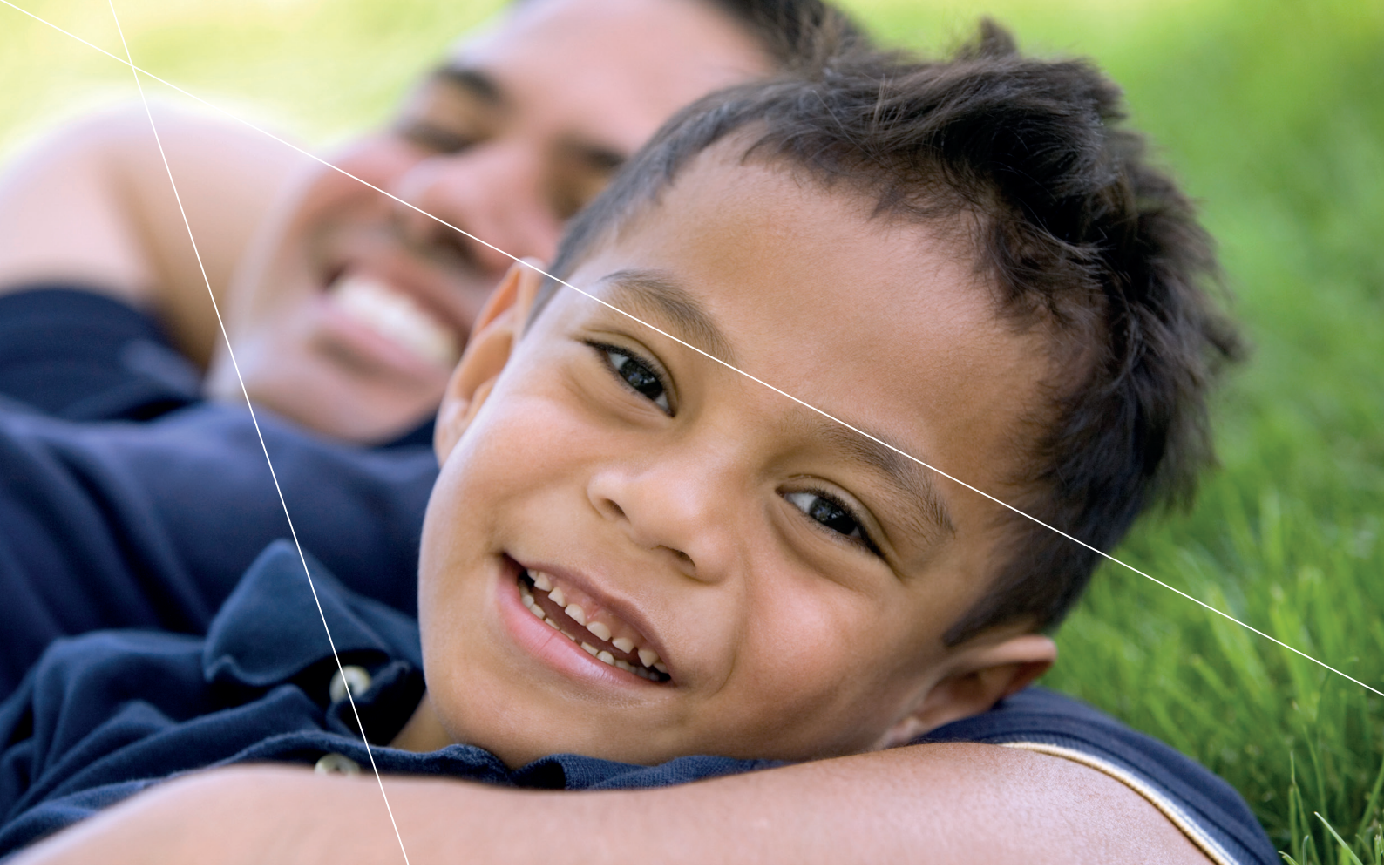

NATIONAL BROADBAND ROLLOUT

American Samoa Brings O3b Fiber Equivalent Internet to Islanders

Halfway between Hawaii and New Zealand lies American Samoa, a beautiful group of volcanic islands in the South Pacific Ocean. The entire American Samoan land mass is about 200 square miles, slightly larger than the city of Washington, DC.

