



AN INTRODUCTION TO LOW-EARTH-ORBIT CONNECTIVITY FOR BUSINESS AVIATION



gogo

Always connected is the new expectation

High-speed inflight connectivity has become essential in business aviation.

Today's passengers, pilots and crew expect to stay connected for both work and personal communication no matter where they fly: to stream, collaborate, and stay secure in the sky as effortlessly as they do on the ground.

Low Earth Orbit (LEO) satellite

networks are making that expectation a reality - bringing fiber-like speed and ultra-low latency to aircraft of every size.

This guide demystifies LEO, explains its advantages for operators worldwide and explores the essential factors to consider when choosing a LEO connectivity solution for your aircraft, mission and business.



Did you know?



DEMAND IS ACCELERATING:

Global business jet flights grew **14%** year-over-year in 2024

(WingX, 2025)



CONNECTIVITY IS EXPECTED:

92% of business travelers say in-flight Wi-Fi is critical to productivity

(NBAA Connectivity Survey, 2024).



INFLIGHT DATA IS EXPLODING:

Average connected-aircraft data usage will increase by **400%** by 2030

(Euroconsult, 2024)



NETWORKS ARE RESPONDING:

Investment in satellite networks dedicated to business aviation is set to drive a **64%** rise in connected aircraft by 2031

(Valour Consultancy, 2022)

The Changing Satellite Landscape: From GEO Foundations to LEO Innovation

For more than two decades, Geostationary Earth Orbit (GEO) satellites have formed the backbone of inflight connectivity outside of the North American Air-to-Ground (ATG) network.

Positioned 36,000 km above the Earth, GEO networks offered business aviation its first broadband experience, providing coverage across oceans and continents - enabling executives to remain connected to their offices and families no matter where they fly.

However, GEO connectivity requires relatively large, tail-mounted antennas that come with weight considerations, installation and certification costs – limiting availability to large cabin and long- range jets. For light and mid-sized aircraft, these limitations made inflight broadband inaccessible.



GEO connectivity therefore has become synonymous with a premium inflight experience, largely reserved for long-haul aircraft at the top end of the fleet.

With the rapid evolution of Low Earth Orbit (LEO) constellations, and the advanced technologies that enable LEO satcom services, the benefits once exclusive to large, intercontinental aircraft are now accessible to all of business aviation.

Operators who once saw inflight connectivity as out of reach (and beyond their budget) can now provide passengers with the same ability to stream, conference, and collaborate in the air as those flying onboard the largest business jets. Meanwhile, larger aircraft are now able to combine the strengths of both networks for ultimate flexibility, redundancy and coverage.

The result is a new era where connectivity is affordable, scalable, flexible, and mission-matched, ensuring every aircraft type - from a light jet on a short regional hop to a long-range flagship crossing the poles - can enjoy the full advantages of next-generation satellite connectivity.



How LEO works for Business Aviation

Low-Earth Orbit (LEO) refers to a network of many small satellites orbiting the Earth at a relatively low altitude - typically between 500 and 2,000 kilometers above the surface, compared to GEO satellites operating at 36,000 kilometers above Earth.

These satellites work together in a coordinated constellation to deliver continuous, global coverage. As each satellite rapidly orbits the earth, they pass connectivity between each other and down to strategically placed ground stations.

For business aviation, the proximity of LEO satellites offers game-changing benefits: faster speeds (60 – 200 mbps), dramatically lower latency (under 100 milliseconds), and truly global coverage, including over oceans, polar and remote regions.



This means passengers and crews on business jets can now enjoy a seamless, high-quality inflight internet experience wherever they fly, enabling real-time communication, video conferencing, streaming and access to cloud-based tools - just like on the ground.

To access LEO network services, aircraft must be equipped with an electronically steered antenna (ESA), capable of tracking and maintaining a connection with the fast-moving satellites. This equipment is smaller, lighter, easier to install and costs less than the bulky tail-mounted antenna systems required to access GEO networks – advantages the business aviation market has been waiting for.



LEO Services: Mission-Matched

LEO satellite connectivity is transforming inflight internet for every aircraft, from compact turboprops to ultra-long-range jets – bringing compelling advantages for a range of missions, flying anywhere.

