



# Sustainable Development

How satellite connectivity can enable successful delivery of the United Nations' Sustainable Development Goals

The United Nations (UN) has set 17 goals designed to end global poverty and hunger by 2030. Inmarsat can deliver the satellite connectivity that is essential to giving people everywhere access to the modern digital world – and the tools they need for a brighter, sustainable future.

At the United Nations Sustainable Development Summit on 25 September 2015, world leaders adopted 17 Sustainable Development Goals (SDGs) to end poverty, fight inequality and injustice, and tackle climate change by 2030.

Within the goals are 169 targets, such as eradicating extreme poverty (people living on less than US\$1.25 a day), eliminating violence against women, and promoting the rule of law and equal access to justice.

It is widely recognised that access to the digital world is essential to lift communities out of poverty and sustain economic growth.

In its discussion paper Working Together to Connect the World by 2020, the International Telecommunication Union (ITU) sets out how information and communication technologies present unprecedented opportunities for advancing inclusive growth, and highlights global initiatives to get another 1.5 billion people using the internet by that date.

It draws on a significant body of research showing that access to broadband leads to increased economic activity across multiple sectors, through access to education, healthcare, banking services, e-commerce etc.

The paper states that there are still large gaps in connectivity – mainly due to a lack of effective policies, tools and investment – and that filling these gaps is essential if we are to achieve an inclusive digital society accessible by all.

The World Bank Group’s World Development Report 2016 states that nearly six billion people do not have high speed broadband (5Mbps and above), while some 60 per cent of the world’s population have no internet access at all, effectively cutting them off from the information and tools they need to prosper.

Both reports conclude that countries need to invest heavily in infrastructure and effective regulation to give disadvantaged people access to the digital world. But even where there is the will, there will always

be communities that are just too remote to make an investment in building and maintaining terrestrial infrastructure for 3G, 4G or fibre networks economically viable.

That’s where satellite connectivity comes in with the game-changing ability to bridge the digital divide between urban and rural populations, anywhere in the world. There’s no need for new, expensive and logistically challenging infrastructure – the satellite constellations and ground networks are already there. All that is required is a compact, ultra-portable satellite terminal (which can support multiple users) and a PC.



## Service benefits

### M2M

- > Affordable two-way data connectivity for messaging, tracking and monitoring
- > Ideal for fixed or mobile asset monitoring
- > Choose from a range of low data rate services
- > Global network availability
- > Reliable network

### BGAN & BGAN Link

- > Global 3G IP network for voice and data broadband where terrestrial or cellular coverage is unreliable or non-existent
- > Easy set-up – be online in minutes with no technical expertise
- > Reliable network – 99.9% Inmarsat-4 satellite and ground network availability
- > Compact, portable terminals
- > Low power consumption – so projects in rural areas with limited power access can still be serviced through a range of battery, mains and solar power options

### Global Xpress (GX)

Global Xpress provides reliable, high-speed connectivity for your organisation, no matter where in the world it is located. Designed to provide a consistent user experience, from the equipment used at a remote location to the service delivered through the pioneering satellite and ground network, Global Xpress is the complete high-speed broadband solution. Inmarsat offers its services through a range of partners around the world. Contact us for information on your local provider and to find out how our range of services and solutions can add value to your business

## Global satellite connectivity

Inmarsat is the leading provider of global, mobile satellite communications services, creating fast, reliable connectivity on land, at sea and in the air.

Our mission is to power global connectivity, by enabling the deployment of advanced digital technologies in industries and regions where the lack of terrestrial infrastructure is holding back development.

Our global networks are renowned for providing highly robust broadband services and dependable connectivity all over the planet, including to the most remote of communities.

Our 15-year partnership with emergency communications agency Télécoms Sans Frontières has shown the power of satellite connectivity in the immediate aftermath of disaster and in supporting the long-term sustainable redevelopment of remote communities.

We have the means, today, of supporting the delivery of many of the UN’s Sustainability Development Goals.



# Health

eHealth solutions – technology-enabled healthcare applications coupled with internet connectivity – are pivotal to achieving the SDGs relating to health and wellbeing.

A shortage of trained medical workers in isolated communities, as well as a lack of healthcare infrastructure, severely limits access to quality healthcare. As well as helping to counteract a lack of healthcare infrastructure, Inmarsat services can be used to support an under-skilled workforce, control the spread of communicable diseases and record the increase of manageable conditions such as diabetes.

