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# Africa: the role of satellites

The 'Digital Divide' has been viewed as one of the main stumbling blocks hindering Africa's development. The combination of rural and isolated communities, lack of access to ICTs, and regulatory obstacles have prevented the widespread use of the Internet, telephone and other services essential to development. Helen Jameson reports.

**Africa is home to 13 per cent of the world's** population, yet only 3.7 per cent of all fixed and mobile subscribers [Source: ESOA]. Access to bandwidth for satellite-based Internet has never been more affordable or more widespread yet full advantage is not yet being taken of these opportunities.

Slowly, advancements are being made and the role of satellite is becoming more and more significant in Africa's development. Satellite is often the only technology that can provide 'last mile' communications. The nature of Africa's geography means that terrestrial communications simply cannot provide for all. This is where satellite makes a major contribution. The use of satellite systems and services, especially VSAT, means that communications may reach even the most remote communities where just one phone per village can often mean a lifeline.

The cost of bandwidth e.g. Ku-band has fallen significantly since

the early 1990s and is now proving to be more affordable than ever. The cost of satellite hardware has tumbled and Africa, along with the Middle East is forecast to see the biggest growth in broadband satellite access of all the major world regions.

Satellite-based services are being used in several different ways to help create sustainable development in the region. This article looks at some of the ways in which satellite technology is used and the issues that prevent wider use of ICTs on the African continent.

## **E is for Education**

One of the most crucial areas to which satellite makes a highly significant contribution is that of e-learning. Education is the vital ingredient that can sustain development in the region. Satellite-based communication is the driver for education. It means that distance and remoteness is no longer an issue and through public-private



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partnerships, the educational experience of millions of Africans is set to change forever.

The use of distance learning has created a knowledgeable and efficient workforce. A project in Free State, South Africa has seen the development of the ICAM project (Interactive Learning, Communications and Management). This is a satellite-based project initiated by the Free State Department of Health who had previously been training their staff through a face-to-face workshop-based system. The training given was often not well attended, was costly and meant that a loss of work hours resulted as the staff had to be taken off duty to attend. So, following the lead of a major bank that provided training through a satellite-based system, ICAM was developed. The project now boasts 40 interactive, video-based classrooms that allow two-way communication.

The hub is based at Bloemfontein where a presenter broadcasts to students and can reach, train, communicate and interact with the participants through voice and data. There has proved to be no additional expenditure compared with the workshops used before, and a low level of isolation was noted by the participants. Its success has meant that the Department of Health now recommends that all training should be given via the system and ICAM now trains governmental and non-governmental organisations in a cost-effective way with a very limited loss of productivity. It is just one example of the huge potential for the use of technology to address training and development challenges.

Another project that is considering satellite technology at present is the DEEP Project (Digital Education Enhancement Project) that has launched an innovative ‘eRanger’ scheme which consists of a motorbike and sidecar equipped with a range of information and communication technologies. The focus of the research is on the quality of teaching and learning in rural African schools where ICT provision is minimal and electricity and network connectivity are fragile and /or are currently non-existent. At present, they are investigating the possibility of adding connection via satellite to the motorbike for use of email, Internet and video-conferencing services. The possibility of the use of BGAN is also being considered. The end results will show the effect of use if ICT technologies has on teaching and learning in rural areas.

#### **Satellites boost rural healthcare**

In healthcare, the impact of satellite is also being felt. The European Space Agency (ESA) has been examining the role of satellite-based communications in the improvement of healthcare and looking into the provision of telemedicine in remote communities. A one-day workshop was held in January 2006 where these matters were addressed and the result of which is a series of pilot projects that will investigate the use of satellite technology to deliver healthcare. Topics to be further investigated include the workforce, the coverage of clinical

services and intelligence gathering.

ESA recognise the importance of satellite within healthcare and how it may be used, not only to give the best care possible to patients but to actually train doctors and other healthcare workers. However, before this particular project may be implemented, issues of interoperability need to be investigated. There are also other legal, social and political issues to address.