Settled as early as 1000 B.C., Samoa was only found by explorers from Europe in the 18th century. In 1899 a treaty was signed, effectively dividing control over the Samoan archipelago between Germany and the United States. The following year, the US formally occupied its portion of the island chain, a smaller group of islands including the excellent harbor of Pago Pago, and incorporated it as a United States Territory.

Even though American Samoa is a remote set of islands, it is fortunate to have an undersea fiber cable, known as the ASH (American Samoa Hawaii) Cable, connecting it to the Hawaiian Islands, and thus the outside world. In addition, there has been a legacy geostationary (GEO) satellite connection to the island as well. Unfortunately, the ASH cable, a piece of the PACRIM East Cable laid in the 1990s and repurposed to connect American Samoa to Hawaii when it was decommissioned, is an aging fiber line.

The reliability of the ASH cable has decreased in recent years, even as the demand for internet traffic has been on a steady increase.

The American Samoa Telecommunications Authority (ASTCA) is a Local Exchange Carrier and telecommunications provider, owned by the territorial government. ASTCA was created by an executive order in 1998, and operates an Internet Service Provider (ISP), Long Distance Exchange, and Mobile CDMA network with 3G data services.

In 2011 ASTCA experienced an all-day outage on the ASH cable and multiple severe outages thereafter that helped underscore the need for a reliable and scalable connectivity.

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GOVERNMENT MANDATES

In 2010, U.S. Agriculture Secretary Tom Vilsack announced a program to bring broadband internet to communities in 18 states and territories across the country. The funding for the projects was provided through the American Recovery and Reinvestment Act, specifically for the purpose of improving communications infrastructure across rural America. “These broadband projects will provide rural America access to the tools it needs to attract new businesses, educational opportunities and jobs,” Secretary Vilsack said. “The Obama Administration understands that bringing broadband to rural America is an economic gateway for people, business owners, and key institutions—such as libraries, hospitals, public safety buildings and community centers. Broadband is important for rural communities to remain strong in the 21st Century.” The U.S. government awarded ASTCA over $95 million USD—$10,000,000 as a loan, $81,034,763 as a grant and $4,462,000 in private investment—to help fund the “Broadband Linking the American Samoa Territory” (BLAST) Project. The purpose of the funding was to replace an old and deteriorating copper line infrastructure, with a fiber optic network that could stand up to the harsh weather conditions on the island archipelago, linking the main islands of American Samoa. The infrastructure upgrade was vital to bringing broadband connectivity to every household, business, and institution in the territory.

Noting that ASTCA was fortunate to be the recipient of funds for the broadband project, Jason Betham, CFO of ASTCA, said the funds would be put to good use in achieving their objective to provide broadband access to all people and businesses in the territory. “The BLAST network carries our services from our central office directly into the home, and American Samoa is the first in the world, not only to have the connection from a central office to the home completed, but throughout the entire country,” Mr. Betham said. And the results of the improved connectivity led to a significant uptick in overall internet usage. “We’ve seen an increase of about 50% in our data usage for business customers. But for residential customers, usage has increased by 100 hundred percent,” according to Mr. Betham.