Such provision of healthcare services can have a powerful impact. A community health project (see panel) to identify chronic diseases amongst isolated villagers in Benin, West Africa, for example, used Inmarsat’s BGAN Link to transmit medical data for immediate diagnosis at an urban hospital, meaning patients could begin treatment straightaway. BGAN Link is a low cost way of accessing high monthly volumes of data over sustained periods and uses the unrivalled reliability of the Inmarsat-4 network, so it can be set up anywhere.

In Gabon, West Africa, a videoconferencing solution utilising BGAN, Inmarsat’s flagship global broadband voice and data service, brought ultrasound technology and expert support to rainforest communities who previously could only seek medical help and advice by making a difficult journey to the vast area’s single hospital (see panel).

In Nigeria, we worked with Mobile Alliance for Maternal Action (see panel), alongside other international organisations to deliver maternal and child health services to 50 poorly served rural communities – a desperately needed service in a country with the second highest under-five and maternal death rate in the world.

Such health projects can also enable a more equitable treatment for girls and women, by empowering them through access to health information to improve their lives, especially during pre and post-natal care.

Longer-term health projects can also improve the sustainability of communities. For example, some projects are designed to be self-sustaining, teaching the local community how to operate eHealth technologies so that the benefits can still continue without external supervision.



Ensure healthy lives and promote wellbeing for all at all ages..



Ensure availability and sustainable management of water and sanitation for all.

## CASE STUDY SOS Children’s Villages Benin

A telemedicine initiative, launched in September 2014, tested remote healthcare for the benefit of around **1,346** children and their families in Benin, West Africa.

Charity **SOS Children’s Villages Benin** worked with clinics in two rural locations in the Abomey and Dassa-Zoumé regions, and used a series of community consultation programmes to monitor, diagnose and treat adults and children.

The clinics utilised the Safe Triage telemedicine application to gather the patients’ medical information on smart tablets, and send it in real time via BGAN Link to a secure server so urban hospital doctors could monitor and evaluate the villagers’ health.

Over the course of the first three months, the clinics saw over **850** men, women and children and remote doctors were able to identify instances of diabetes, hypoglycemia, hypertension and other conditions, and refer these patients for treatment. By catching the conditions early, and not waiting for more serious symptoms to develop, treatment becomes easier and safer. The technology enabled **358** consultations for people within the community that were not benefitting previously from SOS programmes and identified more than **70** individuals with serious conditions that required immediate treatment – attention that they would not previously have received for weeks or months, if at all.

Following the successful pilot the project is still in operation today.

## CASE STUDY Vsee ultrasound in Gabon

The **Albert Schweitzer Hospital** in Gabon, West Africa serves around **60** villages spread throughout the surrounding rainforest, many of which are only accessible by boat.

In 2013, US videoconferencing company VSee, a specialist in telemedicine solutions, took part in a trial using its battery-powered ultrasound field kit and a lightweight, mobile BGAN terminal.

Travelling out to the communities, a Harvard medical student conducted ultrasounds on villagers’ eyes, ears and chests and relayed the images in real time to a doctor at the Albert Schweitzer Hospital, with the two being able to discuss what they were seeing on the spot.

A three-way consultation with an obstetrician at Harvard Medical School also checked the health of an eight-month pregnant villager, measuring the baby’s growth and position, and bringing her the news that she was expecting a boy.

On the back of the successful trials in Gabon, VSee went on to work with Syrian refugees in Kurdistan, successfully treating hundreds of patients with a range of conditions by consulting with specialists around the world.

## CASE STUDY MAMA in Nigeria

In 2015, Inmarsat worked with international partners in Nigeria including **Mobile Alliance for Maternal Action (MAMA)**, Praekelt Foundation, SURE-P, and Dalberg Global Development Advisors to deliver maternal and child health services to **50** physically and technologically disconnected rural communities.

Clinics in these remote areas used BGAN Link Wi-Fi hubs to get access to online health information from MAMA in order to help improve maternal and child health outcomes.

MAMA is a public/private partnership specialising in delivering localised health information to new and expectant mothers via mobile phones. To date it has reached more than two million women, families and care givers across a range of low and middle income countries.

Inmarsat is delivering satellite connectivity services, alongside smart devices preloaded with the organisation’s health application, to rural communities where mobile phone coverage is unreliable or non-existent.

As well as encouraging women to take advantage of maternal care services and advice, the project is also collecting data to enable improvements in maternal, newborn and child health in Nigeria.

# Infrastructure

Basic services are inaccessible to people across large swathes of the planet because of the lack of infrastructure in hard to reach regions.

