northern Alaska and receiving a response took more than three months, and it took up to a year to and from Washington, D.C.

Communication problems between Alaska army stations and national headquarters were the impetus to develop Alaska's first telecommunications network.

In 1900, Congress appropriated \$450,000 to build the Washington-Alaska Military Cable and Telegraph System, or WAMCATS. Telegraph wires

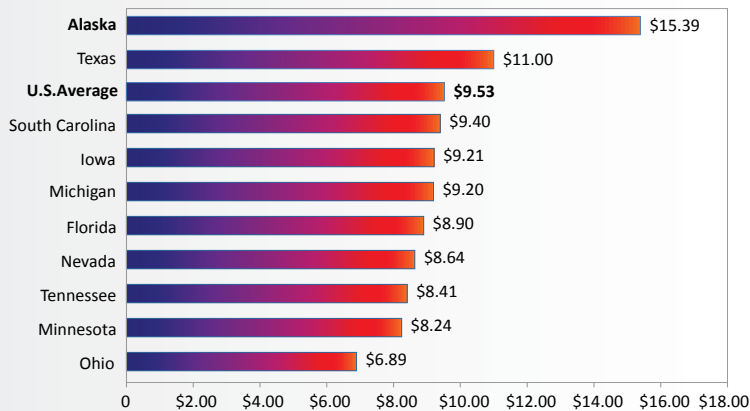
were strung from the Seward Peninsula and St. Michael to Tanana and Fairbanks, then connected to Alaska's Southcentral ports and Canada's telegraph system.

By 1903, a message from interior or western Alaska could be sent through Canada to Skagway, transported by steamer to Seattle, then resent by telegraph throughout the contiguous United States. This reduced a message's transit time to four days between Nome and Washington, D.C., under ideal circumstances.

Weather was harsh on telegraph wires, and freezing rain, falling trees, wind, and forest fires frequently interrupted service. The U.S. Army began replacing telegraph lines with a chain of radio antennae, initially spaced no further than 500 miles apart. By 1926, all telegraph lines in Alaska had

2 Fees Are Highest for Alaskans

Monthly broadband costs per MB speed, 2012



Source: Connect Nation Consumer Broadband Adoption Trends Survey, 2012

been replaced by the radio network, except the link across the Alaska-Canada border near Eagle.

In 1936, WAMCATS was renamed the Alaska Communication System.

War prompts more upgrades

The outbreak of World War II highlighted Alaska's geostrategic importance to the U.S., and the late 1940s and '50s brought substantial improvements to physical and communication infrastructure. The first overland telephone line that connected Alaska to the rest of the U.S. accompanied construction of the Alaska Highway and augmented the submarine telephone cables linking Southeast Alaska to the Lower 48.

The Cold War prompted continued development of Alaska's communication network, both to warn of Soviet air attacks and communicate with interceptor aircraft stationed in Alaska. High-frequency radio communication proved unreliable, so construction of the White Alice network began in 1955.

The White Alice network used a new, more reliable technology called tropospheric scatter. More than 70 new stations were built from the western Aleutians to the Arctic Coast and the southern panhandle, identifiable by the giant curved-billboard antennae protruding from the tundra. (See the photo on page 14.)

The White Alice system became the backbone of

Alaska's midcentury wireless telecommunication infrastructure, especially in rural Alaska. In 1970, over half of Alaska communities still weren't connected to the statewide telecommunications network. Of those with adequate ties to the outside world, the majority relied on White Alice or less sophisticated radio systems, and only two-fifths were linked by telephone lines or microwave.

The space age changes Alaska

Despite Cold War military escalation in Alaska, military networks were mainly used for civilian purposes. In 1969, Congress authorized the sale of the Alaska Communication System to RCA Global Communications, who renamed the Alaska operations unit Alascom.

Part of the agreement required Alascom to invest \$30 million to improve and expand existing infrastructure. In 1972, Alascom purchased the military's satellite earth station in Talkeetna, the state's only satellite link. Prior to the privatization of Alaska's telecommunication network and satellite access, the military controlled what little satellite connection Alaska had.

Television broadcasting started in the early 1950s in Anchorage and Ketchikan, then spread to Fairbanks, Juneau, and other large communities in the following years. Broadcasts were local, and all outside programming had to be taped and flown from Seattle to Anchorage, then distributed to the Interior and Southeast.

Most stations tried to air television shows on the same day of the week they originally played, so shows would broadcast one week late in Anchorage, two weeks late in Fairbanks, and up to three weeks late in Juneau.

The military allowed a special broadcast in 1969, teaming with an Anchorage TV station to downlink live feed of the Apollo moon landing. This was the first-ever live national TV event for Anchorage-area Alaskans, 18 years after the first televised live national broadcast in the Lower 48. There wouldn't be another live national broadcast in Alaska for two years, until the 1971 NFC Championship football game.

These live broadcasts would continue to be special events in Alaska until the 1980s, when television networks went to full satellite distribution.

Satellite technology revolutionized telecommunications in rural Alaska. Through Alascom's partnerships with state and federal agencies, small satellite earth stations sprang up in a handful of villages as part of a pilot program to test telehealth and distance education through voice-only networks.

In 1975, one television station began to broadcast in 16 rural communities. Throughout the next decade, Alascom, with the help of state funding, built more than 200 satellite earth stations and brought long-distance voice and television to nearly every community in the state. In 1982, Alascom launched its own satellite designated exclusively for Alaska service, the Aurora I.

The demands of data

Satellite nearly brought Alaska up to speed, but demand for technology grows faster than infrastructure, and bandwidth bottlenecks quickly slowed traffic.

