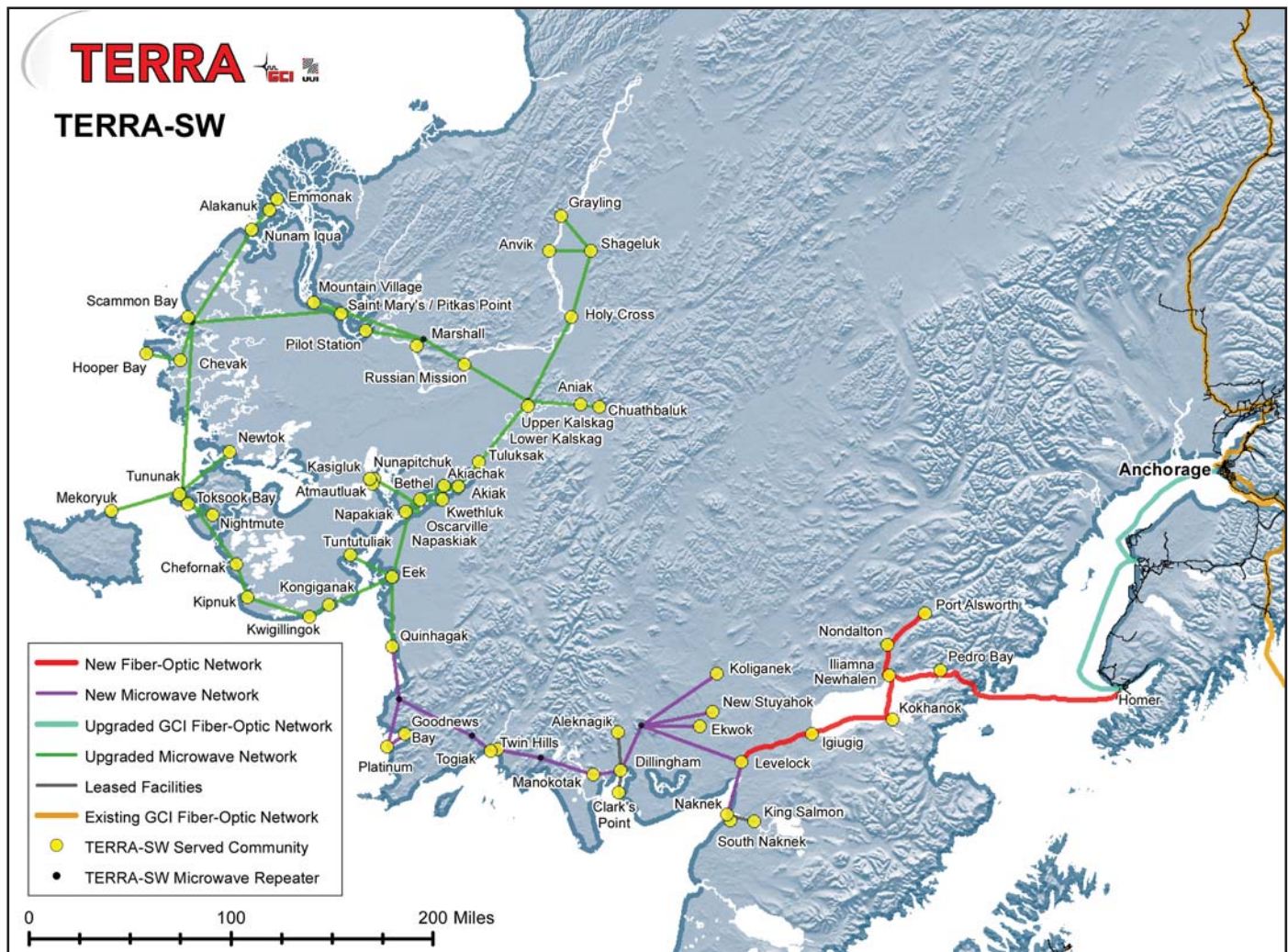


Connecting Southwest Alaska GCI's TERRA-SW hybrid network

BY HEIDI BOHI



TERRA-SW project map.

Compared to the other communities in Bush Alaska, AlexAnna Salmon thought the Village of Igiugig was technologically advanced. Then she saw what the rest of the world had at their fingertips.

"I was happy that Internet opened up new ways to do business until I went Outside and realized that if something goes wrong there, they do not have to wait four days to be back online," she says. "Time is money and when Internet or the phone goes out, we're waiting, dead on the ground."

As the acting administrator for the Igiugig Village Council, Salmon says compromised IT service resulting from inadequate infrastructure makes it difficult for the community to participate in the modern economy, or access global information resources critical for running the community's only government entity and subsidiary businesses – critical revenue streams.

Local governments rely heavily on federal grants that have shifted most of their reporting requirements and project work online. During standard quarterly

reporting periods, Salmon says she often has to work from three different Internet systems available in the community to meet deadlines, turning a 15-minute task into a three-hour exercise. It's not uncommon for her to file progress reports at 1 a.m. when there are fewer people using the limited bandwidth out of Igiugig to the rest of the world.