Lack of access to clean water equates to shocking statistics: nearly one billion people forced to drink unsafe water and 4,000 child deaths a day that are the result of water-borne diseases.

US-based **Planet Water Foundation** aims to reduce these numbers with a range of practical and educational programmes. One of the organisation's solutions is to build water towers with a filtration system, a programme it highlights on World Water Day – 22 March – by filming their construction and sharing the story around the world.

For the past two years Inmarsat, with support from partners AST and Cobham SATCOM, has provided BGAN high-speed data connectivity so the Project 24 activities can be streamed live, supported by social media.

World Water Day 2015 saw Planet Water Foundation volunteers build 24 water towers in rural Cambodian villages, supplying more

than 24,000 people with safe, clean water in just 24 hours. The remote locations meant satellite connectivity was essential.

The exposure generated allowed them to expand their operations in 2016, building more water towers across five continents for World Water Day.

Even when major investment is made in infrastructure, maintaining a network that covers thousands of miles in remote territory is a considerable challenge.

**Ergon Energy** maintains and manages the regional electric distribution network across Queensland which provides energy for more than 720,000 homes and businesses in some of Australia's most isolated and economically vulnerable communities.

The company has installed hundreds of circuit breaking reclosers to manage power distribution throughout the network, with a significant number operating in the most isolated parts of the state where cellular and terrestrial connectivity is limited or not available.

Ergon Energy uses BGAN M2M to remotely monitor, control, and manage the recloser network as Inmarsat's two-way IP data connectivity service meets their requirements for a single, ubiquitous, reliable network that is impervious to natural disasters and weather events, and provides a high level of security.

Although this example comes from a more developed nation, the same principles apply for stimulating renewable power generation in more developing countries.



Ensure availability and sustainable management of water and sanitation for all.



Ensure access to affordable, reliable, sustainable and modern energy for all.



Build resilient infrastructure, promote inclusive and sustainable industrialisation, and foster innovation.

# Economics

Isolated communities are disadvantaged if they have no access to banking and financial services. If there is not a bank within walking distance, or cellular coverage to access banking apps, individuals and businesses simply cannot be part of the growing digital economy.

But without a reliable connection, banks are unable to offer remote financial services or ATMs, so it is difficult for them to reach rural customers.

Inmarsat works around the world supplying secure satellite data services to support local economies. Our global, IP-encrypted satellite services enable banks to establish remote and temporary branches which are securely connected to their head office. It also allows businesses such as shops, restaurants and hotels to accept bank card payments using electronic point-of-sale (PoS) devices.

In urban areas, where 3G connectivity can be intermittent, BGAN and M2M services can act as a back-up to terrestrial services.

For example, in the north of Brazil our regional service provider Onixsat delivers remote banking services for the country's expanding financial services sector, which grew by 76.9% between 2006-2010 according to the Brazilian bank federation Febrabam, largely in ATM service delivery.

In Kenya, BGAN Link connectivity brought Equity Bank Group services to 200 sites to extend financial inclusion (see panel). Local agents can also create other business opportunities, such as selling data-based services, to help support an economically sustainable community.



Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all.



Make cities and human settlements inclusive, safe, resilient and sustainable.

## CASE STUDY Equity Bank Group in Kenya

**Equity Bank Group** has more than eight million customers in Kenya, making it the largest bank in terms of customer base in Africa. In 2010 the bank established the Equity Group Foundation with a corporate social responsibility remit to transform the socio-economic lives of African people by seeking partnerships to promote education, leadership development, financial literacy and access, entrepreneurship, agriculture, health, innovations and the environment.

In 2015 Inmarsat, working in partnership with the Equity Bank Group helped to deliver financial services to **200** sites across Kenya, including some of the most remote places in the region, and extend financial inclusion to the unbanked and unconnected.

We provided local agents in each village with a BGAN Link terminal to give people quick, reliable access to internet banking services. The agents can also use this connectivity to offer other data-based services, which increases business opportunities both for them and the wider community.

Each of the BGAN Link terminals were provided with smart devices preloaded with information on banking and finance subjects, addressing local knowledge gaps and helping to drive economic growth.

# Environment

Inmarsat connectivity is helping organisations to capture critical data on climate change. Our BGAN high speed data service was used by the Earth Observatory Singapore (see panel) to conduct research on earthquakes, tsunamis and climate change in Southeast Asia.