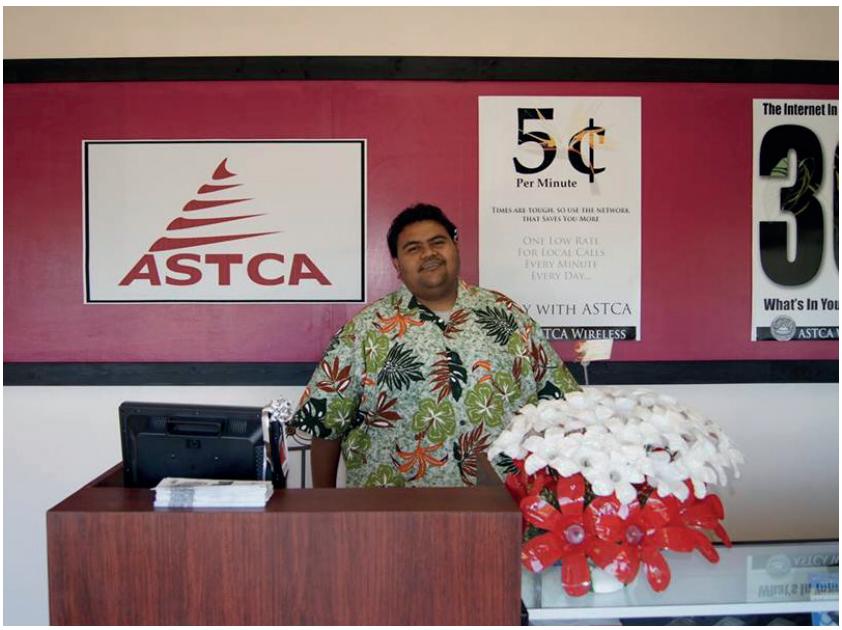
Broadband for All
American Samoa consists of five main islands and two coral atolls

INNOVATION – SAMOAN STYLE

ASTCA’s problem of a single, thin satellite link for international connectivity coupled with only copper wire to the home meant residents of the territory were very dissatisfied with the low speed and poor quality of voice communications on the islands. Additionally, the lack of redundancy caused frequent outages, which was even more irritating to ASTCA’s customer base. Broadband data connectivity at home or via mobile phones was somewhat sparse, and those that did have broadband suffered the same poor service. Even business customers didn’t have a communications service they could count on to meet their needs or deliver the professional-level connections to Hawaii and to other international business centers needed to run a first-rate business.

ASTCA knew that the key to improving service for their customers was to improve the underlying telecommunications infrastructure. Satellite communications have historically been the best and most cost-effective way to connect remote

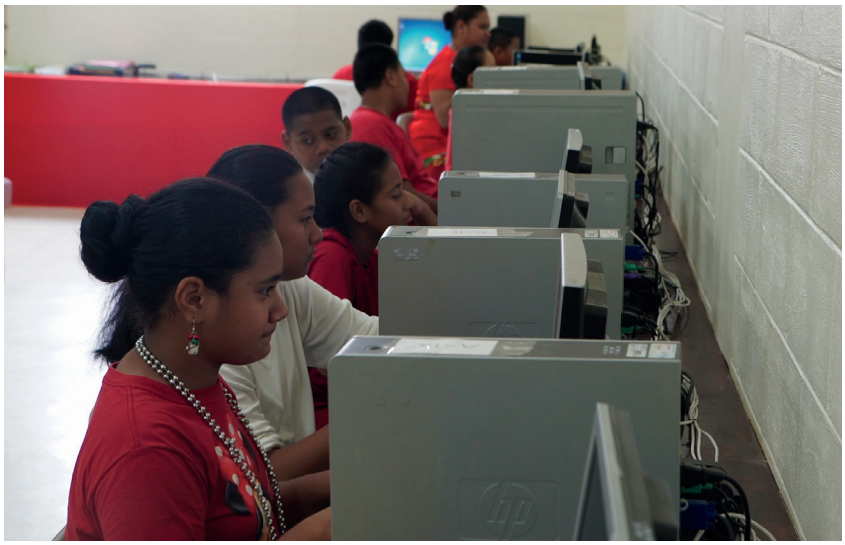
Pacific islands. The technology is proven, and a satellite footprint can cover multiple islands simultaneously with just a satellite antenna and local copper distribution to homes and businesses. However, the rapid uptake of modern applications using SD and HD video, cloud-based apps and other data hungry and latency- sensitive applications have exponentially increased the capacity that a modern telecommunications provider requires to serve data users. ASTCA found the needs in America Samoa to be the same as everywhere else, but adding significant new capacity via undersea fiber to an island in the middle of the Pacific is very costly, and can't be done quickly. And the traditional, legacy geostationary (GEO) satellites offering capacity in increments of 1-4Mbps — at a high cost per Mbps — while delivering a very high latency of over 500msec roundtrip, were not an option to deliver the quality of service expected.



