Private jet Wi-Fi:

What passengers want

A manual for charters and fractionals

Viasat™

Introduction

Because it is now expected that a chartered private jet will be equipped with some form of connectivity, customer queries have evolved beyond a simple: "Do you have Wi-Fi?"

Fast, reliable in-flight Wi-Fi is a high-priority checklist item for business aviation passengers, who simply cannot afford to be disconnected from their professional and personal lives when they fly. The ability to stay as connected in the air as on the ground is expected by customers seeking to charter or part-own a private jet, and these discerning patrons will shop around to ensure they are getting the best available service.

Operators instead face a much more complex line of questioning from customers, including queries such as: "What kind of Wi-Fi do you have? How fast is it? Can I access it if I fly over water? Can I stream video? Are there any limitations on the number of devices or users that can connect to it? How will I be billed for using it?"

The ability to confidently provide answers that satisfy these increasingly sophisticated demands comes through ensuring aircraft are equipped not just with basic Wi-Fi, but with a connectivity solution that has enough capacity, coverage and reliability to enable passengers to do what they want to do online and more, without limitation.

For business jet charter and fractional ownership firms, making the right choice on which broadband system to install on their aircraft can mean the difference between standing head and shoulders above the competition, and blending into the background.

In the pages that follow, we'll guide you through the minefield of choosing the right supplier by taking a closer look at why customers demand in-flight Wi-Fi, what they use it for, what operators should consider when selecting a provider, and how making the right choice can pay off — not just now but also in the years to come.

Why business jet passengers demand in-flight Wi-Fi

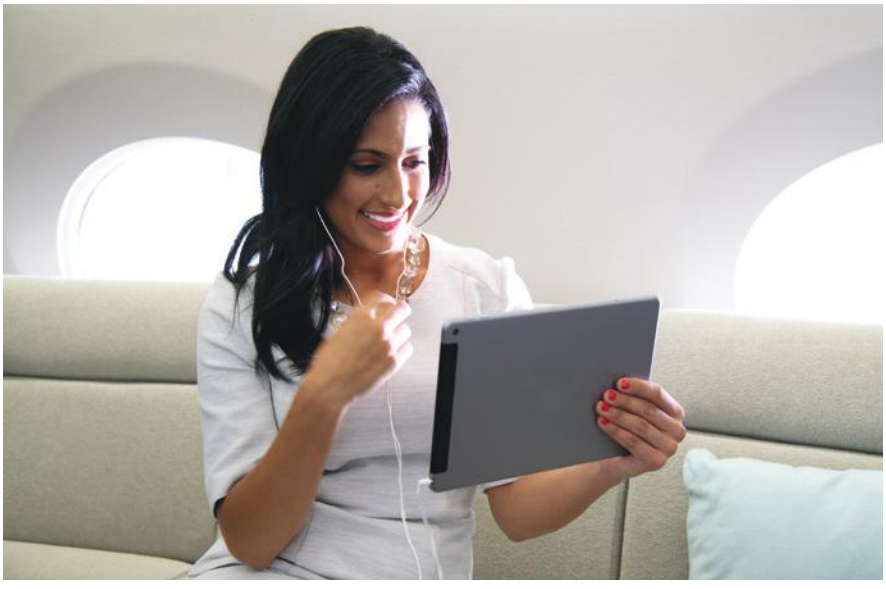
Before choosing an in-flight connectivity provider, it is important to consider why private aviation passengers want — and need — to be connected to the internet in the air, and what they use it for.

Business aviation customers are often key decision makers at the top of their game in their industries who need to make decisions quickly and constantly. Being offline as they travel between meetings can result in delayed decisions, and delays in business can be costly.

One of the key reasons for choosing private jet travel over commercial is the amount of time it saves — with no long waits at overcrowded airports, and the ability to go from curbside to air in minutes rather than hours. Time, after all, is money.

But saving time means little if it is unproductive time. Private jets are often used as flying offices, enabling corporate users to continue with their demanding, high-performing jobs while they travel between business locations and client bases.

Crucial to this is access to a high-speed internet service with enough bandwidth to enable multiple users to perform a variety of tasks on an unlimited number of devices. And crucial to that is capacity. The greater the capacity, the better — and more productive — the experience.



"Travelers demand continuous connectivity while en route, from takeoff to landing, for both domestic and international travel."

National Business Aviation Association
Insider magazine

How business jet passengers use in-flight Wi-Fi

Business aviation passengers use airborne Wi-Fi for a variety of purposes — some professional and some personal.