This research was designed to collect, process, analyse and archive data on tectonic plate movements in the region, to improve forecasting and early warning mechanisms for communities most in danger from natural disasters. Data collected from 50 locations across Sumatra was transmitted via BGAN in real time – giving scientists immediate warning of any unusual seismic activity.

In New Zealand, the National Institute of Water and Atmospheric Research (NIWA), a Crown Research Institute established to enable the sustainable management of the island nation's natural resources, uses BGAN M2M to support its environmental data collection systems.

NIWA has weather stations dotted throughout the islands and as far afield as Fiji, well beyond the boundaries of terrestrial connectivity. By using BGAN M2M, the scientists have instant access to reliable, accurate and up-to-date data on a wide range of measurements including wind speed, rainfall, biometric pressure, humidity and soil temperature. This information is helping them to understand climate hazards and improve the safety and wellbeing of New Zealanders.

In Australia, satellite data on sharks is protecting both the animal and people. Clever Buoy is a system used by the New South Wales government that detects sharks' unique movements and sends signals to lifeguards on the shore via Inmarsat to an app on their smartphones. They can then alert swimmers and surfers and get them out of the water. Scientists and researchers can also be updated on shark sightings as real-time data is shared via a Google+ platform.



Take urgent action to combat climate change and its impacts.



Conserve and sustainably use the oceans, seas and marine resources for sustainable development.



Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation, and halt biodiversity loss.

# Education

Education is a fundamental human right, and yet the Global Out-of-School Children Initiative (OOSCI) estimates that over 59 million primary age children and nearly 65 million adolescents are not enrolled in school.

It is always going to be easier to deliver education in urban areas, where teachers most want to work and suitably-equipped classrooms are more likely to exist. However, giving the same opportunities to students and teachers in rural communities can be achieved via satellite-enabled digital eLearning solutions.

As well as giving children access to quality online learning materials and virtual classrooms, Inmarsat Global Xpress (GX) connectivity that provides ultra high speed bandwidth allows training organisations to up-skill teachers. As a result, good teachers may be less likely to be tempted away from their rural communities to find career development opportunities in the city, and children everywhere can have the opportunity to receive a solid basic education.

eLearning extends to further education too. Universities are changing the way they deliver courses, expanding their reach with more opportunities for students to enrol in online degree courses from internet café-style community centres. They can download course work and lecture notes and upload completed assignments, take part in live video group discussions and communicate with peers and their lecturers all over the world.

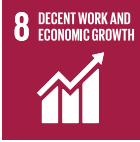
Inmarsat is also promoting access to education through its support for Partners for Possibility, a business and education partnership that aims to significantly improve schooling in South Africa, which was ranked 138th out of 140 in the World Economic Forum Global Competitive Report 2015/16 for the quality of its education system, and came bottom for maths and science teaching. The programme partners school principals with business leaders on a one-to-one basis to promote leadership development. The partners work together for one year to design an improvement plan for their school and get teachers, students, parents and the local community involved. PfP's aim is for all South African children to receive a quality education by 2025.



Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.



Achieve gender equality and empower all women and girls.



Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all.



Reduce inequality within and among countries.

## CASE STUDY Earth Observatory Singapore

The **Earth Observatory of Singapore** (EOS) was launched in 2009 to conduct fundamental research on geohazards in and around Southeast Asia, including earthquakes, volcanic eruptions, tsunamis and climate change, and ensure affected populations are warned when there is the risk of a natural disaster.

To improve forecasting and post-event analysis, EOS uses BGAN to transmit data from **50** sensor stations scattered across Sumatra, which is at the boundary of two tectonic plates and the source of early seismic activity data if an earthquake or tsunami is imminent.

Previously, EOS had to dispatch groups of research technicians to physically collect data from a sample of **10 to 15** GPS permanent stations, which meant critical information was delayed and incomplete.

Now they can access data at any time, and rely on Inmarsat's **99.9%** network availability through the Inmarsat-4 satellites that enables invaluable measurements to still be transmitted even in the worst conditions. In April 2012, for example, when a powerful 8.6 magnitude earthquake struck Banda Aceh in Indonesia, scientists were able to begin analysing data as soon as 12 hours after the earthquake occurred, enhancing their understanding of earthquakes and improve future responsiveness.

EOS also uses BGAN to remotely monitor the condition of the stations, so they can be sure their instruments are working effectively at all times.



# Agriculture

Satellite connectivity can help promote more effective and efficient food production.

