

A satellite is shown in space, with a large green wireframe sphere and a beam of light pointing towards Earth. The background is a dark space with stars.

Advanced MSS Lband Services including Direct-to-Device Satellite Connectivity

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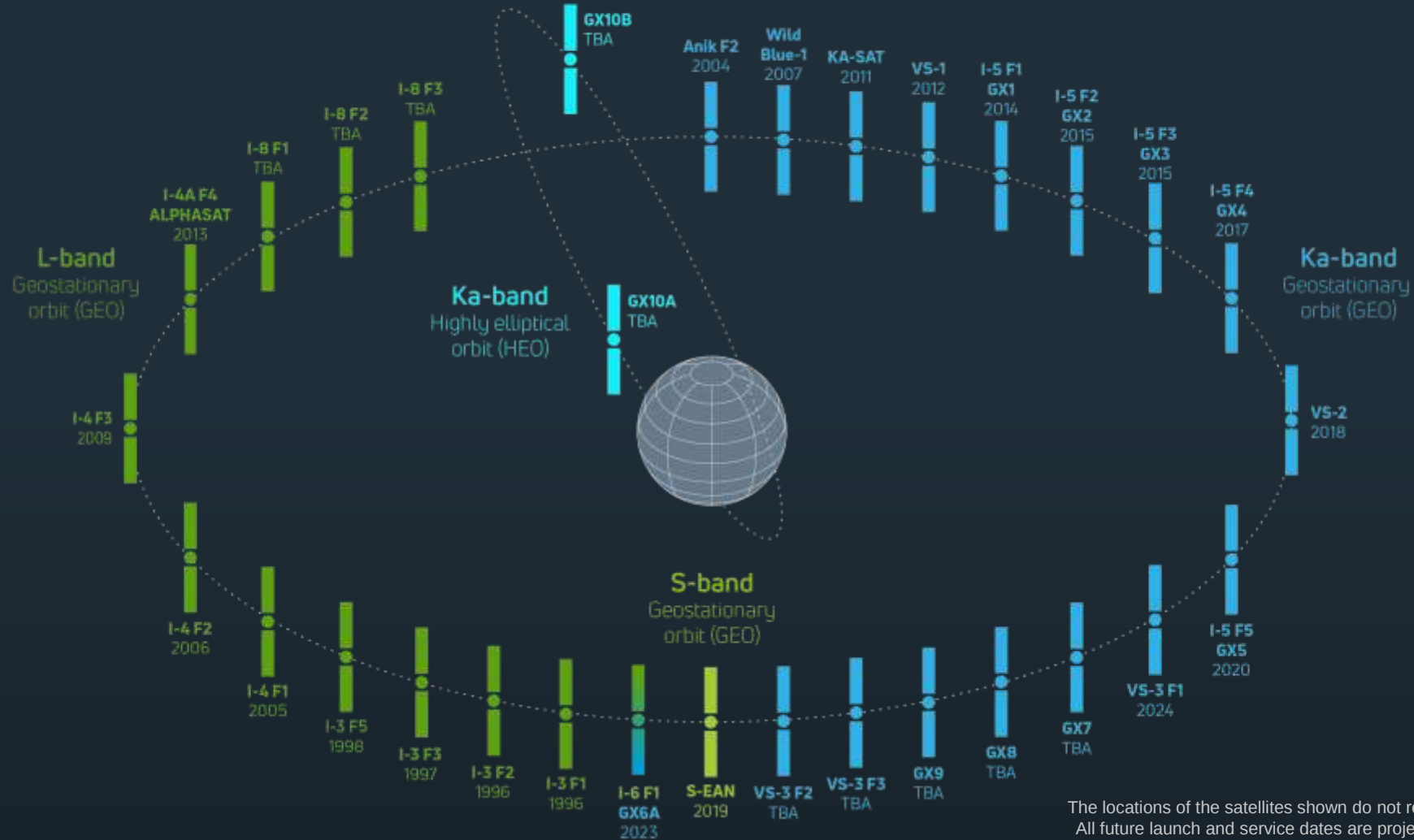


We are a
**global communications
company**
that believes **everyone
and everything** can be
connected

Current and future satellite fleet

Satellites shown with service entry dates

02/06/25



The locations of the satellites shown do not reflect the current actual locations.
All future launch and service dates are projections and are subject to change.
This diagram is for illustrative purposes only.

