TELESAT LIGHTSPEED™

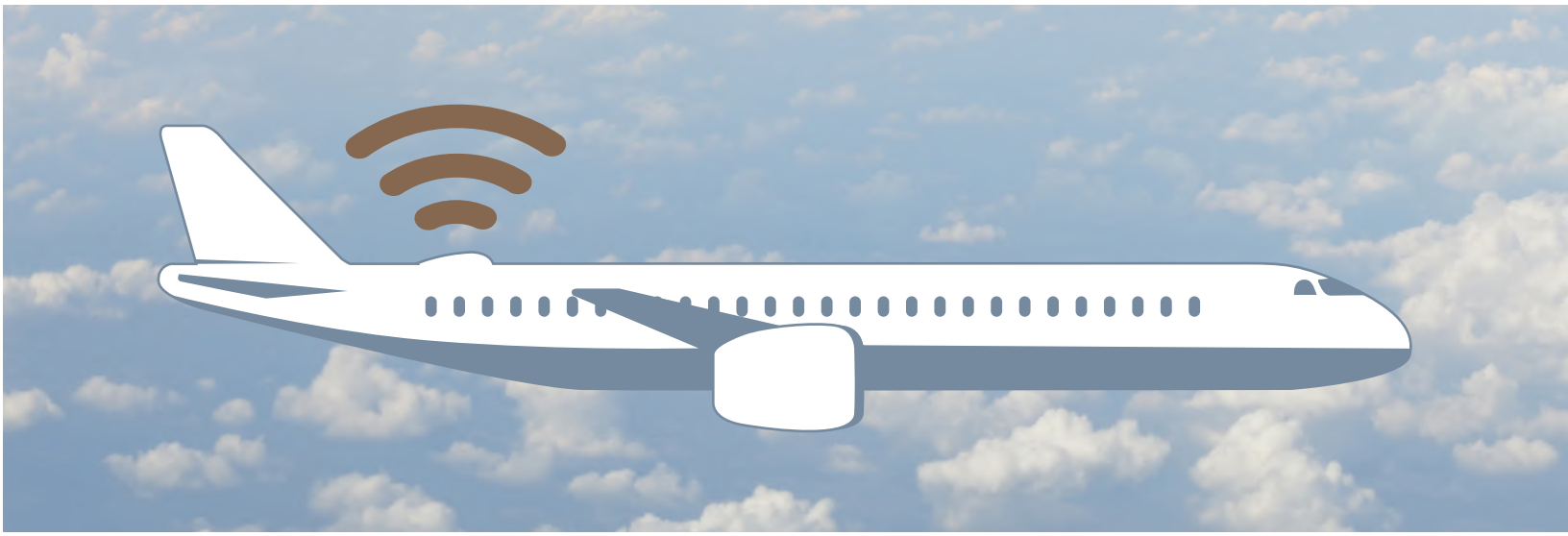
# Inflight Connectivity

## White Paper

TELESAT™

# Inflight Connectivity – Reimagined with Telesat Lightspeed

## Affordable, fibre-quality connectivity to the cabin



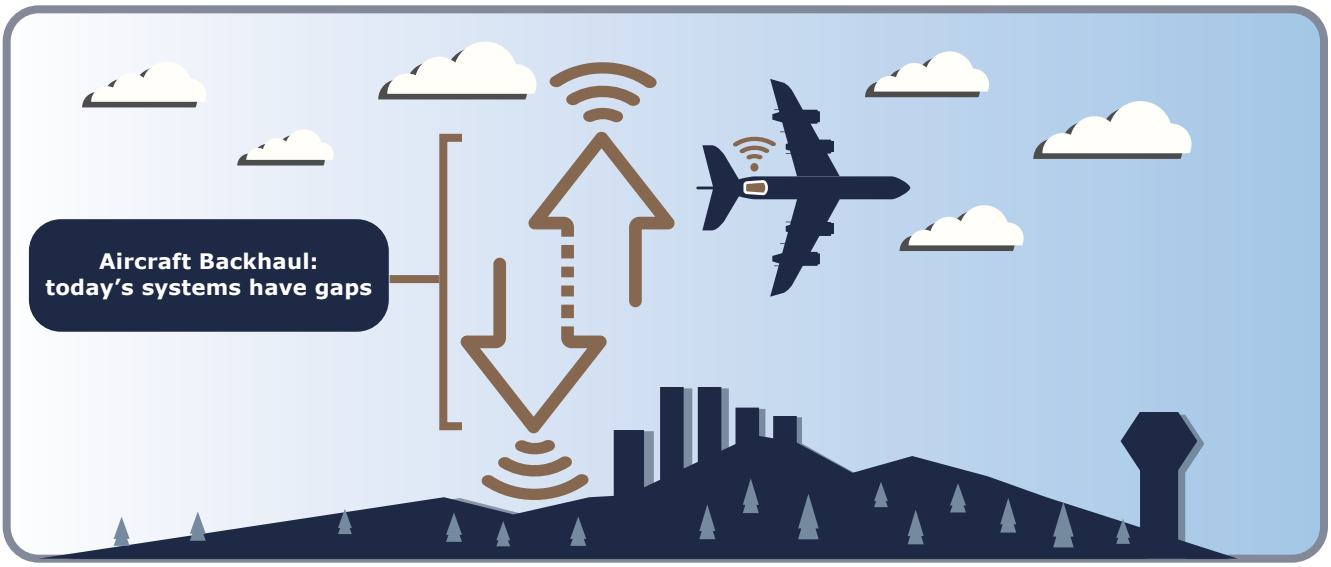
### Imagine this future:

You are a crewmember on board a plane with 400 passengers and notice that most are engrossed with their tablets. Business travelers appear hard at work while a mother helps her child with an online game. You take a moment to sync the customer database and check the status of passengers' connecting flights. The Captain announces you are flying over the North Pole – you stop to appreciate the home-like high speed broadband that has improved the experience for passengers and crew and recall how it didn't exist a few years ago for polar routes, and was poor or limited on most flights. You relax, and take a moment to look out the window at the northern lights.

Achieving the above vision will be a key differentiator for airlines over the next few years. The industry has made huge advances in Wi-Fi for passengers and crew, but expectations of being connected while flying are shifting, from nice-to-have to need-to-have as fliers demand a broadband experience comparable to their fibre at home and at the office. Operational efficiency use cases (e.g., over-the-air updates, real-time data) create additional connectivity requirements.

# 1. Today's systems that connect aircraft and land cannot meet future requirements

**Current connectivity solutions will not achieve the above vision. Specifically, the data transport network connecting an aircraft to land (aircraft backhaul) will be a constraining factor if its performance is not improved along with operational and economic dimensions.**




### 1.1. Performance gap

Current aircraft backhaul systems cannot deliver fibre quality due to the following gaps:

- Low throughput – unable to provide high-speed (e.g., for streaming) to every seat
- High latency – signal delay between aircraft and traditional satellites impact user experience (e.g., slower web pages, enterprise applications timing out)
- Congestion – cannot serve high traffic regions such as airport hubs
- Poor coverage – limited to no service on many routes

### 1.2. Complex

Trying to solve performance and coverage gaps has led to complex networks that are patched together requiring dynamic management and the need for precise hand-offs. To compensate for high latency, performance accelerators are added to the network – more devices leading to higher cost and more complexity.

