GILAT BLOG

Cellular Backhaul Over Satellite: Feeding the World
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Satellite Backhaul Providing Broadband Connectivity in Remote Areas

The demand for internet access is growing exponentially all over the world. Mobile networks are becoming the primary way in which we connect and exchange information.

Both these phenomena are being driven in part because more people have access to smartphones. In order to keep up with demand and provide communication services to everyone, everywhere, Mobile Network Operators (MNOs) are relying more and more on satellite communications.

Satellites can enable cellular backhaul (CBH) in even the most remote places, which are historically unserved or underserved by connectivity. Thanks in part to the rapid drop in space segment prices as well as innovation in ground segment technology, the use of cellular backhaul over satellite is doing its share to bridge the world's enormous digital divide.

Access to high-speed, reliable broadband connectivity can significantly impact a community's quality of life and its economic prosperity. In certain parts of the world, lack of computer access has practically cut off communities from the rest of society. However, more and more individuals are gaining access to 4G smartphones and are depending on high quality connectivity. As the phone is very often their only access point to the Internet, and the geographic area in which they live has either little or no terrestrial network coverage, satellite backhaul is the fastest and most economical solution for providing broadband communication services in remote or rural areas.

Satellite Backhaul Moving to Mainstream

In the past, CBH over satellite was often used only as a fallback solution for hard-to-reach rural and remote areas such as islands, mountains, and deserts, where terrestrial infrastructure such as fiber, next-generation copper, or microwave was either too expensive or unfeasible. However, today more and more MNOs are adopting satellite backhauling, as they are looking for a reliable solution which can provide enhanced Quality of Service (QoS) and Quality of Experience (QoE) that easily extends connectivity to rural sites and integrates seamlessly with their terrestrial network. The economics as well as the ability to overcome technical challenges have brought LTE satellite backhauling to the forefront in more established markets as well as in the developing world. The traditional markets of Asia, Africa, and Latin America remain prime candidates for connectivity due to the lack of terrestrial infrastructure, however we are also seeing the need for backup and emergency response requiring satellite backhauling in large metropolitan areas.

There are several different reasons why MNOs are moving to CBH over satellite. Sometimes it's a government mandate to connect underserved/unserved areas to support bridging the digital divide. Other times, competition between MNOs in increasing their subscriber base drives them to extend networks, so as not to be required to pay roaming costs. In other cases, there are areas where an opportunity arises to support tourist attractions such as hiking trails, scenic travel routes and ski resorts, that require connectivity. Additional growing applications for cellular backhaul include disaster recovery and IoT based applications such as farming.

CBH for Agribusiness IOT

Agribusiness relates to industries that are engaged in farming or that produce farm inputs. The agribusiness industry accounts for nearly 6% of Latin America's gross national product.

The Internet of Things (IoT) is one of the most widespread and efficient technologies driving the advancement of business and household operations. Statista a leading global data and business intelligence platform, predicts the number of IoT-connected devices will more than triple between 2019 and 2030, and approach 26 billion by 2030. IoT refers to the use of specific sensors, protocols, networking equipment, programs and applications to transfer and analyze data in order to obtain value-generating information. Specifically, in the agricultural sector, IoT technology helps farmers collect real-time data about everything related to the planting, growing and harvesting of their crops. This data is transported and analyzed so farmers can make better agricultural decisions.

4G in the Field

TIM Brazil, one of Gilat's long standing Tier-1 MNO customers, has developed an innovative use of a CBH over satellite application for agribusiness IoT to help solve one of the world's greatest problems: food insecurity. As the world population is expected to increase from just over seven billion people today to nine or ten billion by 2050, more and more food will be needed to keep everyone properly nourished. If we don't start implementing smart agriculture systems now, the world will face massive food shortages in the years to come.

To enable the Digital Transformation of rural areas in Brazil, TIM Brazil created the "4G TIM No Campo" project. The main objective of this project is to make up for the lack of mobile connectivity in regions lacking the necessary network technology. With this project, TIM is providing 4G mobile coverage at a frequency of 700MHz, enabling broader coverage to their subscribers.