In addition to enabling travelers to remain productive in the air from a professional standpoint, in-flight connectivity helps provide a healthy work-life balance by keeping people connected to their loved ones on the ground during what can often be frequent and protracted business trips.

It also enables people to switch off and relax — something even the busiest and most time-pressed executives can benefit from — by providing access to the same kind of entertainment commonly consumed during downtime at home.

A recent survey conducted by the National Business Aviation Association (NBAA) to ascertain how its members used in-flight connectivity found that email was the most popular activity, with 96.6% of respondents reporting that keeping on top of their inboxes was their top priority when logging on to the internet during flight. This was followed by web browsing (64.4%) and VPN (35.6%).

Interestingly, more than one-fifth of respondents said they primarily used cabin connectivity to access streaming services such as Netflix. This was followed by social media and large file transfers.

"With more and more travelers looking to stream and conduct video conferencing in the air, technology has a significant impact on business aviation."

Los Angeles, California-based Clay Lacy Aviation, a private jet charter company with a fleet of more than 100 aircraft

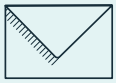
The popularity of video streaming services is growing, as more and more users sign up to consume their chosen entertainment content in this way on the ground. A natural progression from this would assume that in the near future, as people seek to continue their ground-based habits in the air, access to streaming services will move even further up the priority list for in-flight Wi-Fi users.

According to a report released earlier this year by California-based Grand View Research, it is estimated that the global video streaming market will be worth $124.57 billion by 2025 and the compound annual growth rate (CAGR) of the sector will be 19%.

"Extensive usage of online video, coupled with demand for on-demand video, is driving the growth. In addition, increasing demand for high-speed internet connectivity is projected to act as an advantage for the market growth," said Grand View Research when it released its findings in February.

But streaming services such as Netflix, Amazon Prime Video and YouTube TV require a significant amount of bandwidth to minimize buffering and ensure the smoothest possible user experience. It is essential, therefore, that private jet owners and operators opt for an in-flight connectivity service with ample capacity to allow passengers to stream such content to their electronic devices without the frustration of having their viewing interrupted by poor connection speeds.

Private jet travel makes professionals more agile and accessible by getting them where they need to be in the shortest amount of time. But if the aircraft they're flying on is not equipped with a high-speed, high-capacity internet service that lets them do their jobs as effectively in the air as on the ground, those agility and accessibility benefits become eroded.



Email and text communications

Anyone in business knows that neglecting email is a recipe for trouble. Keeping the inbox online is one of the most basic, crucial jobs of in-flight Wi-Fi, so executives will stay connected to their team to keep work and collaboration moving.

Web browsing and social media

While study after study has shown that taking a break can actually improve professionals' work, it's a challenge to find work-life balance. A fast, reliable internet connection helps traveling professionals (averaging 50+ hour work weeks) find time for rest and relaxation with personal web browsing, entertainment and social media.

Streaming media

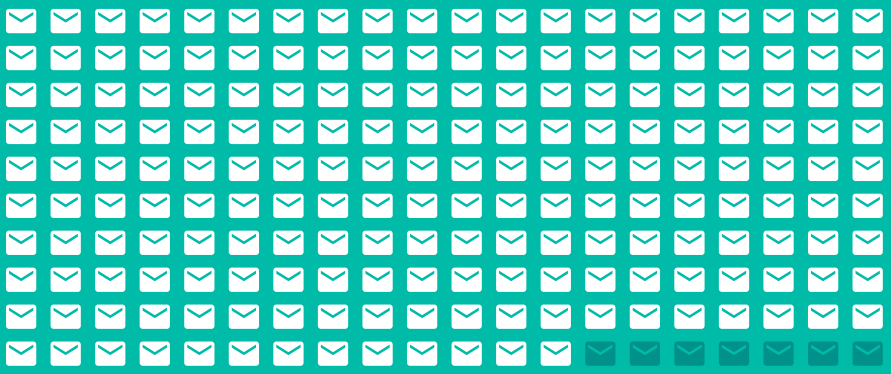
Everyone is streaming more media these days. So no executive wants to invest in a Wi-Fi system for a multimillion-dollar private jet, only to discover that the service struggles to stream video.

Voice/VoIP communications

With the FCC holding steady on its ban of cell phone use on all aircraft, Wi-Fi-based voice and VoIP solutions remain essential for private jet passengers. To ensure high-quality voice communications, a strong and reliable internet signal is required.

