Singtel Satellite

Customer Case Study
Earth Observatory of Singapore (EOS)

Making a real difference Earthquake research with Singtel BGAN

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Business Challenge

Founded in 2009 by the National Research Foundation, Ministry of Education and NTU, The Earth Observatory of Singapore (EOS) was setup to conduct fundamental research on earthquakes, volcanic eruptions, tsunami and climate change to tackle the devastating effects these events affects the regions in and around Southeast Asia.

To forecast earthquakes and tsunamis more reliably, EOS' Tectonics Group setup the Sumatran Global Positioning System (GPS) Array (SuGAr) to collect, process, analyse and archive data on tectonic plate movements in the region.

According to Technical Director Dr Paramesh Banerjee, to be truly effective, the data collected at its GPS permanent stations need to be transmitted via satellite telemetry to EOS. A review of its infrastructure in 2009 revealed the use of legacy GPS receivers with limited memory capacities. This impeded timely data collection across its network of 50 GPS permanent stations geographically dispersed throughout the vast Sumatra Island, which is approximately ten times the size of the Netherlands. Without a reliable satellite system, after each earthquake, EOS had to dispatch up to three groups of research technicians in two-man teams to physically collect data from a sample of 10 to 15 GPS permanent stations.

Executive Summary

Customer Name
Earth Observatory of Singapore (EOS)

Industry
Conservation/Natural Resources

Business Needs
- Real time monitoring and data collection of tectonic plate movements
- Infrastructure to transmit time sensitive data across vast land
- Reliable satellite system to replace manual data collection
- Save costs in data collection and transfer savings to critical research work

Singtel Solution
Singtel's Broadband Global Area Network (BGAN)

Business Value
- Increased effectiveness and responsiveness of critical data transmission upon occurrence of quake
- Gained time and cost savings of up to S$ 50,000
- Enhanced capabilities to raise alarms and save lives

Singtel Satellite Solutions

Singtel's Broadband Global Area Network (BGAN) allows organizations to securely transmit both data and voice from remote locations via a group of geostationary satellites. Without relying on external antenna or terrestrial infrastructure, Singtel BGAN supports remote broadband transmission with guaranteed data rates on demand of up to 492kbps over shared channels.

To address their infrastructure needs, the 1.6kg, single-user Singtel BGAN Wideye Sabre 1 terminal, a robust, highly-portable and compact solution with cost-effective voice and high-speed data transmission of up to 240/384kbps (send/receive) was implemented after a trial was conducted to verify the BGAN terminals' ruggedness against the high humidity and temperatures of the remote areas in which the GPS permanent stations are installed.

Compared to other solutions, Singtel's solution offers a broad range of interfaces ranging from RJ-45, RJ-11 to Bluetooth, providing myriad connectivity options in the field and a swiveled antenna to facilitate rapid and easy pointing for satellite connection. These improved connectivity options helps EOS to eliminate their previous method of dispatching up to three groups of research technicians in two-man teams to physically collect data, improving operational efficiency and saving on manpower cost as a result.

Besides transmitting data collected at its GPS permanent stations, Singtel BGAN also helped to monitor the working condition of the GPS receivers and to inform EOS regarding the electrical health of the power system's charge controller.

In addition, EOS connects twice daily to Singtel BGAN to ensure the working condition of its instruments to optimise data connection costs. During periods where there are no earthquakes, EOS connects once in five days to download the data collected.

Key Benefits with Singtel Satellite Solutions

Barely four months after going 'live', EOS' Singtel BGAN implementation was put to the test when a powerful 8.6 magnitude earthquake struck Banda Aceh, Indonesia on April 11, 2012.

A pleased Dr Banerjee shared, "The April 11 Aceh earthquake marks the first time EOS could completely rely on Singtel's solution to transmit the critical data captured across SuGAr. We are able to begin analysing the earthquake data as early as 12 hours after the quake occurred, which enhanced our understanding of the earthquake process in greater details. This increased our effectiveness and responsiveness."

In terms of operational efficiency, EOS was bogged down with the logistics of sending its research technicians out into the field as soon as possible to manually collect the data captured across SuGAr. Due to the high transportation and manpower costs, only data from a sampling of 10 to 15 stations were collected.