Advanced MSS Lband services including D2D



Evolved MSS

- Land Mobile (trains, buses, etc.)
- UAVs / Drones
- Autonomous Shipping
- Air Mobility and Transport



Advance IoT

- Large and fast-growing satellite market today
- NTN adoption to drive growth
- **Cellular IoT only covers <10% of the earth surface**



Advanced Automotive

- Ubiquitous coverage increasingly important for car OEMs to support safety, security, OTA software updates, vehicle tracking, telemetry data, infotainment, etc.
- Reliable connectivity key for developing autonomous transport

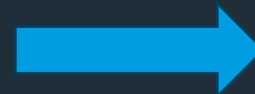
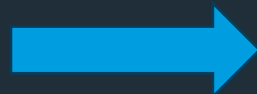


Smartphones/ Direct to Cellular

- Rapid adoption of 5G NTN standards within the smartphone ecosystem
- Analysts project a \$8-50B NTN D2D opportunity in 2032

What's the big deal with D2D

- Use of 3GPP Standards and the follow on ITU WP 4B meetings allows integration to mass market consumer devices
 - Standalone phones may still be the requirement for certain use cases
- Flagship phones and bridge devices are available today; mass market adoption will evolve quickly



Direct-to-device Lband MSS satellite services successfully trialed for first time in India by Viasat and BSNL

- Working alongside partner BSNL, India's telecommunications provider, Viasat successfully showcased satellite-powered two-way messaging services for attendees at India Mobile Congress
- In the trial, Viasat demonstrated two-way messaging and SoS messaging using a commercial Android smartphone enabled for non-terrestrial network (NTN) connectivity.
 - The messages were sent roughly 36,000km to one of Viasat's geostationary L-band satellites.



The outcome proves satellite services to cell phone connectivity is technically feasible for Indian consumers and businesses using Viasat's satellite network.

Use Cases for D2D

- > What can D2D do?
 - Leverage satellite's go-anywhere capabilities to extend Terrestrial Network's reach without deploying costly infrastructure



Use Cases for D2D

> When and Where will D2D be used?

- Disaster Response
- SOS/Emergency Use
- Coverage Gaps
 - › Underserved regions
 - › Unserved areas
- IoT
- At Sea



Viasat + ESA: autonomous, seamless, and resilient connectivity



- > Viasat and the European Space Agency (ESA) entered into an agreement in January 2025 to collaborate on a constellation for IoT and Mobile service
- > Combine GEO and LEO capabilities
- > Open, standards-based, interoperable network for operators to work together seamlessly

3GPP and Standards Setting

- The satellite industry began to participate in 3GPP in 2017, paving the way for the Non-Terrestrial Network (NTN) concept and related spectrum
- The publication of 3GPP NTN standards in Release 17 open different satellite bands for integration between satellites and terrestrial systems.
- ITU-R WP 4B has almost completed the work to recognize this 3GPP standard.
 - Requirements and recommendations completed
 - Three independent labs have confirmed standard has met the requirements.

Mobile Satellite Services Association

- In February 2024, the MSSA was founded to foster the MSS D2D Ecosystem
 - MSS operators: Ligado, Omnispace, Terrestar, Viasat, Yahsat (Space 42)
 - Chip manufacturers: Ericsson, Qualcomm
 - Network Operators: MTN
 - Many others in the device ecosystem
 - Partnerships: GSMA, 5GAA



National Security and Sovereignty in D2D Adoption

- How to ensure D2D operators comply with local laws?
- D2D could be used to bypass sovereign management of telecom, computing and cloud infrastructure.
- Regulation should ensure local laws will be observed by network operators.
 - If an operator can't be trusted to comply, they should not be allowed to participate directly in the market – using local partners might be an answer
- Nations seamless, and resilient connectivity solutions that drive technological competitiveness on the global stage.

Further References

- > MSSA: Mobile Satellite Services Association

<https://www.mss-association.org>

- > GSOA: “Satellite Direct-to-Device Connectivity”

<https://gsoasatellite.com/wp-content/uploads/GSOA-D2D-Paper.pdf>

- > CITEL PCC.II Paper on “REGULATORY, TECHNICAL, AND OPERATIONAL CONSIDERATIONS FOR DIRECT-TO-DEVICE MOBILE-SATELLITE SERVICES (MSS)” by Viasat, Omnispace, Terrestar and Ligado

Document: “CCPII-2024-43-6033r2_i”

- > CITEL PCC.I Paper on “OPPORTUNITIES TO UTILIZE MSS D2D IN NATIONAL CONNECTIVITY POLICY AGENDAS”, by Viasat

Document: “CCPI-2024-44-5545_i”

A night sky with the Milky Way galaxy visible, a shooting star streaking across the upper right, and dark silhouettes of mountains at the bottom.

Let's unlock **OPPORTUNITY**
for everyone, everywhere.