

The image shows two tall, lattice-structured communication towers standing on a hillside. The sun is setting behind the towers, creating a bright glow and silhouetting the structures against a clear, blue sky. The foreground shows the dark silhouette of trees and the hillside.

The JUPITER System

# The Advantages of the Hughes JUPITER System for Cellular Backhaul

Extend Mobile Network Reach to Serve More  
Customers Efficiently and Cost-Effectively

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# Extending Mobile Networks Efficiently and Economically with the JUPITER System

## Background

The growing demand for faster and more reliable mobile connectivity presents a significant challenge for mobile network operators (MNOs) trying to serve rural and remote parts of their service areas. With the coming rollout of 5G network technology, MNOs around the globe will be further strained to provide the network capacity and geographic coverage demanded by users.

The MNO trade group GSMA predicts that over the next five years:<sup>1</sup>

- The number of mobile subscribers will grow from 5.2 billion to 5.8 billion, or 70% of the world's population.
- The share of subscribers with smartphones will increase from 65% to 80% of the total, straining networks as more users have access to the mobile broadband offered by 3G, 4G and 5G networks.
- Operators are just beginning to roll out the more robust 5G networks that will account for 20% of connections by 2025.
- MNOs will invest over \$1.1 trillion in their networks, much of it to upgrade to 5G technology.

With growth opportunities slowing in saturated cities and suburbs, MNOs are putting more emphasis on finding new customers in remote areas. On average, the cost of terrestrial cell towers in remote areas with fewer subscribers scattered over a wider area is 35% higher than putting the same equipment in cities and suburbs with millions of potential customers.<sup>2</sup> Lacking wired

infrastructure, these remote regions often depend on satellites for cellular backhaul to get voice and data to the core network.

Satellites currently provide backhaul to around 60,000 sites around the world, and Hughes accounts for more than 10,000 of those sites across Africa, Asia and Latin America. The research firm NSR forecasts that the number of remote sites using satellite for backhaul will increase to 160,000 by 2028.

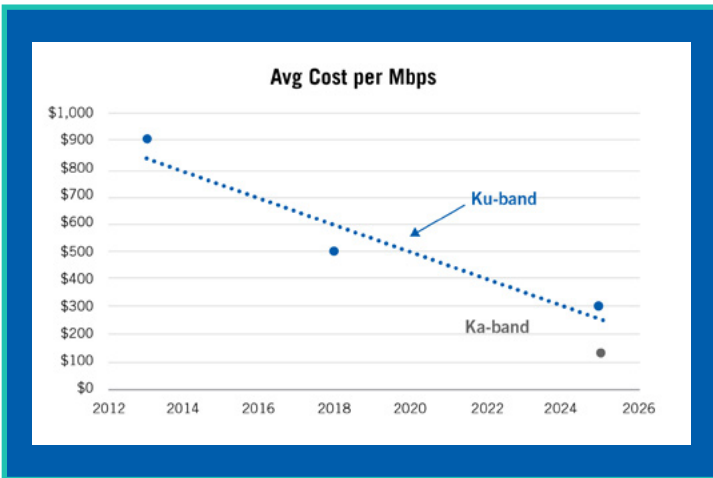


1 GSMA report "The Mobile Economy 2020" [https://www.gsma.com/mobileeconomy/wp-content/uploads/2020/03/GSMA\\_MobileEconomy2020\\_Global.pdf](https://www.gsma.com/mobileeconomy/wp-content/uploads/2020/03/GSMA_MobileEconomy2020_Global.pdf)

2 GSMA report, page 43

## Attractive Economics

In the last few years, leading satellite operators have launched high-throughput satellites (HTS) that have helped drive down the cost-per-bit of satellite capacity, making it more economical to use satellites for backhaul. Data from the research firm Euroconsult shows a steady decline in the monthly average price for a megabit per second (Mbps) of Ku-band satellite capacity:



Euroconsult expect the cost of newly available Ka-band capacity to drop even further, to around \$150 per Mbps per month by 2025.

