European Satellite Operators Association

The Satellite Contribution to Africa's Development

Introduction

Satellite Connectivity is an obvious answer for a continent lacking a rolled out, land-based communications infrastructure. Besides 'bridging the digital divide', satellite services can contribute directly to the achievement of the Millennium Development Goals as well. The UN World Food Programme informed ESOA that fundamental to the achievement of MDG's and African development is:

(i) Adequate institutional capacity and infrastructure to generate and share reliable information and
(ii) The ability to reduce vulnerability to future risks, enhance resilience & protect hard earned developmental gains against shocks

As explained below, satellites can be instrumental in both.

ESOA has considered the African situation over the last years and in doing so has engaged with many organisations including the European Space Agency (ESA) & the UNITAR Operational Satellite Applications Programme (UNOSAT), both of which have signed Memoranda of Understanding with ESOA. These agreements also cover cooperation initiatives concerning Africa where both crisis situations and opportunities for new projects using satellite technology exist. Satellites can be useful in the following domains:

MDG1: Eradication of Extreme Poverty & Hunger

Satellites cannot deliver food but they can deliver on crucial related requirements to ensuring the availability of food and reducing poverty generally. Refer to Case Study I: NIGER & Case Study II: OPPORTUNITY INTERNATIONAL.

MDG2: Achieve Universal Primary Education

Satellites have connected schools under NEPAD projects already. Tele-education (i) enables 1 teacher to teach 'larger groups' of pupils at the same time (ii) overcomes the shortage of teachers (iii) reaches schools in remote & isolated areas (iv) can connect schools to overseas teaching facilities (v) can be used to further train teachers themselves and (vi) can be used to train local professionals in other fields of expertise as well: doctors or workers. It should be noted that once connectivity has been established in a school, the school can also serve as a connectivity centre for the otherwise unconnected village and broadband internet can be put at the disposal of locals after school and during weekends: thus a greater contribution to 'bridging the digital divide' can be made. Refer to Case Study III: SOUTH AFRICA.

MDG4: Reduce Child Mortality & MDG7: Ensure Environmental Sustainability

Countless children die in Africa every day. Key NGOs such as Save the Children work to prevent this. Satellite connectivity can be a key aspect of the solution. Refer to Case Study IV: SAVE THE CHILDREN.

MDG6: Combat HIV/ AIDS, malaria & other diseases

Satellites contribute to health issues relevant to Africa in many ways including (i) enabling tele-medicine (ii) allowing for the monitoring & advance warning of mosquitoes/ locusts and other menaces and (iii) facilitating water management.

Tele-medicine:

It is clear that the availability and quality of healthcare is a huge issue for Africa mostly in those areas outside capitals and major cities. Tele-medicine is the connecting of remotely located medical teams with hospitals, universities and other expert sites so as to give access to medical care, modern techniques and diagnosis to those in the remote field who would otherwise be cut off (in the case of patients) or whose medical education would stagnate (in the case of medical professionals). Satellite communications are ideal for such use.

Malaria & other diseases:

The UN World Health Organisation informed ESOA that satellite imagery is used to monitor meteorological data such as the direction of wind and rain as a direct indicator of the path of malaria-carrying mosquitoes. Although this information is known on a global or national level, the lack of communications infrastructure prevents it being passed to the remote field level. Satellite communications would be ideal for such use.

Water Management:

Related to health is the supply of fresh, clean water. This is an increasingly scarce resource in many parts of Africa where annual renewable freshwater available per person has declined by half since 1950. Available water supplies therefore require careful management, which includes communication between different points located around the water source in order to coordinate water projects going on in the different regions and exchange information and data. Satellite connectivity could facilitate this.

MDG8: Develop a Global Partnership for Development

Satellites are often promoted as tools for tele-education and tele-medicine for which they are indeed ideally suited. However they also give rise to less obvious opportunities such as for businesses and welfare programmes. Refer to Case Study V: DELIFLOR & Case Study VI: WELFARE

Conclusions & Recommendations

The most cost-effective deployment of satellite services arises when a maximum number of users are satisfied with the same type of service. For example, if the basic aim of a project is to connect 5 given points around a lake in order to manage its water supply, this alone will result in considerably higher cost than if the same connectivity was also used to connect schools or hospitals or other points of interest in the area as well. In other words: aggregation of demand can often be key to affordable satellite connectivity and in a continent such as Africa where there is a great need to connect many points, this opportunity should be seized as far as possible: the result can be extremely inexpensive connectivity for thousands delivering sustainable solutions for development.

ESOA member companies have both the experience and the available capacity to implement the type of projects described in this document. Besides the obvious advantage of maximum reach through satellites, such projects can be deployed quickly and easily which is one of the reasons satellite solutions are so often deployed in emergency situations. Africa's particular situation[1] is often classed as an international emergency and satellite solutions are an optimal solution for its size and circumstances.