Specifically, for the agriculture sector, the project makes digitization possible and offers innovative solutions for Brazilian agribusinesses. With this program, agribusinesses can realize time-sensitive decision-making for better crop management by collecting, transferring and analyzing data bi-directionally between farmers, machines, and administrative offices. The "4G TIM No Campo" solution provides a robust network and cutting-edge infrastructure to connect people, machines and software to analyze all stages of the growing and harvesting processes, including when their crops are ripe, how much water is being used and if an irrigation system is needed, general soil health, whether they need more fertilizer or any other input.

In order to make the program a reality, a cellular backhaul over satellite solution was needed to extend 4G coverage to rural areas where farms are located. In partnership with TIM, Gilat supplied 4G backhaul over a multi-spot beam Ku-band satellite to reach Brazil's most remote areas. Gilat's satellite backhauling solution enables TIM to support thousands of sites with fast bandwidth allocation. Furthermore, Gilat's 4G embedded VSAT acceleration provides the excellent user experience that TIM requires for its subscribers.

As an added benefit, the "4G TIM No Campo" program also extends coverage to highways and improves the quality of life of the region's population by enabling access to pervasive 4G mobile connectivity.

Digital Agriculture Makes Business Sense

Why is this project so important? According to research by McKinsey & Co., Brazilian farmers are increasingly turning to technology for operations: 85% use WhatsApp daily for farm-related purposes. However, the strong digital agriculture presence in Brazil is still challenged by several factors inhibiting adoption. One of these concerns is inadequate Internet connectivity.

For TIM Brazil, the use cases for 4G connectivity vary from providing regular voice, mobile data and IoT services to improving communication between office and field and making onboard computers manage real-time information.

As agricultural production becomes more digitally managed, connectivity becomes essential. Contingency measures must be taken to guarantee the desired SLAs. To address this, TIM uses satellite backhauling in conjunction with landline links to enhance its service.

Case in Point

One example of a farm participating in the "4G TIM No Campo" solution is Citrosuco, one of the largest orange juice companies in the world. The solution expands far beyond the company's groves and brings connectivity to several neighboring cities, serving an area of 1.9 million hectares. Citrosuco is the first agricultural company to go 100 percent digital and will have the technology in all its farms located in the interior of São Paulo and Minas Gerais.

According to the company, robust cellular technology and backhauling over satellite provide the necessary infrastructure to optimize processing, enable easier decision-making and support all digitalization initiatives. This investment is driving the company to higher operational and sustainability standards.

Gilat - Leading the CBH over Satellite Market

Cellular backhaul over satellite is proving to be the best solution to rapidly and efficiently expand a cellular network to rural areas, thus answering the need to bridge the digital divide and satisfy the growing demand for connectivity.

For satellite backhauling to meet MNO requirements, Gilat's solution provides end-to-end encryption, maintaining IPSec data security with CMPv2 without compromising performance under fade conditions. Furthermore, it has the flexibility to be configurable for either layer-3 or layer-2 services, thus providing seamless integration to the cellular network core.

Gilat is recognized as the world leader in CBH over satellite, reaching 44% market-share in modem shipments according to a report by industry analyst NSR, 2020. Gilat with its SkyEdge II-c platform and Capricorn family of VSATs has deployments of large networks worldwide, consisting of tens of thousands of sites that are being connected with satellite backhaul, thus connecting previously 'cut-off' communities with the rest of the world.

In addition to TIM Brazil, whose story we brought here, we are proud to work with many Tier-1 MNOs around the world including but not limited to T-Mobile and Sprint in the US, BT/EE in the UK, Telstra and Optus in Australia, Globe Telecom in the Philippines, Telefonica in South America, and in Japan, Gilat dominates the satellite backhaul market with Softbank, NTT Docomo and KDDI among others.

With all these customers, and others, satellite backhauling is a quick solution that can be deployed anywhere. In many circumstances the expense and time involved in setting up a terrestrial infrastructure, if even feasible, would not be cost effective.

To learn more about Gilat's CBH Solutions, please contact us at: info@gilat.com