LIGHT AIRCRAFT

Opening True Broadband to Smaller Cabins

For light jets, turboprops, and entry-level jets, space, weight, and power constraints have historically restricted connectivity options by installing a compact LEO fuselage-mounted ESA antenna - with minimal structural

modification and downtime – owner-operators and charter companies can now offer premium inflight Wi-Fi (once reserved for larger jets and bigger budgets), to passengers and crew alike, even on short regional hops.



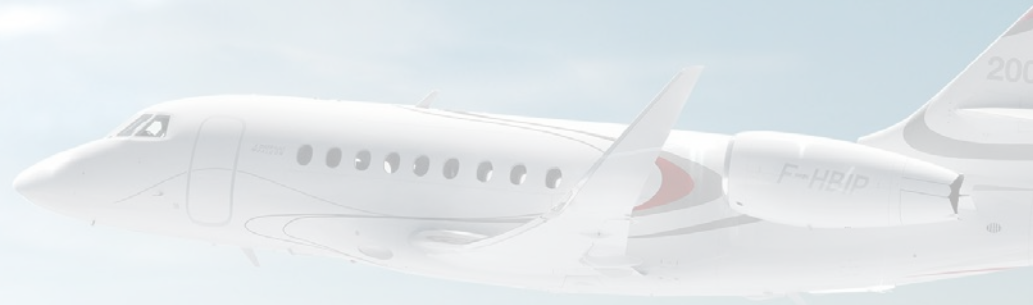
MID-SIZED AND SUPER-MID JETS

The Mobile Office in the Sky

Aircraft like the Challenger 350 or Gulfstream G280 commonly fly multi-leg and transcontinental missions, catering to business travelers and executives who expect seamless “office in the sky” productivity. LEO delivers ultra-low-latency broadband that supports high-demand applications - enterprise video conferencing, secure VPN access and inflight Entertainment including live streaming - creating a seamless passenger experience for both work and leisure.

LARGE-CABIN AND LONG-RANGE JETS: Global Reach and Premium Experience

LEO’s global architecture excels for international missions. For long-range aircraft such as the Global 6500, Falcon 2000, or ACJ business jets, LEO’s ultra-low latency delivers a continuous “office-and-entertainment suite” experience - even on polar or oceanic routes where coverage was once inconsistent. It enables real-time engine and airframe data streaming to enhance operational oversight and predictive maintenance, improving both safety and efficiency.



Tailored to your aircraft and mission

At Gogo we understand that one size doesn't fit all, that's why we have engineered a range of solutions to fit your needs.

From turboprops to VVIP aircraft. For owners, flight departments and fleets. Gogo offers tailored connectivity solutions that match your specific aircraft, budget and mission. Explore our connectivity solutions at gogo.to/myplane





Critical Evaluation Factors

When evaluating LEO satellite service providers for your inflight connectivity, there are several factors that play an important role in the long term performance and reliability of your investment.

Keep reading to explore the following:

1. How important is the number of satellites in the network
2. Network congestion
3. An antenna's ability to execute satellite handoffs
4. Data management & security
5. Service & Support

1. How many satellites does a LEO constellation need?

A LEO constellation requires anywhere from hundreds to thousands of satellites depending on several factors.

The higher the number of satellites in orbit does not necessarily equate to a more stable or reliable network. Factors such as the altitudes of the orbital planes (the lower the altitude the more satellites that are needed), the number of desired in-orbit spares, the anticipated number of users and required network capacity (higher usage requires higher capacity = more satellites), and desired coverage area should be considered.

Lifecycle of a satellite

The average lifespan of a geostationary (GEO) satellite is around 15 years, though some can last for decades. In comparison, a LEO satellite is designed for a mission life of 5-7 years. This shorter lifespan enables providers to continuously and rapidly deliver improvements as their networks are refreshed with new satellites.

Whilst launching new satellites and innovating, networks such as Eutelsat's OneWeb focus on minimizing space debris and maintaining a sustainable space environment, with retrieval and disposal built into their innovative satellite design.

2. Network congestion

While LEO networks can have a greater capacity than traditional satellite communication networks, they can still become congested if too many users are accessing the network simultaneously.

When this occurs, the network provider may prioritize bandwidth allocation to ensure that users deemed to have highest priority needs receive adequate bandwidth. For business aviation, it is important to assess not only the total bandwidth available, but also to look at the total number of users across all markets that constellation serves and the priorities of the provider.

Dedicated Services for Business Aviation

The connectivity needs of business aviation clients often demand enterprise-grade service and aviation-specific hardware. Providers such as Eutelsat and Gogo provide dedicated business aviation solutions, which protect the user experience - ensuring the most reliable and consistent inflight service.