Because its cost is based on data throughput, satellite backhaul makes more economic sense in remote areas than in urban environments. If an urban base station carries

900 GB of traffic per month, the price of satellite backhaul would have to be less than \$100 per Mbps to be cheaper than installing a ground network. On the other hand, if the rural station with less traffic only moves 200 GB per month of traffic, the cost of satellite capacity can be as high as \$400 per MBPS for the cell site to be deployed economically.

Because a number of cell sites can share a pool of capacity, MNOs only need to have the minimum information rate available for use at all times at any given site. And since the pool of satellite capacity is available to be shared, any additional traffic required demands can be allocated dynamically by the system.

By using satellites for backhaul from remote areas, MNOs are also able to build in more resilience into their networks. For example:

- MNOs can use satellites when terrestrial towers in urban areas are knocked offline by disasters such as earthquakes, wildfires or hurricanes.
- The capacity can also be used to offload terrestrial connections during peak times, whether planned or not.



## The Hughes JUPITER Solution

Today's mobile networks carry a combination of voice and data traffic that requires a high-performance, cost-effective, next-generation cellular backhaul solution that can be quickly and easily deployed to any location. The Hughes JUPITER™ System is ideally suited to serve such networks.

The JUPITER System is a Very Small Aperture Terminal (VSAT) platform delivering broadband services over both high-throughput and conventional satellites. Featuring a flexible and robust gateway architecture, an advanced air interface for bandwidth efficiency and performance, and high-throughput terminals, the JUPITER System enables operators to achieve the highest possible capacity and efficiency for any satellite broadband implementation. The foundational technology is the powerful JUPITER System on a Chip (SoC), a custom-designed VLSI processor employing a multi-core architecture and enabling 300 Mbps of throughput on every terminal within the JUPITER family.

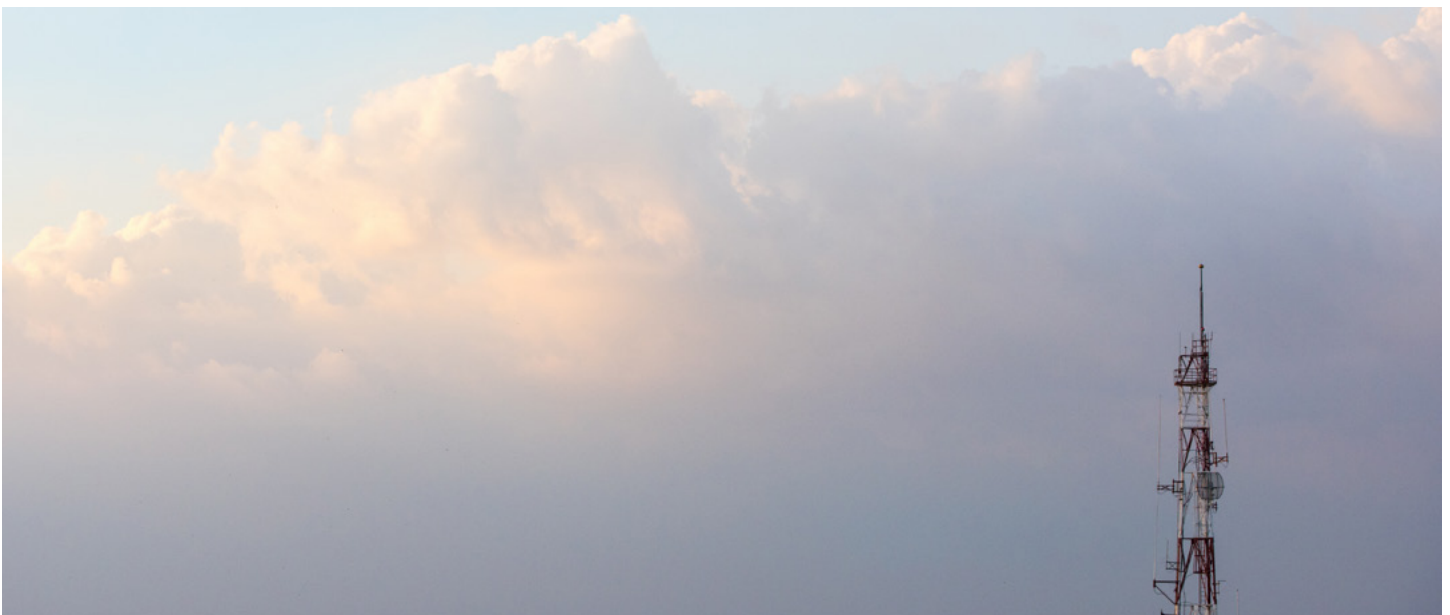
With industry leading latency (~600 ms) and jitter (~10 ms) performance, the JUPITER System offers the best user experience compared to other satellite backhaul offerings.