COMPROMISED CONNECTIVITY

Besides limiting the availability of affordable, sufficient Internet access in the region, Southwest Alaska's broad-

band deficiencies – one of several rural regions that struggle with access – also mean other communication links such as phone and television are delivered over high cost, high latency satellite conditions that result in inconsistent connectivity and long delays. Service for residential, government and business users is severely compromised leaving communities unable to participate in the modern economy, or access global information resources. It is estimated that nearly 150 hospitals, clinics and schools, along with public safety agencies, cannot meet community needs because of the lack of access to dependable high-speed connectivity.

There is a simple explanation for the limitations in Southwest Alaska's network: the communities are connected by satellites 22,000 miles above the equator, which causes delays incompatible with the high speed computer applications that are becoming more and more in demand as the region's customers look to telecommunications to deploy sophisticated applications for providing public health care and services, education and safety. Satellite technology is also prohibitively expensive, cannot be repaired after it is launched, and has a limited life and capacity. In 2007, GCI invested \$93 million in satellites that have a life expectancy of 12 to 14 years.

BETTER SYSTEM

Conversely, a microwave and fiber optic system has a life of about 50 years and it is much less expensive to make upgrades and add new capacity to, Martin Cary, Broadband Services Vice President and General Manager for GCI says. "The objective is to get as many of the rural towns we serve off of the satellite system and onto the ground," Cary says, adding that it is the only way the company will be able to procure capacity fast enough to keep up with customer demand. "When the average user in a rural community wants to access online resources, the experience should be similar to being in an urban center."

To keep pace with the region's demand and growth, GCI is building on its 16-year investment in rural Alaska with TERRA-SW, a hybrid fiber-microwave network that connects 65 villages throughout Southwest Alaska to each

other, existing Alaska fiber networks, and to the global Internet. The acronym TERRA stands for Terrestrial for Every Rural Region in Alaska and came about when GCI executives plotted their vision on a map of the state and realized that in addition to the Southwest Region, the company hopes to eventually modernize its service areas by shifting from satellite technology to the microwave-fiber optic infrastructure.

BROADBAND STIMULUS

The \$88 million project, expected to be completed ahead of schedule as early as 2011, came as a direct result of the \$7.2 billion of broadband stimulus funds given as loans and grants to improve rural broadband networks, encourage Internet use, and upgrade PC centers at community colleges and libraries across the country. Half of the money is a grant from the USDA Rural Utilities Service and The American Recovery and Reinvestment Act and the other half is an investment by GCI in the form of a \$44 million loan to United Utilities Inc. (UUI), a wholly owned subsidiary of GCI, which is Alaska's largest telecommunications company.

The first ever high-speed fiber optic and microwave connection to Southwest Alaska will extend terrestrial broadband services to 65 communities in the Bristol Bay and Yukon Kuskokwim Delta sub-regions, along with more than 9,000 households, businesses, and several public and non-profit entities such as regional health corporations, school districts, and Alaska Native organizations. It includes nine fiber segments, totaling 290 miles of submarine and land-based cable; seven cable-landing stations; and 14 new microwave towers, which collectively are capable of supporting multiple voice, data, and Internet providers.

The potential contribution to the region's economic development is one of the most significant impacts of TERRA-SW. Many of the communities in the region, especially in the Yukon-Kuskokwim Delta, are among the poorest in the nation, with more than 30 percent of the 25,000 residents who have cash incomes well below the federal poverty threshold. Although fish, furs and crafts are exported from the region, the value of these exports has

little impact on the economy. Population out-migration due to lack of jobs is a growing concern and economists say that one of the ways to decelerate this trend is by locals starting businesses and relying less on state and federal money.

DOCUMENTING SUCCESS

Once TERRA-SW comes online, GCI hopes to work with the University of Alaska Anchorage Institute of Social and Economic Research to document some of the economic successes they expect to result.

"The economic development piece of this project is what excites me most because it is going to open up so many new opportunities," says GCI Rural Broadband Development Director Krag Johnsen. "This is one of the largest economic development projects in the state's history. Without broadband, rural communities are going to get left behind. This brings them up to par with urban areas and helps create a better quality of life for those living in Southwest Alaska."

In addition to the improved Internet connectivity, the high-speed backbone that provides a direct, land-based connection to Anchorage will also carry voice communication. Cell phone antennas, which will be installed on the newly built TERRA-SW towers in communities are one of the project's primary assets and will increase cell phone reach and penetration in all the communities, Johnsen says. Besides increasing safety for locals, especially during subsistence fishing and hunting seasons, improved cell coverage and reliability will also contribute to economic development.

For business entities like the Igiugig Village Council reliable cell phone service is important for intra communications. As the largest employer in the community, it owns and runs the electric, water and sewer utilities, along with a contracting company. Many of the village council's employees are in Anchorage and Homer, and because of the required travel need to have constant communication with fellow employees in the field for survey work and the barge transport business. Ironically, Salmon says, despite cell phones locals continue to rely on CB radios for communicating because there is

currently not one provider that can meet all of the council's needs.