The American Samoa Telecommunications Authority (ASTCA)
Internet Service Provider (ISP), Long Distance Exchange, and Mobile CDMA network with 3G data services

So ASTCA was in a quandary with the existing choices for connectivity: an exponential increase in capacity simply could not be achieved via traditional satellite, and there wasn't the time or the money to add the needed capacity via a new undersea cable. To make matters worse, for many years the island population and thus ASTCA's subscriber base, had been shrinking. ASTCA felt this trend could be reversed with the right connectivity solution, since the telecom infrastructure of any nation or territory is a vital component to a robust, modern economy, and a healthy economy supports a stable or growing population.

With the approval of the funding ASTCA was set to build out a truly world class distribution network on the island, connecting each home and business. But they would still have to rely on the aging ASH cable and GEO satellite link to carry traffic off the island. This would create a major internet bottleneck since almost all web surfing, e-commerce, online education, and other internet-based activities would be interacting with servers hosted outside of American Samoa. It would essentially be like building a super highway between a few cities, with only a single dirt road leading to the highway. Communications between residents might be quick but most of the content and services ASTCA customers would want to access would be painfully slow, or altogether inaccessible.



The Broadband Linking the American Samoa Territory (BLAST) Project
Support for e-learning, e-health and economic development efforts

In 2012 ASTCA attended the Pacific Telecommunications Council (PTC) for meetings on the BLAST program, knowing they needed a backhaul solution for terrestrial fiber. They had started to scope the problem and concluded they needed a 135Mbps connection. The best throughput they could hope for using traditional GEO satellite systems was only a 20Mbps

connection. The networking experts at ASTCA did not believe they had the teledensity on American Samoa to support the business case for a new undersea fiber cable.

During the PTC 2012 meetings, ASTCA representatives discovered a new satellite company called O3b (now part of SES Networks), focused on bringing high-performance internet connectivity to hard-to-reach places that were not reachable by fiber. This was the exact situation ASTCA found itself in.

SES Networks' O3b MEO satellites were much closer to the earth than a geostationary orbit requires, meaning that the latency—the time it takes a signal to get to the satellite and back to earth—was drastically lower than the GEO systems they had been using, under 150msec as opposed to over 500msec. Also, the data throughputs available over the O3b system were substantially higher than that of GEO—up to 2Gbps in a single beam, which prior to O3b was absolutely unheard of in satellite.

Essentially, O3b could provide the benefits of fiber, comparably high throughput and low latency, but are deployable much faster and at a lower cost than a new undersea fiber line.