In temperate climates greenhouses are used to grow staple crops year-round, while in harsher environments, such as the desert regions of the Middle East, the use of hydroponics is being explored to increase food production. These structures can be extremely large, so one solution is placing them in remote locations, away from urban infrastructure. Remote real-time monitoring of such sites through machine-to-machine (M2M) sensor technology provides real-time, low-cost updates so any required action can be taken quickly. Site security can also be maintained remotely.

Satellite-powered drone technology is also helping farmers maximise production and crop efficiency. Using drones to take aerial photography gives farmers a unique insight into the topography and soil conditions of their fields, to make sure that crops are planted in the most ideal conditions. These

images can also be input into automated planting and harvesting vehicles, as is happening in large-scale commercial farming in the US. This technology can be too expensive for smaller farms in the developing world, but, as it evolves, the same principles could be applied on a smaller and cheaper scale to help farmers struggling in harsh climates to grow crops more efficiently.

Broadband connectivity is already helping farmers in Africa to improve their economic outlook by accessing information on future weather patterns and viewing current crop prices before they make the journey to market. Satellite-enabled pilot schemes are currently underway, with the aim of allowing farmers to check prices on their mobile phone and so be able to decide the optimum time to sell.



End poverty in all its forms everywhere.



End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.

# Partnerships

In October 2015, Inmarsat, along with other world-leading satellite operators under the umbrella of the EMEA Satellite Operators Association and the Global VSAT Forum, signed a **Crisis Connectivity Charter** at the World Humanitarian Summit Global Consultation in Geneva.

The signing, which took place with the United Nations Office for Coordination of Humanitarian Aid and the Emergency Telecommunications Cluster, signalled Inmarsat's commitment to enhancing connectivity in humanitarian emergencies.

The charter formalises protocols to increase the ability of emergency response teams to access satellite-based communications when local networks are affected, destroyed or overloaded in the wake of a disaster.

The principles of the charter also include increased coordination to prioritise access to bandwidth for humanitarian purposes during disaster operations; pre-positioned satellite equipment; transmission capacity at times of disaster in 20 high-risk countries

in Europe, the Middle-East, Africa and Asia; and training and capacity building for the humanitarian community across all five continents.

Inmarsat has been putting the charter's principles into practice through its 15-year partnership with Télécoms Sans Frontières (TSF).

**TSF** recognises that conflicts and natural disasters often lead to massive displacements of affected populations, meaning that people are separated from their loved ones. The agency was the first to set up humanitarian calling operations, during the first Gulf War and emergencies in the Balkans and Kurdistan in the 1990s, and was soon also establishing rapidly deployable emergency telecommunications for international response teams.

In 2000, Inmarsat became the first official partner of TSF, bringing the lifeline of a satellite phone call to displaced families and critical communications to first responders on the ground.



Strengthen the means of implementation and revitalise the global partnership for sustainable development.



## CASE STUDY TSF disaster response in Nepal

The benefits of its operations were clearly evidenced following the devastating earthquakes in Nepal in April and May 2015.

As well as setting up communications for international search and rescue teams, **TSF** was also responsible for putting over **7,430** Nepalese in touch with loved ones around the world.

With the two earthquakes claiming **9,000** lives and affecting **2.8 million** of the population, family and friends of people in the disaster zone were left desperate for news. By travelling to remote villages armed with IsatPhone satellite phones, TSF provided the means for them to reassure loved ones and request help.

TSF was still at work in Nepal three months after the disaster, providing an essential post-emergency eHealth service with Médecins du Monde. Medics travelled to remote communities to perform health checks, then transmitted data on their smartphones via BGAN. This allowed disease outbreaks to be detected early so intervention and treatment plans could be put in place.

- 1 Working Together to Connect the World by 2020 – Reinforcing Connectivity Initiatives for Universal and Affordable Access. Discussion paper produced by the International Telecommunication Union for the Broadband Commission for Sustainable Development special session, World Economic Forum Annual Meeting, January 2016.
- 2 World Bank Group World Development Report 2016 <https://openknowledge.worldbank.org/handle/10986/23347>
- 3 SOS Children's Villages Benin / Safe Triage eHealth case study <http://www.inmarsat.com/wp-content/uploads/2015/06/Case-Study-eHealth-SOS-Benin.pdf>
- 4 Vsee case study <http://www.inmarsat.com/wp-content/uploads/2014/04/Vsee-case-study.pdf>
- 5 All in School UNICEF / UNESCO Institute for Statistics initiative <http://allinschool.org/>
- 6 Partners for Possibility business and education programme, South Africa <http://www.inmarsat.com/news/inmarsat-backs-campaign-improve-education-south-africa/>

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