### 1.3. Expensive

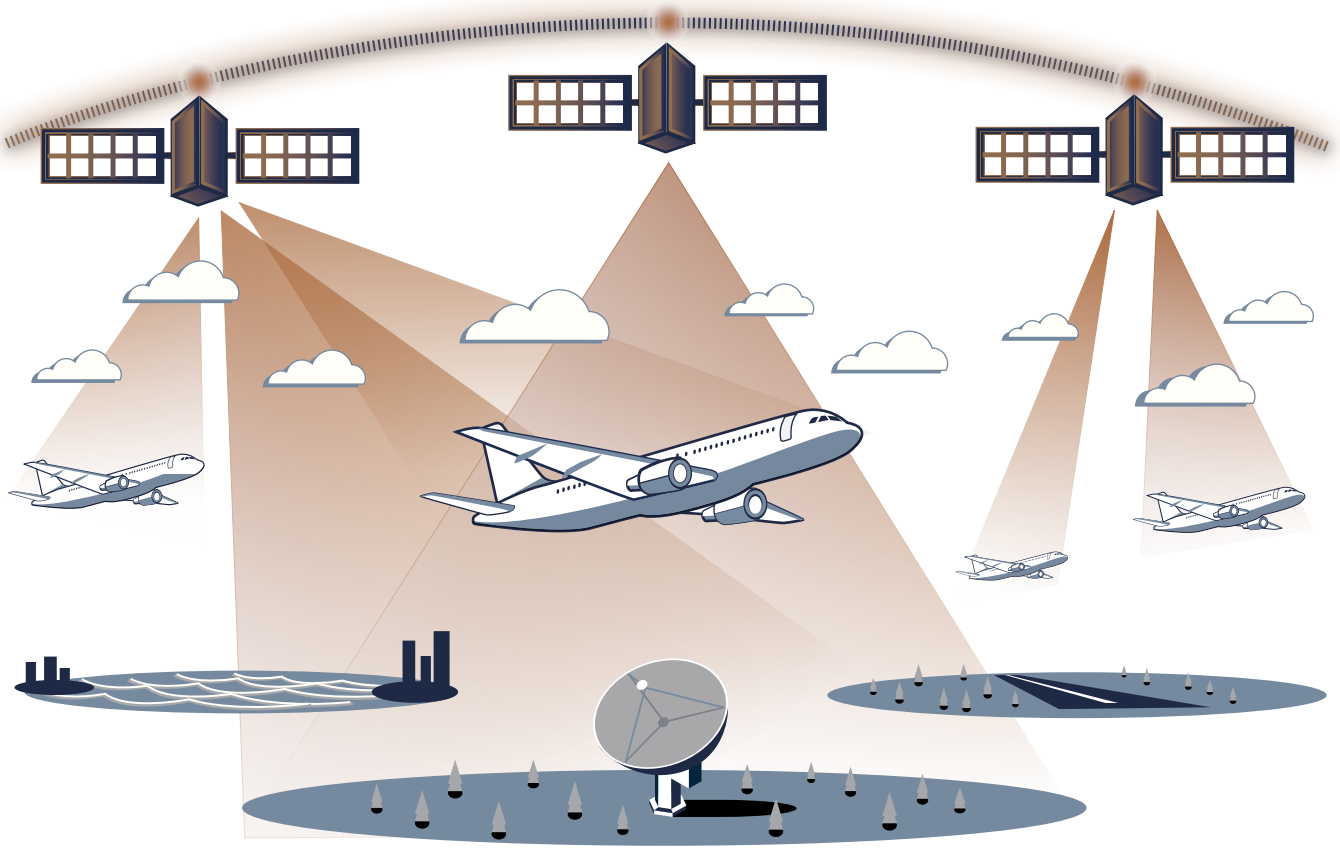
Applying today's economic models to growing data requirements will not be friendly to airlines' bottom lines. Airlines need a more cost-effective solution that allows them to profitably meet flier and operational data demands.