File sharing

Few things are more frustrating than settling in to get some work done, only to realize you can't access the file you're supposed to be working on. Some 39 percent of corporate data lives in the cloud, which means that if your in-flight connection bogs down with file sharing, you're not fully connected, which directly impacts overall productivity and collaboration. A good in-flight Wi-Fi solution lets business travelers edit, share, and download important files in real time.



96.6%

said their top priority was **checking email** in-flight

64.4%

said their top priority was **browsing the web** in-flight

35.6%

said their top priority was **using a VPN** in-flight

Survey conducted by the National Business Aviation Association (NBAA)

How in-flight Wi-Fi makes private jet operators more competitive

If someone has a positive experience they will recommend it to their friends and seek to repeat it. Conversely, if a person experiences something negative they will avoid a repetition and warn others against it. Access to reliable Wi-Fi is no exception.

The ability to stay connected is a popular talking point, and internet users who have experienced low-quality or non-existent broadband access tend to talk loudly about it. Add in the amplification provided by social media and those disgruntled voices have the potential to reach a much wider audience.

Installing an in-flight connectivity system is a big decision for fractional ownership and charter operators who rely on repeat bookings and word of mouth.

Some in-flight connectivity providers suggest in their literature that passengers conserve bandwidth by, for instance, limiting the number of active devices or suspending cloud services. But given the propensity of today's internet users to multi screen, placing such limitations can have a detrimental effect on their online experience.

Consumers who routinely stream movies to their laptops while simultaneously checking email or social media on their smartphones at home expect to be able to do the same thing when they travel. If they have chartered a business jet equipped with a Wi-Fi system that lacks the capacity to enable them to continue their ground-based habits in the air, they might look to charter their next flight from an operator that boasts a higher-capacity service. Put simply, capacity is king.

There is little point in spending thousands of dollars on equipping a fleet of business jets with a Wi-Fi solution that does not have enough capacity to enable users to perform the tasks they wish to perform, or which places limitations on the number of devices that can be used simultaneously.


Passengers expect the same
Wi-Fi experience at home, in
public venues and in flight.

The importance of future proofing

Another key point to consider alongside capacity when selecting an in-flight Wi-Fi provider is forward compatibility. Connection speeds and data throughput are constantly evolving and improving, meaning that even on the newest aircraft an in-flight connectivity solution can quickly become yesterday's news.

Business passengers want their in-flight internet connectivity to be as fast and reliable as their connections on the ground, and they expect this level of quality to be as good, if not better, in the years to come.

According to *Chief Executive* magazine, a publication read by CEOs who regularly buy and use business aircraft, the quality of a private jet's in-flight connectivity system has become such a priority for executives that it eclipses more traditional considerations such as how far and how fast the jet can fly.

"Forget airspeed, range and rate of climb: the business jet performance metrics that matter most to executives now are often the bandwidth, speed and coverage area of the onboard connectivity equipment," according to a recent *Chief Executive* article.

To meet these high expectations now and in the years ahead, business jet owners must future-proof their aircraft to ensure that the in-flight connectivity systems they install today will remain useful in five or 10 years' time, without becoming obsolete.

A connectivity solution that can cope with, and evolve with, increases in internet connection speeds and bandwidth can help keep costs and aircraft downtime to a minimum. When it comes to connecting an aircraft to a broadband network, it makes sound business sense to buy a system that will work with the network provider's technology of tomorrow, as well as today's. Otherwise, further costly investments will need to be made further down the line.

Not only is the future-proofing of connectivity systems vital to meeting passenger expectations now and in the years to come, it also makes sense from an aircraft resale standpoint. Given how important in-flight connectivity has become, business aircraft owners could see the value of their assets tumble if their chosen service provider and onboard equipment become, or look likely to become, obsolete.

The improving global aviation market has resulted in fewer desirable preowned aircraft being offered for sale, therefore buyers have to carefully consider the long-term value of their investments. This is particularly true of the fast-growing fractional ownership market.

According to Argus International, the fractional business aircraft market saw yearly gains in 10 of the 12 months of 2018. Fractional activity in March 2019 increased by 6.3% compared to the same month in 2018, rising to a 12.3% increase for midsize jets.

As this market continues to grow and the pool of attractive preowned jets shrinks, owners of aircraft that are equipped with truly forward-compatible connectivity systems will not only have a more desirable asset on their hands should they choose to sell, but they will also reduce their own need to buy a replacement from this shrinking pool.

"Forget airspeed, range and rate of climb: the business jet performance metrics that matter most to executives now are often the bandwidth, speed and coverage area of the onboard connectivity equipment."

