



Manik Vinnakota, Director of
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Can LEO technology be the key to universal broadband?

Universal broadband has long been a futurist dream, ending the digital divide and expanding our logistical scope of the planet. With increasing LEO adoption, some believe that dream is within reach. Telesat Lightspeed intends to bring us closer to that dream, delivering competitive LEO connectivity on par with fibre, with the scope to address remote locations. Manik Vinnakota, Telesat's Director of Commercial and Product Development, discusses the potential of the service, and Telesat's vision for a connected world.

*Laurence Russell, Assistant Editor,
Satellite Evolution Group*

Question: How is broadband currently served by satellites? Why has true universal broadband always been such a challenge?

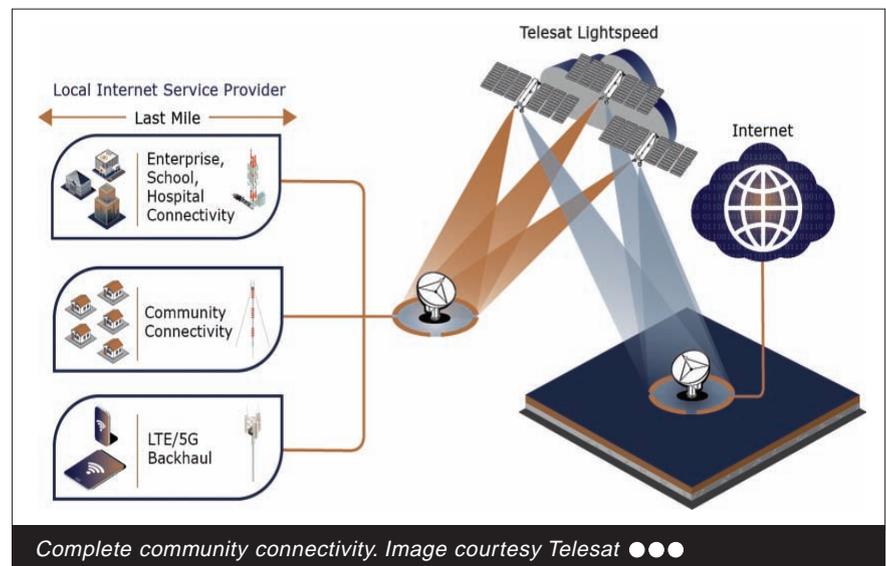
Manik Vinnakota: Expanding network coverage to rural and remote areas has been challenging for telecom operators for decades. The costs associated with deploying terrestrial backhaul over long distances, often through difficult terrain like mountains, jungles, deserts, and the frozen tundra, far exceed the potential profits that can be achieved in densely populated communities.

Geostationary (GEO) satellites can

provide backhaul links to bring internet traffic to the urban fibre backbone to connect a majority of the unserved or underserved populations, but not without their own unique challenges. Telecom operators consistently state that the bandwidth costs, coupled with the networking equipment and software required to integrate the satellite capacity with their terrestrial network is complex and costly to manage, requiring workarounds and expertise that they don't have within their organizations.

Whether expanding broadband Internet networks or wireless networks, most countries require that the backhaul traffic lands in the country. This means

Q&A



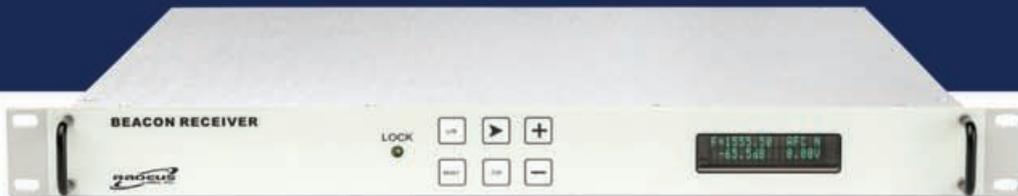


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that a gateway must be located in the country, further increasing the satellite infrastructure costs to add additional teleports in every country the operator wishes to serve.

Universal broadband remains a challenge because the business case doesn't close – it's just too expensive.

Question: Why is LEO better, and why should telcos consider these solutions?

Manik Vinnakota: Today's satellites operate from a GEO orbit that is some 36,000km away from Earth. These satellites are so high above the planet that it takes almost a second for a signal to travel from the ground to the satellite and back down to an Internet user. The Internet requires acknowledgments for data packets to be sent and received. While a second doesn't sound like a long time, if every packet being sent gets delayed by another second due to the acknowledgment, it starts to add up very quickly and that's why Internet over geostationary satellites is not optimal. The second of delay is multiplied over and over just to load a single web page, so the user experience suffers.

By bringing the satellites much closer to Earth at 1,000km, the time for data to reach the satellite and come back to the user is less than 50 milliseconds, a latency that is on par with most fibre networks today.

For many years satellite operators and telecom companies could deploy TCP acceleration and other techniques try to overcome latency. But it is not possible to accelerate encrypted web pages, ecommerce sites and VPN, which all time out on GEO. Over 74 percent of web pages today use the https:// encryption protocol, so Internet users on high-latency GEO backlinks will have a poor browsing experience.

LEO networks also provide consistent coverage and performance anywhere on Earth, including Polar regions, which GEO satellites cannot reach due to their orbital position along the equatorial belt.