The use of mobile terminals can help doctors and healthcare workers in remote areas to contact major medical facilities to help with diagnosis. The use of the Internet to provide diagnostic help is also becoming more and more popular. The development and wider use of telemedicine will go a long way to healing Africa’s Digital Divide.

#### **E-Commerce: The Cyber Café – an African phenomenon**

E-Commerce is growing in Africa and is absolutely crucial to its development. If Africa is to compete in the global marketplace then voice and data networks are essential. Financial institutions, oil and gas and retail are examples of the sectors where satellite has enabled effective networks.

The advent of the African cyber café has created huge demand for satellite services and a growing number are springing up in more remote locations. From their beginnings as telephone shops, they are now adding Internet services and a growing number of hotels, hostels and lodges are also adding Internet services to their portfolios.

There are probably in excess of 20,000 public Internet access points in Africa serving over two million customers (source: Catalysing Access to ICTs in Africa) and although most of these outfits are independent, there are some that are teaming up with foreign IT companies to create larger business with numerous branches (e.g. BusyInternet of Ghana). Most of the cafés rely on dial-up Internet access but the demand for low-cost VSAT solutions is gaining momentum where regulation allows their use.

The hunger for ICTs is tangible in the region as we have seen through the enormous growth in popularity of the Internet café. However, there is a major issue threatening the roll-out of satellite-based services on the continent and that is regulatory issues.

#### **Regulation**

Improvement through satellite communication of the health, education and economic situation of African states is all very well but there is a major stumbling block that is preventing access to these services and that is regulation. There is no doubting the enormous benefits that satellite-based services can bring to Africa but the continent remains fragmented and satellite services are still not affordable even where access to ICTs is available due to lack of liberalisation.

A growing number of interests – both in public and private sectors have begun advocating regulatory and policy reforms that facilitate expanded access to satellite communications throughout the continent. This was a key finding of a report entitled “*Open and Closed Skies...Satellite Access in Africa*”. The report, which was written by a drafting group led by the Global VSAT Forum (GVF), summarises the findings of a survey of the regulatory conditions applied to satellite services in Africa.

Funded by the International Development Research Centre (IDRC) of Canada, the report complements work carried out by “CATIA” (Catalysing Access to ICTs in Africa), a three year project supported by the UK Department for International Development (DFID). One of its primary objectives was to facilitate expanded access to low-cost satellite Internet across Africa.

The report demonstrates that new satellite-based Internet delivery systems now make it possible to obtain bandwidth ten times more affordably than was formerly available to almost anywhere in Africa. The ‘missing link’ is the implementation of more effective regulatory and policy approaches to encourage service provision. In this re-



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gard, the report demonstrates what is (and what isn't) effective African satellite regulation, with a particular focus on successful approaches.

Included among the progressive satellite regulatory reforms are:

- Liberalisation of the satellite sector;
- Implementation of blanket-licensing for low cost VSAT terminals;
- Minimising satellite regulatory fees;
- Recognising type approvals issued by other Administrations and certification bodies; and
- Confirming plans to enhance transparency of satellite regulatory requirements and processes.

Regulatory harmonisation has already occurred across the world through the 'One-Stop-Shop'. It is through this concept that parties may gain access to licensing data for each country in a particular region via one URL. In Europe for example, applicants who wish to provide satellite services may apply online and have access to all necessary details including one – off and recurring costs.

High license fees and many restrictions are no longer suitable as perhaps they were in the past when terminal prices were extremely high.

To help promote these practices, local inter-governmental groups have supported the CATIA project. Regional organisations such as the East African Regulatory Postal Telecommunications Organisation (EARPTO), the Telecommunications Regulators Association of Southern Africa (TRASA) and the West Africa Telecommunications Regulators Association (WATRA) have begun to play an instrumental role in promoting regulatory harmonisation.