[1] (i) Poor economic performance in the last 3 decades (ii) 32 out of 35 countries with a low Human Development Index are in Africa (iii) 1/3 of the entire population live in chronic hunger (iv) 45% of the population live on under a $ per day (v) the number of food emergencies have tripled since the 1980's and (vi) Africa is the only continent where food aid delivery requirements are increasing (Source UN World Food Programme)

CASE STUDY I: NIGER

In early 2005 the people of the Dakoro region of Niger suffered a famine due to drought and locusts. The NGO Telecom Sans Frontier (www.tsfi.org), which uses satellite technology, intervened to set up an early warning system connecting 12 vulnerable & isolated regions of the country.

The system allows for the relaying in real time of information on key indicators (such as variations in stock of subsistence crops/ modifications in the population's diet/ variations in natural resources) to avoid a repeat of famine situation of 2005. Beyond the basic exchange of information, locust movements/ meteorological information can be monitored by satellite and communicated to the local authorities.

To install this, TSF:

(i) Trained 26 employees seconded from the Niger state (agriculture and livestock departments) over 12 days in the 12 most isolated (no landline or GSM) zones of the country
(ii) Installed telecommunications centres and opened the system
(iii) Handed over running of the system to the local authorities in September 2006

Costs were kept to a minimum: the system was based around a portable broadband satellite terminal, for which communications are normally charged by volume of data. TSF, with the Université de Pau, developed software to compress the data sent in each form from around 300kB to 3kB thus making the most cost-effective use of the system. Use shows that the whole system clocks up about US$100 a month in communications costs. It is sustainable in the long term as Niger's government can easily cover all costs.

Key features to note from this project are:

⇒ It relates to the first MDG (food shortage)
⇒ The solution revolves around satellite technology: satellite communications and a potential use of satellite imagery
⇒ The associated cost is realistic
⇒ It is sustainable as it (i) educates locals and is thus independent of foreign support in the long-term and (ii) is affordable

This project could be extended to other countries that regularly experience food shortages.

CASE STUDY II: OPPORTUNITY INTERNATIONAL

Opportunity International (OI) is an NGO and a leader in microfinance[2] dedicated to providing opportunities for people in chronic poverty to transform their lives. Micro-enterprise development builds on the foundation that many of the world's poorest people are a good credit risk. Their lifetime of struggling just for food and shelter fosters the kind of single-minded drive that it takes to start or build a small business. OI provides such persons with access to small loans and adds business training, mentoring, financial planning and leadership development that will enable them to start or expand their own businesses. By helping a poor family to increase its income, micro-enterprise development has an immediate and lasting impact on quality of life - the ability to afford food, shelter, education and healthcare. As business income increases, the business is able to expand, and the effect spreads beyond the family into the local community, through employment and contribution to the local economy: true sustainable development. This Case Study describes OI's activities in Malawi. (http://www.opportunity.org)

OI decided to add value to banks who provide such microfinance services in developing countries, by ensuring they have reliable, robust and cost-effective access to the Internet in order to allow safe and efficient remote management and monitoring of their local area networks, remotely executed database backups to remote servers for disaster recovery, and ability to engage in effective general communications with remote support and other OI Partners. VSAT technology (using very small aperture satellite terminals) was identified as the optimum solution, as it does not require local terrestrial infrastructure to be in place. OI chose the Opportunity International Bank of Malawi to be the first entity where such a VSAT system would be installed under a pilot project as Malawi faced excessive difficulties in reliably accessing the Internet. Before using VSATs uninterrupted Internet access had not been possible and when a connection was successful, the throughput was so poor that remote management and database backups were unacceptably slow or even impossible, with the local ISP constantly overselling their circuits and being totally saturated so that they were virtually unusable.

The VSAT installation is still in the pilot phase of the project. Opportunity International's goal is to have a successful VSAT installation at the Opportunity International Bank of Malawi in order to demonstrate that VSATs are viable options that could be used in other locations where other communications are not easily available. VSAT technology will further enable OI to continue its outreach to serve the poorest of the poor.

Key features to note from this project are:

⇒ It relates to the first MDG (eliminating poverty)
⇒ The solution revolves around satellite technology: satellite communications for local African banks
⇒ Such micro-finance systems require communications technology in order to be effective in both receiving and loaning funds and performing all related operations
⇒ Micro-finance has been recognised as a key to sustainable development as well for socially responsible investment; recall the Nobel Peace Prize being awarded in 2006 for micro-finance initiatives and the huge contribution they have made to development

Once the pilot is verified, this project could be extended to many other countries.

[2] Microenterprise development started as microcredit - the provision of small, collateral-free loans to the poor in developing nations. Over time, this term has expanded to include a broader range of services such as savings and insurance, all encompassed by the term microfinance.

