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Role of hybrid satellite services in connecting Africa

As part of a broader solution, satellite can help deliver reliable communications to areas that have very little in terms of infrastructure. Africa is a continent that suffers from a distinct lack of connectivity and satellite, teamed with other technologies, is helping mobile operators to reach the population that would be otherwise isolated.

For many African communities, communication is a problem. Often isolated and in difficult-to-reach areas, there are whole communities that struggle to access the kind of technology that urban dwellers take for granted. It is very expensive to roll out terrestrial infrastructure outside of urban areas across Africa but the popularity of the mobile phone, and particularly mobile data services, means that mobile operators are having to think very carefully about how they can extend their reach to connect new customers that are hungry for mobile services. Operators are already working hard to upgrade their existing infrastructure in order to cope with demand, but there is an enormous and largely untapped market out there that they need to secure and that is the rural user.

Africa has a range of geographies and topologies and a population that is spread from huge cities to tiny villages. Mobile providers, therefore, must ensure that they can reach their customers no matter how remote they are. To do this, they require help from a satellite service to provide backhaul

so that people everywhere can enjoy the mobile services they want. To construct cellular towers and rollout cellular infrastructure is just too expensive and often impractical for companies to consider. Cellular backhaul has become a key market sector for satellite service providers who can help MNOs to extend their reach and expand valuable customer bases without breaking the bank, and delivering a cost-effective and reliable service to those who demand it.

It might be useful, at this point to look at the situation in Africa in terms of mobile phone usage. There has been a massive surge in mobile phone ownership and usage across the African continent. No matter where you go, this is very evident. But the most noticeable trend that is coming out of the African mobile market is that of data usage. The demand for data is enormous, and is only going to continue on its growth path. The mobile market drives the data business in Africa with most people owning at least one mobile phone or smartphone and using it for all their data needs. In terms of user trends, it is important to note that we are not simply

talking about sending messages. People use their mobile devices to access the Internet and to send video clips or images. They access social networks on their mobile devices and also bank accounts and other services. These types of applications absorb significant bandwidth. The increase in use of catch-up services is also having a large impact, along with user generated content.

While most African cities enjoy 3G, mobile coverage becomes scattered and less reliable in rural areas. The next challenge for mobile phone operators will be to expand data capabilities into regions that are more economically challenging, in the unconnected rural areas of high growth markets. Satellite offers flexibility, scalability, cost effectiveness and unlimited reach for the mobile phone operators who are willing to cover these rural areas. It can easily and cost-effectively extend connectivity to areas that are characterised by low penetration of terrestrial infrastructure.

Mobile Network Operators need to look at the ways in which they can reach customers in more remote regions of Africa in the most cost-effective way. There are literally millions of potential subscribers to be gained, but reaching them is the challenge. Satellite can play a vital role here, and teamed with other technologies, getting out to these pockets of population can be done efficiently and at a very reasonable cost. Coupling satellite with other technologies often makes

sound business sense to operators as satellite alone can be a costly option for backhaul.

Satellite and microwave

Economically, satellite-microwave backhaul makes good sense for MNOs who wish to extend their reach to rural areas. Here, a microwave link is used to connect base stations in a local area. The base stations are then backhauled over a satellite link to the operator's core network. This is a very economically sound method that does not require much infrastructure. It is easy and quick to deploy. Satellite provides coverage over very large areas and it is also immune to events such as natural disasters making it highly reliable. It uses low power, and is secure. The microwave link supports connection of large populations over small distances and satellite is ideal for the support of large populations over large distances. Both lend themselves ideally to solving the MNO's quandary.

Satellite and small cell technology

Small cell technology has had a significant impact on MNOs as they continue to discover new ways of making mobile services accessible to all. Femtocells and picocells can provide low-cost and flexible connectivity and they are a good fit for areas where population is less dense and sparser. For governments that are trying to fulfil their Universal Service

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Obligations, using small cells also makes sense in terms of a patchy population. In turn, for the MNO, it enables them to be profitable, as well as serving new customers.

The small cell sector has developed technology that can withstand the outdoors and that can support a village or town or other public area. They are very easy and quick to deploy, taking only a couple of days, in some cases. Above all, they are low-cost. By deploying VSATs to these remote sites, traffic can be backhauled over satellite to the core network. This gives the operator the edge over its competitors by enabling them to roll out networks in remote areas with ease.