# 2. About Telesat Lightspeed

**Telesat is a leading global satellite operator with headquarters in Canada and a 50 year history of innovation. Telesat is developing a new network optimized for airline connectivity, Telesat Lightspeed.**

**Telesat Lightspeed is a state-of-the-art global network:**

- with hundreds of advanced satellites in low-earth-orbit (~1,300 km from earth, ~35 times closer than traditional satellites)
- seamlessly integrating with terrestrial data networks at major global hubs
- leveraging a number of important technology developments in the fields of machine learning, digital processing, optical communications, electronic antennas, advanced manufacturing and new launch vehicles
- will deliver terabits of high performing, low cost, low latency broadband to every corner of the Earth

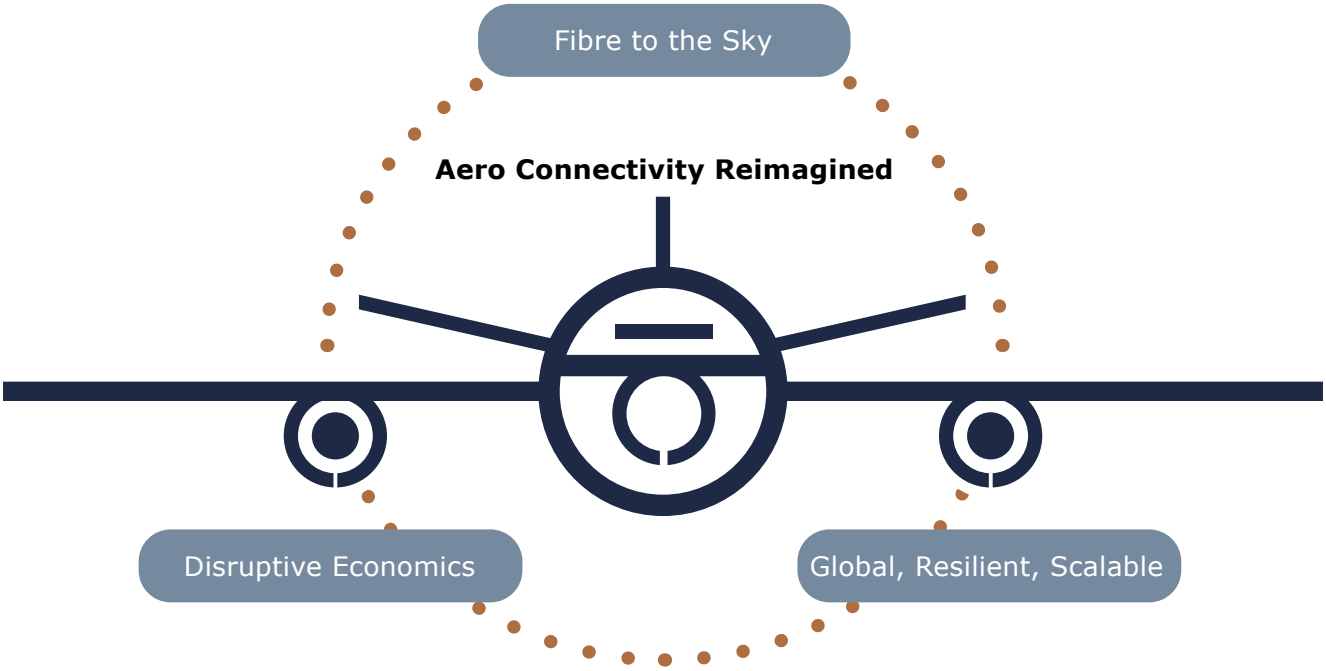


Telesat Lightspeed is ideally suited to deliver fibre-quality connectivity to any aircraft globally. It is also a superior solution for backhauling cellular and ISP traffic from non-fibre areas as well as providing broadband connectivity to ships, remote enterprises and government users.

# 3. Telesat Lightspeed value proposition – Aircraft backhaul of the future

### 3.1. Fibre to the Sky

As your home or office has high performance connectivity, Telesat Lightspeed will deliver a virtual 'Fibre to the Sky' passenger experience, enabling digital operations to be unconstrained with fibre quality connectivity to every plane.