TRASA was the first inter-governmental regulatory group to confirm that it will drive the programme forward in its region. A wide range of activities were co-ordinated such as holding workshops, developing a regional satellite policy and regulatory guideline, providing an online forum and establishing a one-stop shop for online submission of VSAT license applications. WATRA have also adopted recommended guidelines to aid with reform.

African Administrations' ability to transform the regulatory landscape has already been proven in the Internet sector. As of 2002, liberalisation of ISPs was already in an advanced state. The Kenyan Internet industry has addressed the question of why full advantage is not being taken of satellite-based communication and an association representing local Internet interests there, TESPOK lobbied for immediate liberalisation of the country's VSAT sector.

The report highlights the fact that any initiatives that are in progress to expand terrestrial infrastructure usually occur within cities and along trunk routes.

Therefore, the cost of bandwidth can be 10-100 times more expensive than in North America or Europe.

Satellite technology provides the perfect solution to this problem in both urban and rural areas. In addition, prices for VSAT systems have dropped, and can now be found for less than US\$2,000.

Technology opens doors, it breaks down barriers and it plays an essential role in the development of Africa. Advances are slowly being made and results felt in even the most remote communities. Although there is still a long way to go and the question of the 'Digital

Divide' will be addressed for years to come, there is the growing realisation of the huge potential that satellite technology holds in order to address a plethora of development challenges.

#### First pan-Africa satellite system

There are two operations vying for the position as the first pan-African satellite system - RascomStar-QAF and NigComSat Limited. Whilst it might seem like a competitive situation, it isn't as the Nigerian Government has an equity stake in both systems. According to a NigComSat spokesperson, the systems when operational should complement each other.

RascomStar-QAF, a private company registered in Mauritius, is in charge of implementing and exploiting the first satellite telecommunication project dedicated to the African continent, under an agreement with RASCOM, the Regional African Satellite Communication Organisation.

The company is responsible for the financing, design, procurement, construction, installation, commissioning, operation and maintenance of the space segment as well as for the launching of the satellites.

The system provides a range of value-added services to all including:

- Telecommunications services in rural areas of Africa on a large scale at very low costs by using appropriate technology;
- Development of inter-urban linked with the interior of each African country;
- Direct links between all the African countries without exception, thereby realising savings of hundreds of millions of dollars paid out annually to operators outside the continent as transit charges for intra-Africa traffic; and
- Television broadcasting, Internet and other value-added services.

By building a new communication satellite system, RascomStar-QAF will provide a range of values added services to all countries of Africa with original features, including full coverage of the African continent in both C and Ku bands.

The system will enable operators dedicated to Africa to provide low-cost universal rural telephony services in the remotely populated areas of Africa, where traditional fixed or mobile phone operators have difficulty offering services at acceptable price levels. RascomStar-QAF will be offering an attractive price for its voice, fax and IP messaging services.

The network will include a redundant platform for overall traffic control, gateways allowing network integration with the public switched telephone network (PSTN) of each African member-country, and user terminals that can be solar powered. It will support the operation of 150,000 terminals disseminated on the whole African continent, including 25,000 that can communicate simultaneously.

#### NigComSat

NigComSat-1 is a super hybrid geostationary satellite with a launch mass of 5150kg (5.15 tonnes), a service life of at least 15 years and reliability of more than 0.70 per cent by the end of its lifetime. It will be located at 42.5°E. Based on a DFH-4 platform, NigComSat-1 is scheduled to be delivered in orbit using the launch vehicle, Long March 3B in May 2007.

NigComSat-1, with C, Ku, Ka and L bands will provide the most optimal and cost-effective voice, data, video, Internet, application services/solutions coverage for the African continent.

NigComSat-1 has been built with radiation hardened technology, high reliability, onboard software re-programmable ability, fault tolerance, robust on-board switching system, high redundancy and high efficiency. The satellite will offer stronger footprints and centre beams over the African continent; better look angles and shorter latency for intra Africa communication traffics; and high fade margin compensation for attenuation losses due to rain.