"With Singtel's solution, we can now download the data across all our GPS stations remotely. This saves up to S$50,000 per trip – valuable funding we can plough back to our critical research work," said Dr Banerjee. He added, "Unlike previously, where our researchers waited days for the earthquake data to come in, with Singtel BGAN, our researchers are losing no time in starting their post-earthquake analysis."

EOS' researchers produce co-seismic offset reports after each earthquake, which are shared with the earth science community and tsunami warning centres around the world. Based on the earthquake occurrences along the highly active Sumatran fault, one area EOS' researchers are currently focusing on, is the crustal behaviour along a 300-km section in the northern Mentawai island that has not seen a major rapture in more than 200 years.

That is why, when abnormalities were detected in the initial data captured after the April 11 Aceh earthquake, EOS raised a warning to scientists in Indonesia's Mindanao island regarding the potential of an earthquake in their area. As more data were analysed, these initial observations proved to be a false alarm.

"Every day, millions of lives remain vulnerable along the fault lines. Though the alarm we raised right after the April 11 earthquake was a false one, the sheer capability to do that testifies to the tremendous value we are gaining from our Singtel BGAN investment," shared Dr Banerjee.

Furthering a Long Term Relationship

To Dr Banerjee, Singtel BGAN is key to supporting their ongoing research initiatives, "Singtel BGAN is one of our foremost communication systems. I don't think we can find a better solution to support our research work. It is strategic and key to our effectiveness, as our researchers strive to enhance our understanding of earthquake mechanisms day by day."

Looking ahead, EOS is looking at employing broadband technologies more extensively to expand its SuGAr network into a seismic data network.

"Sumatra's immense size makes this data collection work very tedious and costly. Boat trips from Padang, the main city of Sumatra to the remote spots where our GPS permanent stations are placed, can take up to three days."

Dr Banerjee, Technical Director, EOS

About Singtel

Singtel is Asia's leading communications group providing a portfolio of services including voice and data solutions over fixed, wireless and Internet platforms as well as infocomm technology and pay TV. The Group has presence in Asia, Australia and Africa with over 550 million mobile customers in 25 countries, including India, Indonesia, the Philippines and Thailand. It also has a vast network of offices throughout Asia Pacific, Europe and the United States.

About Singtel Satellite

Singtel Satellite is Asia's leading provider of one stop satellite communications and ICT solutions, driving innovations to meet voice and digital challenges in Fixed and Mobile Satellite segments on both land and at sea.

With a strategic focus on Maritime communications, Singtel Satellite engages the key needs of Maritime customers with broadband satellite communications and ICT applications in Crew Welfare, Operational Efficiency, and Monitoring and Control, bridging mission critical communication gaps between ship and shore.

From satellite to fibre to IP, Singtel Satellite offers global coverage and versatility across platforms. Backed by 3 teleports pointing to more than 30 satellites and supported by our award winning IP VPN infrastructure and an extensive terrestrial network of more than 200 Points of Presence (PoPs) in 160 global cities – Singtel Satellite ensures quality customer experience in communications and connectivity.

Committed to delivering service excellence and with more than 35 years of collective experience, Singtel Satellite empowers global customers with complete solutions to organically drive productivity, efficiency, and experience.

Awards

Asia Communication Awards 2015
Satellite Operator of the Year

VSAT Industry Awards 2014
VSAT Service Provider of the Year

The Technical Innovation Award
Seatrade Asia Awards 2012, 2010, 2008

Global Top 20 World Teleport Association
Top Teleport Operators of 2013, 2012, 2010,2009

Asia Business Continuity Awards (ABCA) 2014
NCS - Business Continuity Provider of the Year

Computerworld Readers Choice Awards 2014
Singtel Managed Connectivity and Managed Services

Computerworld Readers Choice Awards 2014
Singtel EXPAN Hosting Services

NetworkWorld Asia - Information Management Award
Best in Security-as-a-Service (2012-2014)
Disaster Recovery & Business Continuity (2014)

NetworkWorld Asia - Readers Choice Award
Best Managed Services (2008, 2009, 2010, 2011, 2012)
Managed Security Services (2014)
Managed Infrastructure Services (2013, 2014)

*Visit http://www.singtel.com/business_awards to download the reports

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