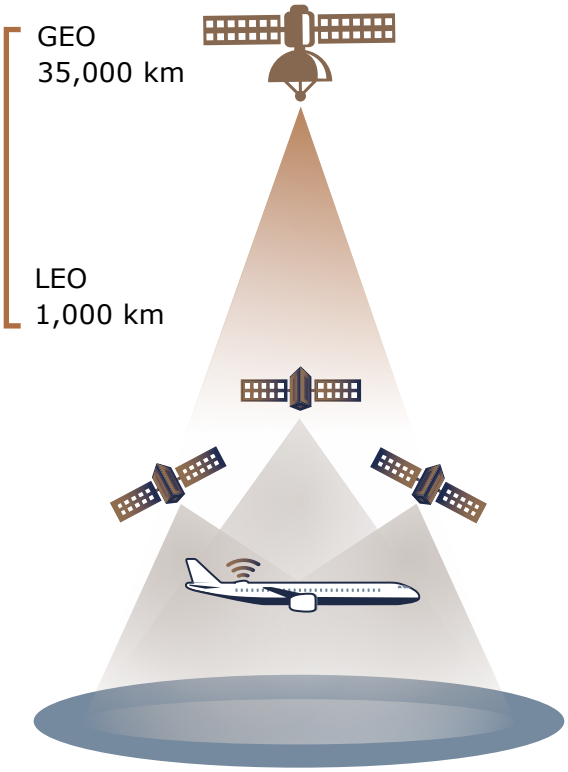



### 50 Times Faster Internet Speeds

Telesat Lightspeed will provide hundreds of Megabits per second (Mbps) to every aircraft, orders of magnitude higher than what is available through current satellite or air-to-ground systems. This will enable every passenger to stream video, browse the Internet or perform any other online activity unconstrained.

**Improve Operational Efficiencies**

Crew and ground maintenance teams also benefit from reliable high-speed connectivity. Customer loyalty programs can be instantly accessed on crew tablets. Cabin crew can receive updates from ground operations, providing critical information to passengers connecting to other flights. More throughput can be dedicated to increasing communications between the cockpit, cabin and maintenance teams before the aircraft has landed, reducing turn-around time.




**Responsive & Secure connectivity**

Telesat Lightspeed, being ~35x closer to Earth vs traditional satellites, has terrestrial like latency of 30-50ms. The advantages of low latency can be seen in many applications, such as:

- Social media: quickly load content heavy webpages and applications
- Ecommerce: Smooth online shopping, browsing product pages quickly
- Real-time streaming: Never miss a game while in-flight
- Enterprise applications: Use a VPN or browse encrypted (Https) intranet pages without issues
- Real-time operational data: real-time graphical weather maps, high-fidelity aircraft reporting to ground maintenance crews

Telesat Lightspeed can enable different routes per traffic type – operational data can be routed separately from the passenger data to different points on ground. If required, traffic can be routed only over satellites, without traversing any ground network and landed directly in the country of the airline's choice.

### 3.2. Disruptive Economics

Telesat Lightspeed enables airlines to benefit from technology advancements and economies of scale to serve future data demand without impacting the bottom line.

**Low cost**

Telesat Lightspeed enables aircraft backhaul at disruptive price points. Telesat's system will offer the lowest ratio of investment to useable capacity than any current or announced future satellite system providing airlines with important economic advantages.

Telesat is also working with manufacturers to develop low cost, high performance user terminals.

**Economies of scale in procurement**

By sourcing aircraft backhaul connectivity on the Telesat Lightspeed global network, airlines benefit from economies of scale and thereby reduce their connectivity costs by aggregating supply. Capacity can be purchased in Gbps at a global or regional level and allocated on a per business need.

### 3.3. Global, Resilient, Scalable Network

The Telesat Lightspeed network can connect an airline's entire fleet – narrow body to wide body planes, gate-to-gate, anywhere globally – removing the current challenge of patching together disparate networks. Lower latency also helps simplify the network – no need for latency workarounds such as performance enhancing proxies or web accelerators used in traditional satellite networks.