In addition, through the use of Time Division Multiplexing (TDM)/Time Division Multiple Access (TDMA), the JUPITER System makes the most efficient use of satellite bandwidth.

**The JUPITER System offers the best user experience compared to other satellite backhaul offerings.**

With varied peak traffic times in a dispersed, multi-site network, TDM/TDMA technology allocates satellite capacity to different sites and times on an as-needed basis. Remote sites share the same satellite capacity for their traffic, and the capacity is dynamically assigned as needed to each radio access network (RAN) in the system.

For more information about the Hughes JUPITER System and how it can help you expand your mobile network, visit our [website](#) or contact us at [GlobalSales@Hughes.com](mailto:GlobalSales@Hughes.com).



## Case Studies

### Indonesia

In a competitive selection process, five satellite service providers in Indonesia were chosen by BAKTI, a division of the Indonesian Ministry of Communications and Information, to deploy up to 8,000 cellular backhaul and Internet access sites using over 7 GHz of satellite capacity across multiple satellites. BAKTI required that the service providers employ HTS capacity, necessitating a flexible ground system solution to accommodate HTS spot-beams. Every one of the five service providers selected the JUPITER System for their ground network. The Indonesian service providers participating in the program are iForte, Lintasarta, Pasifik Satelit Nusantara (PSN), Teleglobal, and Telkom/TelkomSat.

Leveraging the latest JUPITER technology, the network incorporates Layer 2 functionality to seamlessly integrate terrestrial and satellite traffic for up to 16,000 TCP sessions, an essential feature for applications such as cellular backhaul with many simultaneous users.

### Peru

Telefonica Peru, a subsidiary of Telefonica SA of Spain, teamed with Facebook, IDB Invest and the Development Bank of Latin America to launch Internet para Todos (IpT) Peru, an open-access rural mobile infrastructure operator which aims to bring mobile broadband to remote populations where terrestrial infrastructure is not economically feasible. Acting as a wholesale provider, IpT Peru uses the JUPITER network to provide MNOs the infrastructure they need to deliver high quality retail mobile communication services to rural communities throughout the country.

Approximately 100 million people – or 20% of the Latin American population – lack access to mobile broadband.

The partners in IpT Peru hope this program will provide a roadmap for other countries in Latin America and the Caribbean to create similar infrastructure improvements.



### Democratic Republic of the Congo

Vodacom DRC, a subsidiary of South Africa-based Vodacom Group, serves an area where more than half of the 92 million residents live in villages surrounded by mountains, jungles and rugged terrain. Providing mobile connectivity with landlines to small rural communities in the Congo doesn't make economic sense because the roads are poor, and the villages are scattered over a hard-to-access area larger than Greenland. Vodacom DRC uses the JUPITER platform to deploy a turnkey, low-power, cell-site solution that easily connects to their mobile network via satellite.

The company initially installed 800 cell sites in the mountains of the South Kivu province in the eastern Congo, providing 2G voice and data service for the first time to the region's rural population. The subscriber base grew quickly and drove profits for the company. Vodacom DRC has since upgraded more than 100 of the sites to 3G service by leveraging the higher throughput of an HTS satellite through the JUPITER platform.



# Hughes JUPITER™ System

The most widely used VSAT system in the world, the JUPITER System is the platform of choice for satellite operators, governments, mobile network operators, and aeronautical and maritime service providers, operating on more than 40 satellites around the globe and powering efficient and cost-effective satellite broadband, cellular backhaul, community Wi-Fi, and mobility implementations.

**The world's highest performing satellite implementations are JUPITER-driven.**

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