Chief Executive magazine

A unique advantage

Satellite-based in-flight connectivity takes three forms: L-band; Ku-band; and Ka-band, with the latter offering the fastest speeds. Viasat has the unique advantage of offering business aircraft owners both a mature and global Ku-band service and an extensive Ka-band service which is in the process of being expanded further. It is easy to switch between the two, or even install both on the same aircraft, ensuring that an investment made today is an investment in the future.

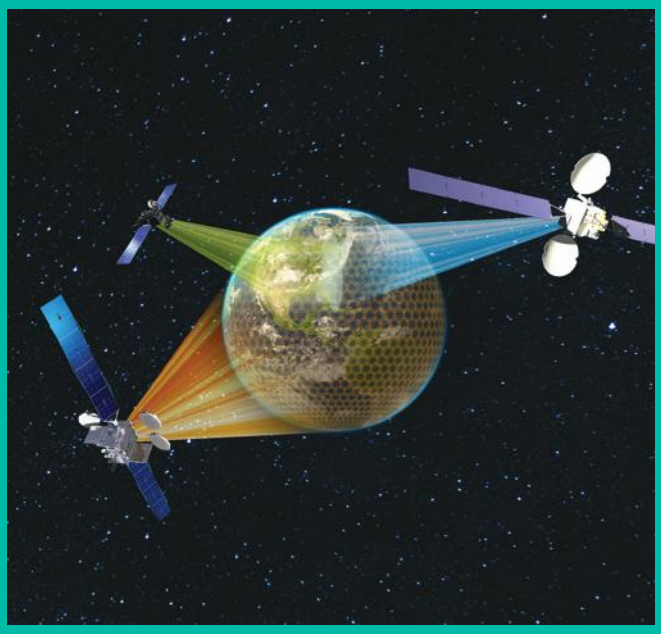
“When change does come, it is easy to swap out the existing Viasat Ku-band terminal with the new Viasat Ka-band Global Aero Terminal. This is because Viasat uses the same 3 LRU form factor and wiring used by our current terminals for our future units,” said James Person, Viasat’s director of global business development for business and VIP aviation. “This means the rest of your in-flight connectivity system is truly future proof.”

A trio of ViaSat-3 geostationary satellites is under construction and due to come online in the early 2020s. This constellation will provide over 1 terabyte of bandwidth to business jets globally, going far beyond what is available today.

By equipping a business jet with a combination of Viasat’s dual-band antennas and Global Aero Terminal 5510 satellite terminal, operators can reap the benefits of the service and redundancy provided by today’s Ku-band and ViaSat-2 Ka-band networks, and easily tap into tomorrow’s global Ka-band service when ViaSat-3 becomes operational.

For Ku-band business aviation customers, Viasat recently doubled the speeds on its Ku Advanced network to up to 10 Mbps. The new high-speed in-flight connectivity business aviation service packages will provide new and existing Ku-band customers with the ability to upgrade their solution with faster speeds and enhanced experiences across the world’s most heavily-flown routes.

Existing and future Viasat business aviation customers can take advantage of Ku Advanced’s increased speeds, with near-global coverage and an easy migration path to Viasat’s Ka-band system through the use of existing aircraft wiring, offering a truly forward-compatible solution.



Why capacity is king

The importance of capacity when it comes to in-flight internet connectivity cannot be stressed often enough.

One way to look at in-flight Wi-Fi capacity is to compare it to the number of lanes on a highway. Put simply, the more lanes the highway has, the more vehicles it can accommodate. During periods of heavy traffic, such as the morning or evening rush hour commute, the increased volume of cars on the road constrains lane capacity. If there aren't enough lanes, traffic slows down or grinds to a halt.

Similarly, an in-flight connectivity system powered by a satellite that lacks capacity will slow down or crash when lots of users try to access the internet at the same time. Instead of lanes on a highway, in-flight connectivity relies on satellites through which packets of data, or data bits, are transmitted. Everything done online, from email to streaming video, is in the form of data bits. Capacity is the maximum number of data bits that the satellite network is able to accommodate and send to all users of the service over a given period of time.

It stands to reason, then, that the more data bits the network can accommodate, the better the user experience will be. If the capacity is substantially large, more data bits can flow through the satellite network — even during high internet traffic periods — and this results in a faster, higher-quality connectivity experience for each individual user.