As a single backhaul network for the entire fleet, Telesat Lightspeed will help keep network operations simple and keep operating costs low.

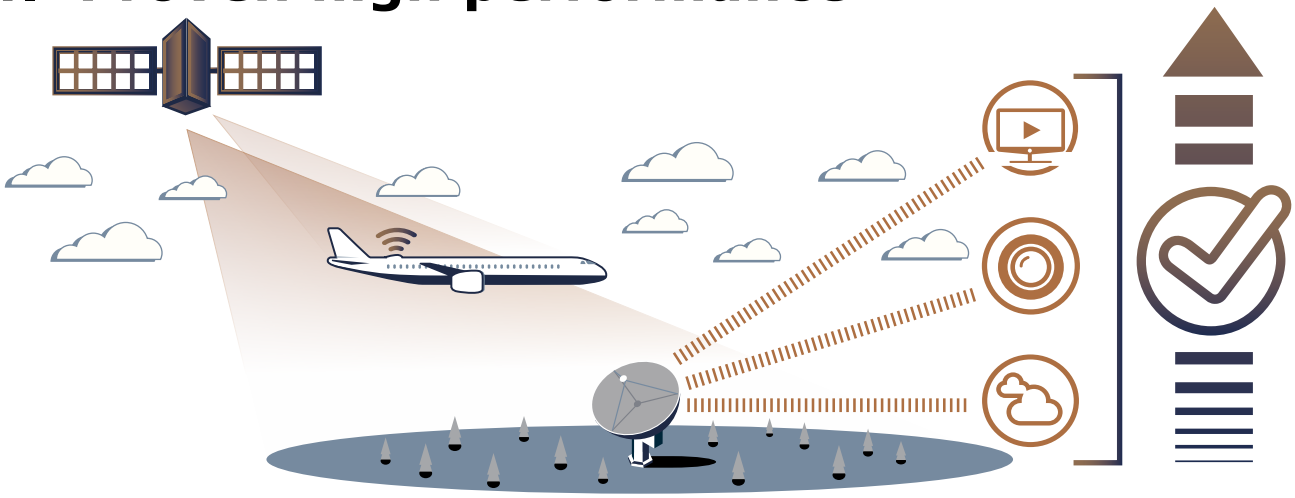
The network has multiple terabits of throughput, sufficient to connect every commercial aircraft in the world and much more. More satellites can be added to the constellation to increase throughput supply. Therefore, it is highly scalable able to cater to future demand growth.

**Everywhere – poles, large airport hubs …**

There is no route too far north or south for Telesat Lightspeed. High latitudes to the equator are covered – 'fibre in the sky' everywhere. Full global coverage means all routes receive a consistent high throughput connection. Busy routes over the North Atlantic tracks stay covered by the same service the entire flight. Even polar routes are covered offering passengers the same experience flying from North America to Asia or from Australia to South America.


**Fibre grade connectivity will continue in and around busy hubs and simultaneously connect hundreds of planes. The smart technology on Telesat Lightspeed will flexibly manage throughput to not just serve one airport hub but can simultaneously serve areas with multiple busy hubs in close vicinity, for example 25-30 Gbps to New York City's three major airports.**

# 4. Proven high performance



In October 2018 Telesat completed the first ever Telesat Lightspeed inflight broadband connection with our Phase 1 LEO satellite.. Industry leading data upload speeds were demonstrated from the aircraft, which included streaming movies. The aircraft tested multiple low latency applications including video conference calls and secure cloud and VPN applications. Tests also validated the performance of Ka-band aero terminal, including antenna tracking capabilities, RF and modem performance and end-to-end network testing.

Visit https://telesat.com/leo-satellites/performance-results/ to view additional testing results.

# 5. Learn more

Telesat Lightspeed offers a compelling, all round value proposition for aircraft backhaul of the future. Talk to your in-flight connectivity service provider or visit https://www.telesat.com to learn more about Telesat Lightspeed.