3. Understanding antennas

LEO constellation satellites are continuously orbiting the planet and do not maintain a fixed location overhead, the way GEO satellites do.

From a fixed point on the ground, a single satellite may only be seen overhead for a few minutes at a time. As a result, most LEO networks utilize Electronically Steered Antenna (ESA) technology. An ESA is an electronically controlled array of antenna elements that can be non-mechanically steered to point in different directions without moving the antenna itself. ESAs don't have moving parts, which reduces the risk of mechanical failure to nearly zero.

Designed to be small, lightweight and affordable, the installation of an ESA antenna on the fuselage requires minimal structural

modification. Nevertheless, Supplementary Type Certification (STC) for the antenna is required to ensure the aircraft remains safe to fly, meeting airworthiness and regulatory compliance. In selecting a LEO ESA system, look to the roster of STCs awarded to ensure availability and compliance for your aircraft.

The Gogo Galileo ESA antenna system is designed and built specifically for business aviation applications.

Gogo offers customization via two low-profile ESA sizes to ensure a perfect fit on nearly all business aircraft based on size and needs.

Visit gogo.to/install for the latest STCs for Galileo.

Gogo also manages all support, certification, and installation processes in partnership with OEMs and Dealers, and follows global aviation governing bodies change management processes for continued airworthiness – ensuring that the antenna meets the highest level of airworthiness and build quality.

Furthermore, with a future-proof philosophy, we have designed our Gogo Galileo hardware to be adaptive to future network technologies, protecting the long-term viability of your investment.

Two antenna options. One seamless experience

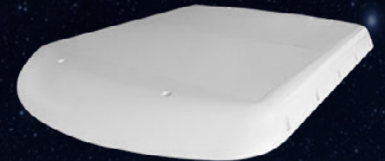
Gogo Galileo - HDX Antenna

- Designed for all aircraft
- ↓ 60 Mbps | ↑ 11 Mbps | Low Latency
- Fuselage mounted
- 1 LRU + 1 antenna required for service



Gogo Galileo - FDX Antenna

- Optimized for super-mid to large-cabin aircraft
- ↓ 195 Mbps | ↑ 32 Mbps | Low Latency
- Fuselage mounted
- 1 LRU + 1 antenna required for service



4. Network & data security

Security is a top priority when considering any inflight internet provider to keep data and networks protected from potential cyber threats.

Users should expect the same standards of security that they have on regular broadband connections to prevent eavesdropping, tampering, and unauthorized re-direction of internet traffic.

Overlay networks such as private relays and Virtual Private Networks (VPNs) should seamlessly integrate and be supported, and all communications must be kept private, unaltered, and supported with end-to-end encryption.

Ensuring your global inflight connectivity provider specializes in advanced aviation network and data security is imperative. The best security systems are built from the ground up and integrated into every level of the network. You can read more about Gogo's industry leading cybersecurity practices at **gogo.to/cyber**



5. Customer service & support

Having a robust customer support and service network in place is paramount to minimizing downtime and ensuring reliable internet connectivity for business aviation.

When selecting a connectivity provider, consider the level of customer service and support that is offered. With high expectations from passengers and crew for reliable and uninterrupted internet connectivity during flights, it is essential to have a provider that can offer prompt and effective assistance in the event of any technical issues or system downtime. A provider that understands the impact of

any AOG event and as such offers 24/7/365 live support with trained experts you can talk to in person, and one that has a global network of certified service centers, can provide peace of mind and expedite any corrective action that may be required.

Gogo offers 24/7/365 worldwide customer support and has a global network of customer service and product support teams who are always available to keep your systems operational. Gogo also offers remote always-on system monitoring, diagnostic and support services, allowing our support team to connect directly to your hardware and solve issues without having to send a tech or replace your LRU.

Conclusion

LEO is a game-changer for business aviation, bringing high-speed, low-latency inflight broadband to aircraft of all sizes.

Yet speed is only part of the story: aviation-grade hardware, cybersecurity, Entry into Service, and 24/7 global support define a successful investment.

With Gogo's multi-orbit strategy and trusted partnerships, operators can provide seamless inflight Wi-Fi that exceeds today's expectations and tomorrow's challenges.



Ready to fly connected?

Get in touch with a Gogo connectivity expert today.

CONNECT