Alaska connected to the global fiber optic network in 1991 when a spur was built off the North Pacific Cable between Oregon and Japan. The Alaska spur landed in Seward and connected to Anchorage. Alaska telecommunications companies rushed to lease bandwidth on the new fiber connection, and within a year it was at maximum capacity.

Fiber optics is the preferred method of carrying voice, video, and data because of superior capacity compared to other wired networks and a lack of delay compared to satellite.

Since then, additional subsea fiber optic cables have connected Southeast and Southcentral Alaska to the global network, and terrestrial fiber has been installed along much of the road system.

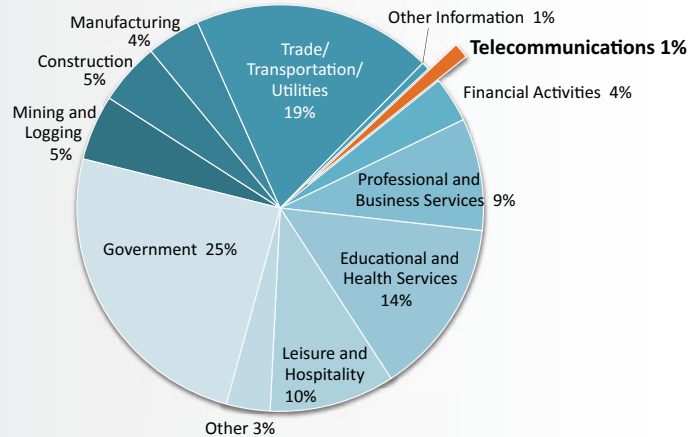
The missing middle mile

Wireless communication — like radio, tropospheric scatter, microwave, and satellite — helped rural Alaska leapfrog over many of the traditional technological infrastructure developments of the 20th century.

After the original WAMCATS telegraph wire deteriorated and was replaced by radio, rural communities weren't connected by wires and cables. But the data-intensive demands of modern broadband

3 Telecommunications A Small Industry

Alaska's industry makeup, 2013



Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

access — especially two-way communication like video conferencing, gaming, or uploading — don't work as well with geosynchronous satellite communication. Though satellite data transfer improves constantly, the reality of a nearly 25,000 mile round trip between points A and B via satellite is difficult to overcome.

Several projects are in planning stages and one is under way to bring broadband to underserved areas in the state. The GCI TERRA project uses a combination of fiber optics and microwave transmitters to bring broadband to western Alaska. The small dots of connectivity on the map in Exhibit 1 in western Alaska are the TERRA network, which is still expanding.

Alaska recently received a one-time grant from the Federal Communications Commission to bring 3G and 4G mobile wireless service to 48 rural communities in the next few years. Most of rural Alaska has 2G coverage, which is not fast enough to be considered broadband.

Small industry today, big impact

Alaska's first long-distance company, Alascom, had a monopoly in the early years and was instrumental in working with the state to build the back-

Continued on page 19

Employer Resources

Two new rules for employers with federal contracts

The Office of Federal Contract Compliance Programs has revised the nondiscrimination and affirmative action regulations under Section 503 of the Rehabilitation Act of 1973 and the Vietnam Era Veterans Readjustment Assistance Act of 1974, or VEVRAA. The laws took effect March 24 and can be found at www.dol.gov/ofccp/regs/compliance/ofcccomp.htm.

Per VEVRAA, federal contractors recruiting veterans must list most of their job openings with their local employment service office and send recruitment notification to the appropriate Employment Service Delivery System, which in Alaska is one of the 21 job centers. Notification must include:

- That they are a federal contractor
- That they desire priority referrals of protected veterans for job openings at all statewide locations
- The name and address of each hiring location
- Contact information for the person responsible for hiring at each location who can verify the information in the job listing and receive priority referrals
- Contact information for any outside job search company

used, such as a temporary employment agency assisting with hiring

Federal contractors can receive recruitment and employment assistance from employment specialists in statewide job centers. Staff can help list jobs in the Alaska Labor Exchange System, ALEXsys, and show contractors where to find federal compliance information. For federal data collection, the government requires ALEXsys to retain contractors' recruitment histories for three years.

To post a job on ALEXsys or to find a local job center or other employment resources, visit jobs.alaska.gov/employer.htm.

Job center staff will also help veterans or job seekers with disabilities apply for jobs with federal contractors, help them complete the application if needed, and encourage them to self-identify at the pre- and post-offer phases of recruitment.

Employer Resources is written by the Employment Security Division of the Alaska Department of Labor and Workforce Development.

TELECOMMUNICATIONS

Continued from page 17

bone of the modern telecom infrastructure.

GCI entered the scene in 1979, which was around the same time the FCC instituted a policy of "rate integration" in Alaska, which meant Alaskans shouldn't pay more for long distance than the rest of the nation.

Lower prices and improved service were the result of the "phone wars," which lasted through the 1980s and into the 1990s along with many mergers, takeovers, and new telecommunication firms. AT&T eventually purchased Alascom and became AT&T Alascom. GCI continued to gain customers across the state, and would ultimately become the largest network in Alaska. Alaska Communica-

tions Systems (the name was said to be partly in homage to the original Alaska Communication System that evolved from the first WAMCATS network) formed in the late 1990s with the purchase and merger of several smaller networks, and immediately became a statewide player.

Today, the industry has a small share of Alaska's overall employment but plays a significant role in many people's daily lives. Telecommunications employed about 4,100 a month on average in 2013, and employment has remained largely steady in the industry since 2000. (See Exhibit 3.) Changes in employment over the past 15 years have been driven by special projects and mergers and acquisitions.