An effective satellite network must also have the flexibility to focus capacity where and when it is needed, regardless of the number of users or daily fluctuations in the number of aircraft in the sky. Older satellites are static and have limited capability to put capacity where it is needed, while newer satellites have the flexibility to meet increased demand when and where it happens, such as at an airport with heavy air traffic.

For internationally-traveling private aviation users who rely heavily on streaming video and teleconferencing, greater capacity and more speed when and where it is needed are crucial to meeting their evolving requirements. But many of today's Wi-Fi equipped business aircraft have only the most basic connectivity and lack the capability to handle these data-intensive requirements.

For business jet charter and fractional ownership operators, the ability to boast fleets equipped with high-capacity, high-speed broadband that does not place limits on users will be a key selling point going forward.

Capacity is the engine behind high-speed internet, and high-speed internet is the engine behind enabling users to do what they want to do online.

Limited capacity leads to a poorer user experience by slowing down, or preventing people from achieving what they want to achieve on the internet.

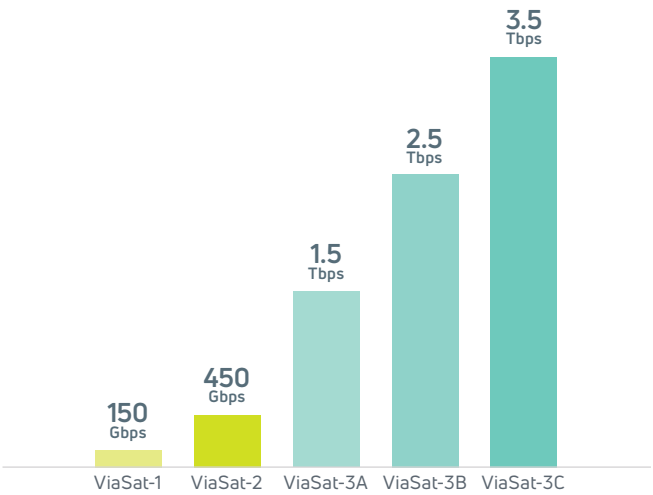
Why Viasat is the king of capacity

To address requirements for ever wider capacity, Viasat launched the ViaSat-1 satellite in 2011. It had, at the time, more than double the capacity of traditional satellites. ViaSat-1 earned a Guinness World Records® title as the highest-capacity communications satellite in the world, and our satellite fleet will soon provide more than twice the total combined network capacity of the commercial communications satellites in space today.

In 2017, ViaSat-2 was launched and it became the world's highest-capacity satellite, providing six times the coverage and nearly twice the capacity of ViaSat-1.

When Viasat launches a trio of satellites, each referred to as ViaSat-3, starting in early 2020s, it will make even higher capacity and truly global coverage a reality. Each of the ViaSat-3 satellites is expected to offer 1 terabit or more of total network capacity — a substantial jump from ViaSat-1 (140 Gigabit per second, or Gbps) and ViaSat-2 (260 Gbps).

"The innovations in the ViaSat-3 system do what, until now, has been impossible in the telecommunications industry — combining enormous network capacity with global coverage, and dynamic flexibility to allocate resources according to geographic demand," said Mark Dankberg, Viasat's chairman and CEO.



The ROI factor

The return on investment (ROI) for business aviation charter and fractional ownership operators of equipping their aircraft with a fast, reliable, high-capacity, forward-compatible in-flight connectivity system is four-fold.

Such an investment will make them more competitive when it comes to attracting customers; more likely to get repeat bookings; more fuel-efficient; and better able to increase the resale value or their aircraft.

ROI through competitiveness

As outlined earlier, customers who charter or invest in partially owning private aircraft are incredibly discerning and have high expectations. They typically have high-performing jobs which require their full attention, even — and often especially — when traveling. This means they expect to be able to use their aircraft as extensions of their offices, making access to high-quality in-flight Wi-Fi an absolute must.

In the words of Ed Kilkeary, CEO of Latrobe, Pennsylvania-based business jet management and charter firm L.J. Aviation: "A business jet lacking connectivity would be more difficult to charter today. I expect to see the majority of business jets, either in new production or undergoing a cabin refit, with in-flight connectivity, going forward."

Investing in a connectivity system that promises to not only meet but far exceed those expectations will be recouped in the form of increased customers.

ROI through loyalty

Once you've attracted customers with the promise of great in-flight Wi-Fi you need to retain them and make sure they come back for more. If an executive boards a chartered aircraft expecting to be able to continue working seamlessly throughout his/her flight and finds that the connectivity service does not live up to those expectations, he/she will not rush to repeat the experience. If they find they can do everything they wanted to do and more online, it stands to reason that they would be more likely to become a loyal customer.