Question: How will Telesat Lightspeed address the shortcomings of current solutions and allow for true universal connectivity?

Manik Vinnakota: Telesat's state-of-the-art LEO network, Telesat Lightspeed, will transform satellite Internet services with low-latency, high quality, affordable, fibre-like connectivity everywhere.

From a cost perspective, we designed our LEO constellation network to deliver Gigabit data links to Enterprise, Telecom and Government customers with disruptive economics. We achieve this by incorporating the most advanced technologies possible, driving the greatest efficiency over the

network. MIT Researchers who have studied the various LEO constellations have concluded that Telesat's constellation is the most efficient.

Having worked with leading telecom providers for over 50 years, Telesat designed its network to address the shortcomings and complexities inherent in integrating traditional satellite-based solutions. For example, Telesat Lightspeed services will be certified with MEF's 3.0 Underlay Connectivity standards, allowing telcos to easily understand how our layer 2 services can be procured and integrated into their networks.

For telecom operators who serve several sparsely distributed locations throughout a country, it is not economically feasible to assign a full LEO capacity beam to each location because they would be underutilized. Our Telesat Lightspeed satellites have advanced phased-array antennas that create over 135,000 hopping beams to dynamically deliver the right amount of capacity, to the right geography, instantaneously.

Alternatively, more densely populated communities will need much greater capacity to meet bandwidth needs, and through that same beam hopping technology we can dynamically form larger beams from multiple satellites to deliver over 20Gbps into a single community.

And finally, if backhaul traffic needs to land in country, with Telesat Lightspeed we can cost-effectively add a private interconnect anywhere the telecom operator needs it.

Question: With multiple LEO networks being launched, in addition to new MEO and GEO satellites, customers have many new choices. What should buyers be considering as they evolve their connectivity strategies?

Manik Vinnakota: As telecom operators consider all next-generation satellite technologies, one of the most important factors to consider is scalability. According to Worldbank, by 2022 yearly total Internet traffic is projected to increase by 50 percent from 2020 levels, reaching 4.8 zettabytes or 150,000Gbps. Exponential growth in connectivity demand will occur in every connected community. Telecom operators need to question each



Constellation. Photo courtesy of Telesat ●●●



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The organisers of Space Tech Expo, Europe's leading supply chain event for the space industry, are delighted to announce the launch of two new dedicated conferences designed to support the growth of the European satellite connectivity industries

ONBOARD CONNECTIVITY SUMMIT 2021

Unlocking global connectivity coverage

Realising next-gen connected vessels and aircraft

Optimising fleet management, predictive maintenance, and MRO through IoT / SaaS solutions

SATELLITE CONNECTIVITY SUMMIT 2021

Monetising satellite data services

Seamless integration of satellite within 5G

Driving down operational costs through standardisation and innovation in network architectures

Both events will run alongside the 2021 edition of **Space Tech Expo Europe** in Bremen, Germany, 16 - 17 November 2021 and conference passes will grant access to both tracks + the free to attend exhibition and Industry and SmallSats Forums on the show floor

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satellite operator's ability to scale network capacity into communities to meet this increased demand.

Network resiliency is also a critical factor to consider. Satellite-dependent communities must ensure that they don't have single points of failure in their satellite architecture. Buyers should ask operators how many satellites are in view of each site and the amount of time it will take to divert traffic from one satellite to the other if there is an anomaly. Equally important, buyers should inquire how satellite operators mitigate degraded performance or outages in the case of inclement weather events.

Question: Who can LEO connectivity benefit most?

Manik Vinnakota: Due to the close proximity of Earth, LEO will provide a much faster broadband link than what is possible in MEO or GEO orbits. There are many latency-sensitive applications that cannot work over a GEO link. LEO

networks can transfer encrypted traffic without timing out, and allow users to access cloud services, and online gaming. Another important benefit in LEO is data upload capabilities. Any application that requires large (5Gb – 10Gb) data uploads, like cloud services or e-medicine will perform much better in LEO. On the Telesat Lightspeed network, we will have 70 times more uplink capability against the most advanced GEO satellite in orbit.

Question: What impact will Telesat Lightspeed have on EMEA-based businesses?

Manik Vinnakota: In addition to expanding connectivity to remote communities, Telesat Lightspeed will bring enterprise-grade connectivity to EMEA based companies, many of which have a global presence.

Airspace over EMEA is denser than anywhere in the world for air traffic, as is the Mediterranean for the cruise industry and super yachts. With Telesat

Lightspeed, we'll be bringing more capacity into Europe that all the GEO satellites in orbit combined together!

Oil and gas companies can connect their oilfield platforms on land and in the oceans, as well as the tanker vessels to their corporate headquarters, through one unified network with disruptive economics.

Question: What's possible in a world with full LEO coverage?

Manik Vinnakota: In a world full of LEO coverage, we have the opportunity to bring fibre-quality connectivity to every point on our planet. For the first time, scientists conducting important research in the Polar regions will have access to 24/7 broadband connectivity. Remote populations can access telemedicine, distance learning, and participate in the digital economy. We believe that when we create connections, we unleash potential for all; potential to learn, potential to grow, and potential to prosper.



Telesat Lightspeed. Photo courtesy Telesat ●●●

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