Like so many in Alaska's villages, Ulric Ulroan does whatever it takes to make a living. In addition to being the mayor of Chevak, a village of about 765 in the Yukon Kuskokwim Delta, he is the father of six children and teaches and coaches basketball at the high school. During the summer months he operates Chevak Bird and Culture Tours to supplement his income, hosting birders who come to site varieties including the Spectacled Eider, Emperor Geese, Sabine's Gull, Black Turnstone and Yellow Wagtail.

STAYING CONNECTED

As is the case with Salmon from Igiugig, for conducting city business it is critical that he stay connected with federal and state agencies, and organizations such as the Alaska Municipal League. During the birding season, guests book tours using internet and email, and once in Chevak stay at a remote camp that is 10 miles away from the village, so cell service is needed in case of an emer-

gency. And, as is the case with teenagers everywhere, cell phones are part of the youth culture and an important tool for coordinating team practice and travel.

"Cell phones are my main way of staying connected with the world," he says of clients that come from Australia, the United Kingdom and the Netherlands and make bookings using any combination of his web site, email and the phone. "Staying connected is very important – it's everything for my business," he says, adding that slow and inconsistent connectivity makes it "almost not worth having."

With the advent of TERRA-SW, he says, it will be much easier to grow his personal business, and take care of city and school business. "It's about time we had this kind of technology in the bush," he says.

FAR-REACHING IMPROVEMENTS

In addition to improving safety in the Southwest Region, both education and health care will also greatly benefit, Cary says. TERRA-SW will enable schools to use online resources for both K-12 students and teachers including

lesson plans, forums for sharing ideas and opinions, and tools that support innovations in teaching and learning at all levels, including special education. It will also allow students to participate in virtual and interactive classroom activities, field trips, and museums.

Telemedicine, which relies on advanced telecommunications to increase access to health care in remote areas, will also greatly benefit from TERRA-SW, GCI executives say. In addition to transmitting medical records via private health networks, improved, high-speed connections will enable technicians to send x-rays from a remote clinic to specialists in Anchorage, or Outside, just minutes after the images are taken of a patient.

"It will enhance the care available to patients in remote villages, and equip medical providers throughout the region with more to do their jobs effectively," Cary says. "Bringing high-speed, low-latency technology into these locations and knowing the impact on schools, health care, and just folks who want to be connected from home is going to be huge." □

Fast-Tracking TERRA-SW Phased Funding for TERRA-NW

BY HEIDI BOHI

GCI is fast-tracking its TERRA-SW project, with hopes the 65 villages in the Southwest Region will benefit from the historical development as early as this year. This project was funded by an \$88 million loan and grant from the Rural Utilities Service as part of the Stimulus Act.

In the second round of Stimulus Funding GCI applied for \$154 million for TERRA-NW, the sister telecommunications upgrade to TERRA-SW that would have covered 80,000 square miles across the Norton Sound and Northwest Arctic sub-regions and delivered end-to-end terrestrial broadband service to about 4,000 households and 300 businesses in 20 villages in the Norton Sound and Kotzebue Sound areas of the state.

Unfortunately TERRA-NW did not receive stimulus funding, and now GCI says it will have to build it in smaller pieces to make it financially feasible. A grant proposal recently submitted to the Regulatory Commission of Alaska, requesting funding through its Broadband Internet Access Grant Program, lays the development out in three phases starting in 2012. Phase I would build from Grayling to Unalakleet. Phase II extends from Unalakleet over to Nome and includes Shaktoolik. Phase II brings in St. Michael, Stebbins, Elim, Golovin and White Mountain.

Although there are fewer communities along the TERRA-NW route, because the distances between villages are longer than those for the Southwest piece, it will require more remote locations to be built, making the per-village cost higher. At the same time, because the TERRA-SW project is now under construction, several cost and schedule efficiencies can be realized when the northwest extension goes through.

Although funding sources are still uncertain, GCI continues to evaluate programs and partnerships that make these projects viable for the telecommunications company, GCI Broadband Services Vice President and General Manager Martin Cary says. It anticipates substantial capital investments over the course of the next seven years and finding funding partners for the remaining work.

Like TERRA-SW, this companion project will establish a multi-generational communication solution for the vast region and expand communications options for all users, supporting public and private economic development, improving critical telemedicine and distance learning services, and enhancing operations for nonprofits, and government and tribal entities.

"Alaska is the only place we do business, and we plan to continue to invest in the state," Cary says. "TERRA-NW is the next logical investment."

GCI is also looking at other corridors where it would make sense to implement telecommunications technologies similar to the TERRA projects, including one that lies in the area between Prudhoe Bay and Barrow. Although it is not on the company's immediate horizon, Cary says there is a lot of communication traffic in and out of Barrow and the Barrow Arctic Science Consortium also makes it an interesting location.