ROI through savings

Research from the U.S. Federal Aviation Administration (FAA) suggests that for each pound of weight added to an aircraft, the incremental additional fuel burn rate per flight hour is 0.005 gallons. With fuel costs accounting for up to half of business jet operators' variable costs — and global oil prices on the rise again — it makes both financial and environmental sense to conserve as much fuel as possible by opting for a lightweight in-flight Wi-Fi system. To help keep costs to a minimum, it is important to select a provider that ticks all the boxes when it comes to the size, weight and power (SWaP) aspects of the hardware required to keep private jet passengers connected in the air.

ROI through resale value

In-flight Wi-Fi is one of the most recommended private jet upgrades and brings with it a high return on investment. Sourcing a global in-flight internet system that offers high speeds and forward compatibility is an effective way of protecting your investment and can result in as much as 80% ROI. A good in-flight connectivity system can increase the resale value of an aircraft because it is a feature that is so highly sought after by customers.

> "A business jet lacking connectivity would be more difficult to charter today. I expect to see the majority of business jets, either in new production or undergoing a cabin refit, with in-flight connectivity, going forward."
>
> **Ed Kilkeary**
> CEO of Latrobe, Pennsylvania-based business jet management and charter firm L.J. Aviation

Unlimited Streaming

In addition to providing unrivalled capacity, Viasat offers an extra service that enables users to manage their connectivity subscription costs and avoid any unwanted overage charges. After all, if you have the capacity to do everything you want to do on the internet, the last thing you need to worry about is how much of a bill you might be racking up by doing it.

Viasat Unlimited Streaming offers a single monthly subscription fee with no data caps for streaming, meaning popular services such as Netflix, Amazon Prime and YouTube TV can be viewed without impacting access to web browsing, email, corporate VPN, videoconferencing or cloud services.

By removing the worry about data allowances and overages, this service enables private aviation passengers to catch up on the news of the day or watch their favorite TV series without thinking about how much data they're using and how much they might be charged for it.

Viasat Unlimited Streaming is designed to make your in-flight entertainment system more flexible and cost-effective, and does not require any additional equipment beyond the Viasat Ka-band in-flight connectivity system.

It can use personal streaming media subscriptions or subscriptions assigned to the aircraft, and entertainment content can be streamed either to a passenger's personal device or to a cabin monitor. For aircraft owners, this means the costs associated with installing and operating a separate direct broadcast television system can be completely avoided.

Viasat Unlimited Streaming takes advantage of the world's highest capacity satellites, and Viasat's Ka-band avionics enable aircraft to access our enhanced satellite technology to meet the increased demand for speed, capacity and performance.

Will your in-flight connectivity support tomorrow's technology?

The future is now. Viasat keeps you ahead of connectivity demands for today and tomorrow's business jet travelers.

Watch the video at
https://youtu.be/sCWZ0RUb1sg

Five key things to consider when selecting an in-flight connectivity provider

Choosing which in-flight connectivity provider and what type of solution to go for amid a cacophony of claims and counter-claims from companies competing for your business is no mean feat.

The selection process can be a minefield of terminologies and acronyms, from Ka to Ku, and from ATG to GEO, LEO and MEO.