CASE STUDY III: SOUTH AFRICA

A satellite operator worked with NEPAD and the South African government on a pilot project to provide educational resources across satellite to remote schools in South Africa. Two schools took part in successful trials, which used a compact and easy-to-use satellite terminal to connect to four basic PCs and a wireless network. As well as accessing information on the Internet – information that the schools had previously not had any access to – the satellite communications supported new links between the African schools and schools in the UK. By connecting to a central server in Cape Town, it also helped teachers share teaching resources and follow a national curriculum. The project was extended to 12 schools, before being taken nationwide.

Key features to note from this project are:

⇒ It relates to the second MDG (education)

⇒ The solution revolves around satellite technology: satellite communications to (i) link schools with central hubs and (ii) allow African children communicate with European children thus exposing them to a culture they may otherwise never know

⇒ It contributes to sustainability as it (i) goes to the core of educating children bringing long-term benefits and (ii) can be implemented locally with or without the involvement of foreign support

⇒ Concerning cost: the contributions of such projects are so fundamental that once a pilot has successfully been run, they justify continued funding

⇒ A connected school can become a connectivity hub for providing access to a whole village

Such projects could be extended all over Africa and support the NEPAD case for connecting 600 000 schools in Africa: indeed satellites provided the links in at least 6 of 8 projects retained by NEPAD.

CASE STUDY IV: SAVE THE CHILDREN[3]

Ongoing torrential rains in Mozambique are causing major rivers to flood, threatening the lives and livelihoods of thousands of families. According to government authorities around 59,000 people have been displaced by floodwaters in the Zambezi River basin. Other major rivers in central Mozambique are still on alert. The situation is expected to worsen and is particularly dangerous for children, whose basic needs are of critical concern immediately but whose long-term wellbeing must also be secured as food runs out, health risks increase and the environment for children becomes more risky.

Save the Children is the NGO providing the families affected with household kits comprised of blankets, cooking and eating utensils, water purifiers, soap, buckets and plastic sheeting. Their teams rely on critical, timely communications in the field, which is provided via satellite, as no other reliable Internet connectivity is available or accessible. The connectivity delivers Internet access to Save the Children's main country office in Maputo, as well as three sub-offices. It allows mission critical communications integral in coordinating the actions on the ground as well as allowing timely communication with headquarters in order to enhance fund raising activities. Save the Children is therefore able to run the day-to-day activities of their Mozambique program, which has been in country since 1988.

Key features to note from this project are:

⇒ It relates to the fourth & seventh MDG (child mortality & environmental sustainability)
⇒ The solution revolves around satellite technology: satellite communications enabling coordination for life-saving supplies to reach those in need

Coordination through communication is required to deliver not only live-saving supplies to people in need because of flooding as in this case but even more generally in delivering food, water, medication and all sorts of supplies to regions all over Africa.

[3] Save the Children and Opportunity International in Case Study II above are members of NetHope (www.nethope.org), which enables member NGOs to deliver information and accelerate response to the most disadvantaged communities in remote developing areas by:

⇒ SHARING ICT knowledge for rapid and effective deployment and efficient operations
⇒ COLLABORATING with nonprofit and industry leaders to develop for best practices for public benefit technology deployment in the NGO world, and
⇒ FACILITATING innovative and cost-effective use of ICT

CASE STUDY V: DELIFLOR

Deliflor was the leading Dutch grower of chrysanthemums and was looking to expand its operations into Africa. It identified a suitable business partner in Ethiopia. Located just a few hours outside of Addis Ababa, the local partner could meet all of the requirements of the Dutch company; except for communications. Deliflor's operations relied heavily on the data shared across its IT network. It worked with a satellite operator to help its Ethiopian partner establish a cost-effective communications solution over satellite, giving it a reliable data connection to its new partner in the Netherlands. Satellite communications was instrumental in supporting a business that generated local employment for 200 people, at an approximate cost per terminal of € 350 plus airtime.

Key features to note from this project are:

⇒ It relates to the eighth MDG (partnerships for development)
⇒ The solution revolves around satellite technology: satellite communications
⇒ The associated cost is realistic
⇒ It can be sustainable as it generates mutual commercial benefits both for African locals and European companies
⇒ Just as companies seek to outsource labour to other developing countries such as China and India, Africa could also begin to present such opportunities

CASE STUDY VI: WELFARE

Mobile satellite technology is helping inhabitants of a remote African village collect their pension and social security without fear of fraud. The mobile units, which replace the need for people to walk many miles into an urban centre, are equipped with satellite communications for high-speed data connectivity. Fingerprints of the claimants are analysed and checked with a central IT database, ensuring that payments reach the people who need them most.

Key features to note from this project are:

⇒ It relates to the eighth MDG (partnerships for development) and addresses the issue of security which can often be a hindrance in different contexts
⇒ The solution revolves around satellite technology: satellite communications

This project could also be extrapolated to apply to election procedures, bank or micro-finance transactions, or other situations where security is an issue.