Both the microwave and small cell methods coupled with satellite backhaul are facilitating the transition from 2G to 3G in regions across Africa. Satellite can serve any region within a given footprint offering unlimited coverage. Latency and data speed are no longer an issue as technology is available to overcome these problems in the form of ACM for example.

HTS are also an attractive proposition as they can offer more throughput at lower cost. HTS use spot beam technology that reuses the frequency band across the coverage area. This allows much higher throughput than the traditional satellite that uses wide-beam technology. It is envisaged that these next generation satellites will support the expansion of MNOs into rural markets, combined with small cell technology and will allow MNOs to operate with reduced OPEX.

Gilat is a company well established within the satellite

backhaul business and an expert is tackling the issue of rural communications. Its solution CellEdge, offers users an enhanced user experience while enabling them to keep CAPEX and OPEX down.

Gilat's CellEdge is a fully integrated, high-performance solution that bundles a small cell for 2nd and 3rd generation networks with an optimised, highly efficient satellite backhaul. Gilat provides not only the backhauling through its SkyEdge II VSATs, but also fully integrates BSS/RAN equipment, ready to be connected to the core network. This comprehensive solution transparently and efficiently connects multiple remote IP-based small cell sites via satellite. Mobile operators benefit from one point of contact providing an end-to-end solution enabling quick deployment, high reliability and outstanding user experience.

Minimal satellite space segment overhead is achieved by efficient voice and data compression combined with satellite bandwidth allocation on demand, reducing satellite OPEX by up to 80 percent compared to traditional solutions.

The SkyEdge II hub transmits a common, statistically multiplexed outbound signal to all remote cell sites. In the inbound direction, the bandwidth is assigned on demand allocating the minimum number of timeslots required by the small cell. The hub continuously monitors traffic generated by each cell, allocating bandwidth from a common pool to each VSAT, according to real-time demand. This method is



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vastly superior to traditional Single Channel per Carrier (SCPC) technology, which allocates the maximum bandwidth on a permanent basis to each cell.

CellEdge provides both high transmission power for wide coverage as well as low energy consumption, reducing costs and thus enabling operators to use solar power at off-grid locations. OPEX is significantly reduced by eliminating the high fuel costs required for powering traditional, diesel generator-operated sites.

iDirect SatHaul

The iDirect SatHaul™ solution combined with lower cost bandwidth from HTS have made it possible to deliver high speed, reliable service in areas that cannot be reached by traditional terrestrial or microwave backhaul.

Satellite has the unique ability to reach almost any location and provide immediate connectivity. It is quick to deploy and provides a very reliable connection. The iDirect SatHaul solution combines the latest in satellite infrastructure with advanced transmission techniques, including mobile specific optimisation of signalling, voice and data content to offer the most profitable business case for 2G, 3G and 4G over satellite.

Highlights of the iDirect SatHaul solution include:

- Unique solutions that are optimised for 2G, 3G or 4G requirements;
- Advanced Quality of Service - bandwidth management and prioritization to ensure terrestrial-grade link quality and higher reliability for voice and data services;
- Compression and Optimisation – providing the most efficient voice calls over satellite, combined with advanced optimization of signaling, transmission and data content;
- Remote side hardware designed for outdoor deployments, with low power consumption; and

- IPSec for advanced security requirements.

iDirect SatHaul is empowering mobile operators around the globe to connect remote and rural areas. iDirect's partnerships with industry leading suppliers of cellular infrastructure provide mobile operators with tested, proven solutions to meet their network requirements. As demand for mobile voice and data services continues to explode, satellite technology will play an integral role expanding coverage and opening up new revenue opportunities for mobile operators.

Bright future

The future is bright for hybrid satellite backhaul. This is an area of growth with legs as it enables fast and cost-effective network expansion. Mobile network operators are striving to deliver ubiquitous services. Demand across Africa for broadband data and video via mobile devices is very strong and this demand is no less strong in outlying areas. Hybrid satellite backhaul provides an affordable, scalable and reliable solution that can be deployed anywhere to extend the reach of cellular networks.

The emergence of HTS will enable operators to provide an excellent and cost-effective means of delivering mobile voice, data and video services. Many people rely upon their mobile devices as a means of connecting to the Internet. Many do not have fixed broadband lines available.

Therefore, in many cases, a smartphone or other mobile device may be their only way of connecting to the Internet. Provision of a high quality cellular service is hugely important. It's not just about the voice these days, but about the data and the video.

Satellite can change MNOs businesses for the better by enabling them to do more business in places they have not previously been able to access.