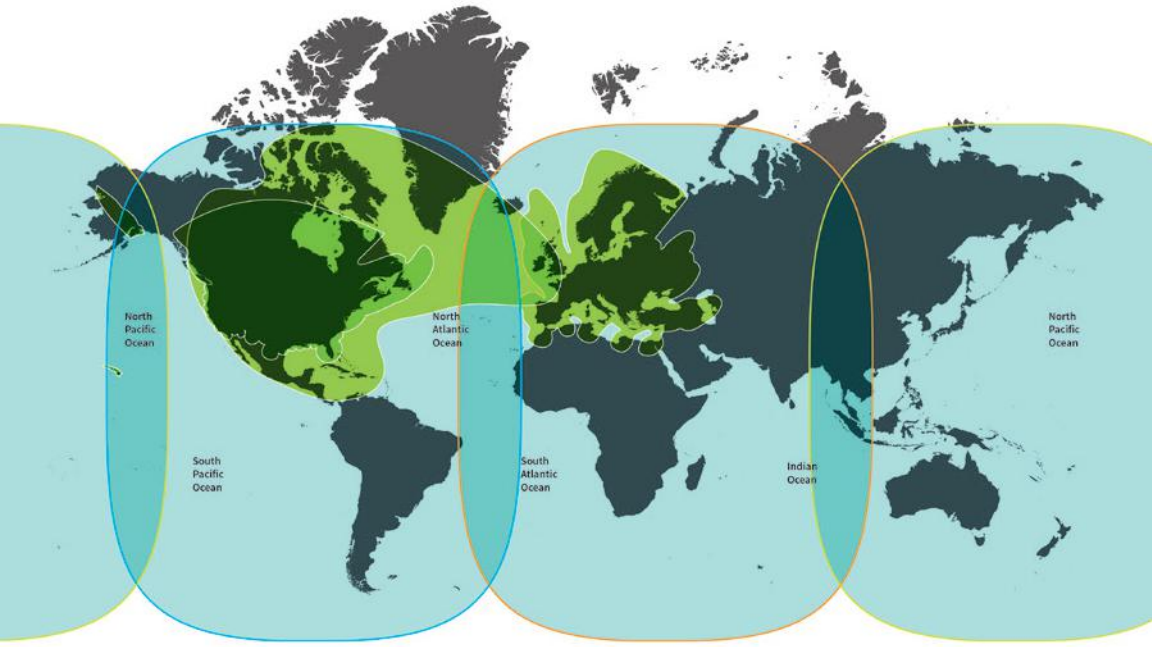
To help simplify the decision-making process, it is useful to break it down into five main areas: capacity; speed; coverage; forward compatibility; and the reputation of the network provider. This can make it easier to weigh up the options and assess which providers/products tick the most boxes, based on your own unique requirements.

☑ Capacity

As previously mentioned, capacity is king when it comes to the quality of the in-flight Wi-Fi user experience. Choosing a service provider that offers a sufficient amount of capacity to enable passengers to achieve what they want to achieve online is vital. Satellite capacity varies across operators by a factor of over 100, so when choosing a network operator for in-flight connectivity it is important to ask whether the provider's satellite capacity is over 100 Gbps. It is also important to know whether the power in the satellite can automatically shift to support natural daily capacity surges, such as Monday mornings at business aviation airports.

☑ Speed

Again, this comes back to capacity. The greater the capacity the faster the speed, and the faster the speed the more reliable the service when it comes to performing passengers' most popular tasks, such as streaming video, surfing the web, checking email and teleconferencing.



- Current Ka coverage
- Ka coverage ViaSat-3A
- Ka coverage ViaSat-3B
- Ka coverage ViaSat-3C

Coverage is approximate and subject to change.

☑ Coverage

Where you fly affects which type of in-flight connectivity service is best-suited to your needs. For instance, there is little point in installing an air-to-ground system if you plan to fly overseas. Even if you only fly domestically now, opting for a service that can't be accessed when your aircraft flies over water can limit your options when it comes to adding longer-distance routes in the future. Think carefully about the coverage areas offered by each contender and consider how they fit in, not only with your current route network but also with your possible future network.

☑ Forward-compatibility

Installing an in-flight connectivity solution is a long-term investment, so it pays to consider how the hardware you install today can adapt to the changing technologies of tomorrow. Ask potential providers about the migration path of their systems to ensure that they will be able to work with rapidly-evolving developments in global broadband technology. Obsolescence is a key point to bear in mind when you make your in-flight Wi-Fi choices.

☑ Reputable network provider

There is a growing pool of in-flight connectivity providers, some well-established and some new to the industry. Ask potential providers how long they have been in business, how much experience they have in the in-flight Wi-Fi market, and how many satisfied customers they have on their books. Look for providers with a strong track record in developing connectivity solutions.

The Viasat difference

Powered by one of the world's highest capacity satellite network, Viasat's in-flight Wi-Fi solution for business aviation places no limit on the number of devices that can be used, no limit on the number of users using them, and no limit on the number of uses that can be performed on them.

Viasat in-flight connectivity has more than enough capacity to stream video to every device on the plane, simultaneously and at all stages of flight. This is where the Viasat difference really kicks in.

Viasat's high-speed in-flight connectivity system has flexible pricing plans to meet the unique needs of various customer types. The service can be billed hourly, making it easier and more straightforward for business aviation charter companies to charge their customers and build the cost of using Wi-Fi into their charter rates

Viasat's system is also smaller and lighter than many competing products and the hardware does not need to be installed inside the pressurized aircraft cabin. This means there is more room on board for personal items and luggage. Traveling executives can therefore maximize both productivity and space in their flying offices.