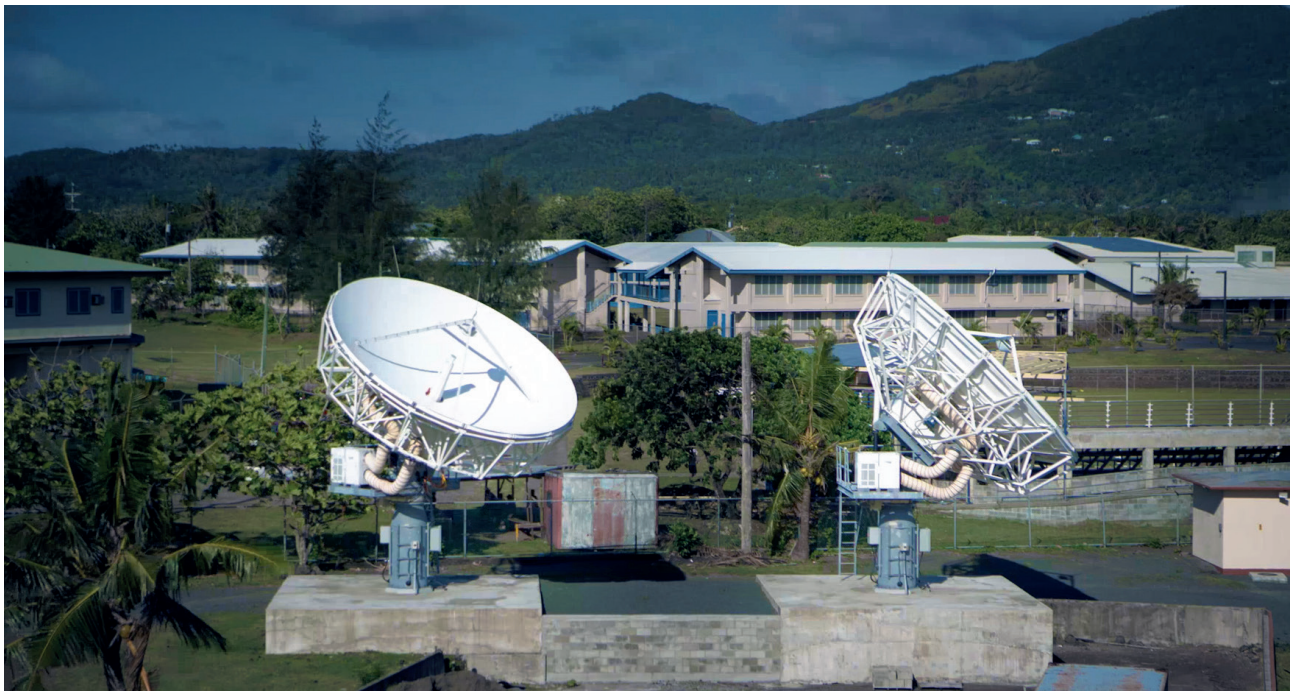
ASTCA's then CEO, Aleki Sene, Sr., had a vision of 1Gbps capacity to American Samoa, and elected to be one of the first users of the new O3b service. He also had the foresight to install a 7.2M antenna, planning for the scaling of the service he assumed would be needed once subscribers realized how much more they could do with true broadband internet performance. Mr. Sene wanted to be sure that the internet experience on American Samoa would truly be world class.

ASTCA implemented Multiprotocol Label Switching (MPLS) in order to control the quality of services for different users (business versus consumer) and different applications (voice versus data). This allows them to make the transmission path transparent to users and to always provide them the highest quality of service (QoS) based on available capacity and routing.

ASTCA implemented a hybrid satellite solution with the downlink over O3b and the uplink over the ASH fiber line connecting American Samoa to Hawaii. This gives them the equivalent of a 90msec roundtrip data latency.

In April of 2015, ASTCA first came up on the O3b network. In October of 2015, ASTCA began the rollout of fiber to the premises across the entire territory. The outer islands had a greater need over the more populated areas. Even though focusing on the population centers would have yielded higher revenues more quickly, ASTCA made the decision to serve their subscriber base with the greatest needs first. Customers in the outer islands had actually been used to shouting so as to be heard on voice calls before the O3b and fiber rollout. As an American Territory, ASTCA is subject to the same 911 requirements as any other US territory or state.

Though the conversion required a truck roll to every house and place of business across the territory, the results have been astounding: there has been a 600% increase in data usage since the O3b backhaul service was brought up and a 20% increase in revenue. ASTCA has now essentially converted all residential and business locations, bringing fiber equivalent internet to the entire population of American Samoa.



SES Networks' O3b Teleport in American Samoa
Providing resilient high-performance, low latency backhaul and internet services

NATIONAL BROADBAND ROLLOUT

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Bucharest | Romania
Dubai | United Arab Emirates
The Hague | The Netherlands
Istanbul | Turkey
Johannesburg | South Africa
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