A Multinational Ground System Delivering Affordable Broadband Across Asia Pacific

There are 600 million people across the Asia Pacific (APAC) region with little to no access to the internet. A burgeoning commodities market and governmental support for better access to education and medicine have helped to drive a business case to provide it. Access to reliable connectivity has proven to support developing economies, educate communities and save lives. Thanks to Kacific Broadband Satellites Group, satellite services are opening the door to these opportunities for the 600 million.

Kacific's Mission to Close the Digital Divide

APAC, a vast region crossing oceans and mountainous terrain, has limited infrastructure for terrestrial connectivity and high cost barriers for providers trying to enter the market.

In 2013, Christian Patouraux and his team went to work figuring out how to deliver affordable connectivity in the developing regions of APAC where no other satellite operators were focused at the time. With his ingenuity, creativity, and many long-standing relationships in the industry, Patouraux founded Kacific Broadband Satellites Group for the sole purpose of closing the digital divide in APAC, one terminal at a time.

Kacific secured the funding for their project on a strong business-to-business services model based largely on the commodities growth potential in the region.

The goal was to supply reliable, cost-effective broadband across 25 countries which required an advanced non-terrestrial network built upon a specific high-throughput satellite (HTS) and multiple digital gateways.

Kacific's network consists of 56 spot beams servicing 25 countries across Asia Pacific. Source: Kacific Broadband Satellites Group

An End-to-End Ground System for Affordable Broadband

After Kacific chose Boeing to build their Ka-Band HTS satellite, Kacific1, they needed an equally advanced ground

infrastructure to support it. In 2018, Kacific selected Kratos to build the end-to-end ground infrastructure for their new network.

"We selected Kratos because of their balanced focus on high quality and value. We saw them as a committed partner that was present globally to walk with us through the operational journey of our satellite, who would develop a deep understanding of our business needs and would continue to ensure the system evolves to meet Kacific's changing needs over the long-term."

Christian Patouraux, CEO, Kacific Broadband Satellites Group

Kratos assisted in the gateway location selection, which was integral in obtaining the best service quality while keeping costs low. Beyond location selection, it was also important that the turnkey ground system installation process include efficient site survey management, civil works, and equipment import.

Five 9m Ka-band gateways were manufactured and constructed across three different countries to support the network: the Philippines, Indonesia, and Australia, all to be installed simultaneously. As part of the process, Kratos:

- Provided an onsite engineering team at the teleport locations throughout the installation process.
- Ensured compliance standards were met including an overall evaluation of antenna performance.
- Integrated the gateway hardware with software for efficient monitoring and control.

"Overall, Kratos played a crucial role in the gateway installation process by providing expertise, project management, and integration services to ensure the successful deployment and operation of the antenna systems for Kacific."

John Loke, CTO, Kacific Broadband Satellites Group

Connecting Gateways Across Land and Sea

With multiple sites spread over such a large service area, a key question was how to connect everything in a reliable and

Kacific Gateway in Pasuruan, Indonesia Source: Kratos

resilient way. Kacific needed to connect their gateways with the ability to switch signals from one gateway to another to endure unpredictable tropical weather conditions. Traditional radio frequency (RF) over fiber technology was not a viable option because of the high cost and the geographical distances between sites.

Kratos offered an innovative approach to connect the gateway locations and network operations center using RF over IP technology, sending digitized packets over a network connection so the system could react and respond immediately to potential service interruptions.

Three of the gateways are treated as primary sites and the other two are treated as diversity sites to provide additional resiliency that withstands rain fade, natural disasters, or any other service interruption event.

SpectralNet Wideband digitizers at Kacific gateways convert RF signals into IP packets to remove distance barriers in RF signal transport. Source: Kratos

Beyond the antenna hardware and digitizers, Kacific employed a suite of additional products to assure optimal operations and quality of service. These products provide

"Several key factors influenced Kacific's selection of Kratos antennas including performance, cost-effectiveness and ease of maintenance to support the reliable and efficient operation of the satellite system."