Viasat is an industry leader with vast experience in building and managing satellite systems. Our products and services connect hundreds of thousands of residential customers in the U.S., hundreds of commercial airliners and business jets, as well as senior leader government aircraft.

We have transformed the in-flight experience by offering unprecedented Wi-Fi speeds and performance through advanced satellite technology. Our unrivalled capacity keeps passengers connected to everything they need to stay productive, entertained and accessible in the air.

Viasat's in-flight connectivity solution is certified for use on a wide range of business jet platforms across all five of the major manufacturers: Bombardier, Cessna, Dassault, Embraer and Gulfstream.

Don't just take our word for it. Here's what some of our business aviation customers had to say about the difference Viasat's in-flight connectivity service has made to their operations:

"At Flexjet, where a commitment to long-term relationships is one of our three guiding principles, we value the extraordinary service and personal attention we get from Viasat. It is one of the many reasons we chose Viasat for our large cabin fleet Wi-Fi service."

Megan Wolf
Flexjet Chief Operating Officer

"When evaluating in-flight connectivity services, we looked at three main aspects: the cost against what the solution could deliver, the ability to support us 24/7/365, and ensuring the technology was forward compatible. Viasat decisively ticked off all three."

Mark B
maintenance supervisor in the flight department of a Viasat business aviation customer

12.1 million

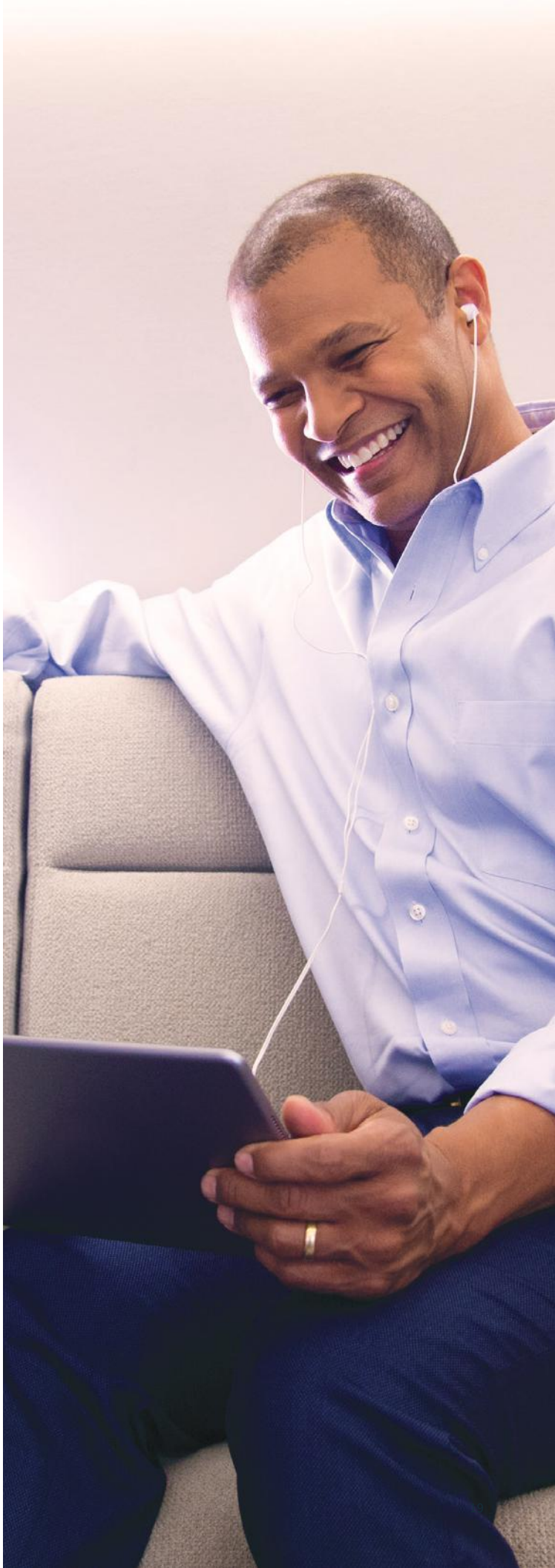
devices connected per month

160,000

flights connected per month

1,700

business and commercial aircraft connected



We invite you to elevate in-flight connectivity with the best Wi-Fi in the sky **and experience the Viasat difference.**

Global headquarters
6155 El Camino Real, Carlsbad, CA 92009-1699, USA

WEB viasat.com/business-aviation

TEL 888 842 7281 (US toll free)
+1 760 476 4755

EMAIL business-aviation@viasat.com

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