John Loke, CTO, Kacific Broadband Satellites Group

Kacific's network includes five 9m antennas across APAC – in Australia, Indonesia and the Philippines. Source: Kratos

advanced monitoring and control of the ground system and the satellite, supply information about signal quality and interference, and analytics on the entire system so the Kacific team can operate their network with real-time information and in a constant state of operational improvement.

Reliable & Affordable Broadband Connectivity Across APAC

Internet connectivity is fundamental in supporting good quality and equitable healthcare, education and services. Connecting isolated communities sustainably and profitably is a challenge for the satellite industry, but Kacific continues to prove that it's both possible and profitable.

When the Kacific1 satellite launched in the second half of 2019, the gateways were complete and commissioned to begin receiving signals in Indonesia, the Philippines and Australia with all the management data converging at the network operations center located in Singapore. By the first half of 2020, Kacific1 broadband services commenced across

The Suite Details

of an Advanced Satellite Ground System

Antennas tend to be the most visible sign of a ground system but they are just one part of a complex suite of interconnected hardware and software components. The other Kratos products employed in Kacifc's next generation network included:

C2 – EPOCH® - the industry-leading C2 solution for real-time satellite command and control and payload status monitoring

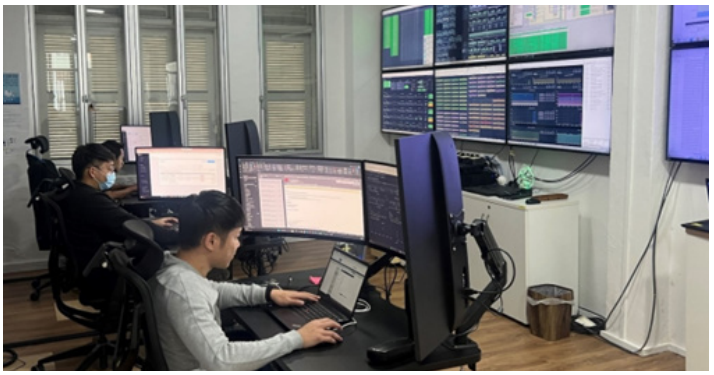
TT&C – XR1 TT&C Modem – for RF signal processing of downlink data from the Kacific1 satellite

RF – Monics® - for centralized RF monitoring and interference detection across the entire network

M&C – Compass® - to manage monitor and control a wide range of devices on Kacific's network

IF – SpectralNet® - digitizers employed at each gateway location to convert RF signals into IP packets for transport over Kacific's IP network

SSA – Skyminer – for real-time situational awareness tying performance data together to optimize operations over time



Kacific's network operations center in Singapore Source: Kratos

"Kratos is a collaborative partner that continues to be aligned with Kacific in the way we operate and in our vision for the future. I am delighted to say that we would like to continue that journey with Kratos as we go forward and expand our constellation of geostationary satellites."

Christian Patouraux, CEO, Kacific Broadband Satellites Group

Asia Pacific. And today, there are hundreds of new terminal deployments across the region supporting businesses and communities where access goes far beyond business to support improved education and healthcare services.

Kacific is driving growth and social and economic development in the areas where connectivity is most in need and where price is cited as one of the major barriers to Internet access and use. Their creativity and ingenuity in building their next generation network and their selection of space and ground system technology partners have been key to their success in keeping service cost well below the threshold of broadband affordability set by the International Telecommunications Union (ITU) and UNESCO. For Kacific broadband services, the per gigabit cost is less than 2% of Gross National Income per capita.

Kacific is carrying their service delivery model forward with plans to expand its existing network with new infrastructure in Asia Pacific. This means increased access to affordable and reliable broadband internet services to APAC communities and businesses like Techiron Resources, Oil Search Foundation, and Dili Vanilli whose satellite services extend beyond their own use.

Kacific broadband service delivery breaks the cost barrier to provide a myriad of opportunities and critical services support to remote communities across Asia Pacific.
Source: Kacific