



Telesat LEO

Wireline quality. Wireless Flexibility. Disruptive economics.

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Proprietary

Telesat Overview

Telesat overview

Leading Satellite Operator

4th largest global satellite operator

Fleet of 17 GEO satellites, 1 LEO and HTS satellite payload on Viasat-1

Privately held by Loral Space & Communications (NASDAQ: LORL) and Canada's Public Sector Pension Investment Board

C\$927 million
2017 revenue

C\$5.7 billion
2017 year-end assets
16 satellites in-orbit

C\$3.8 billion
Contracted revenue backlog



Telesat offices

Global Customer Base

BROADCAST



ENTERPRISE

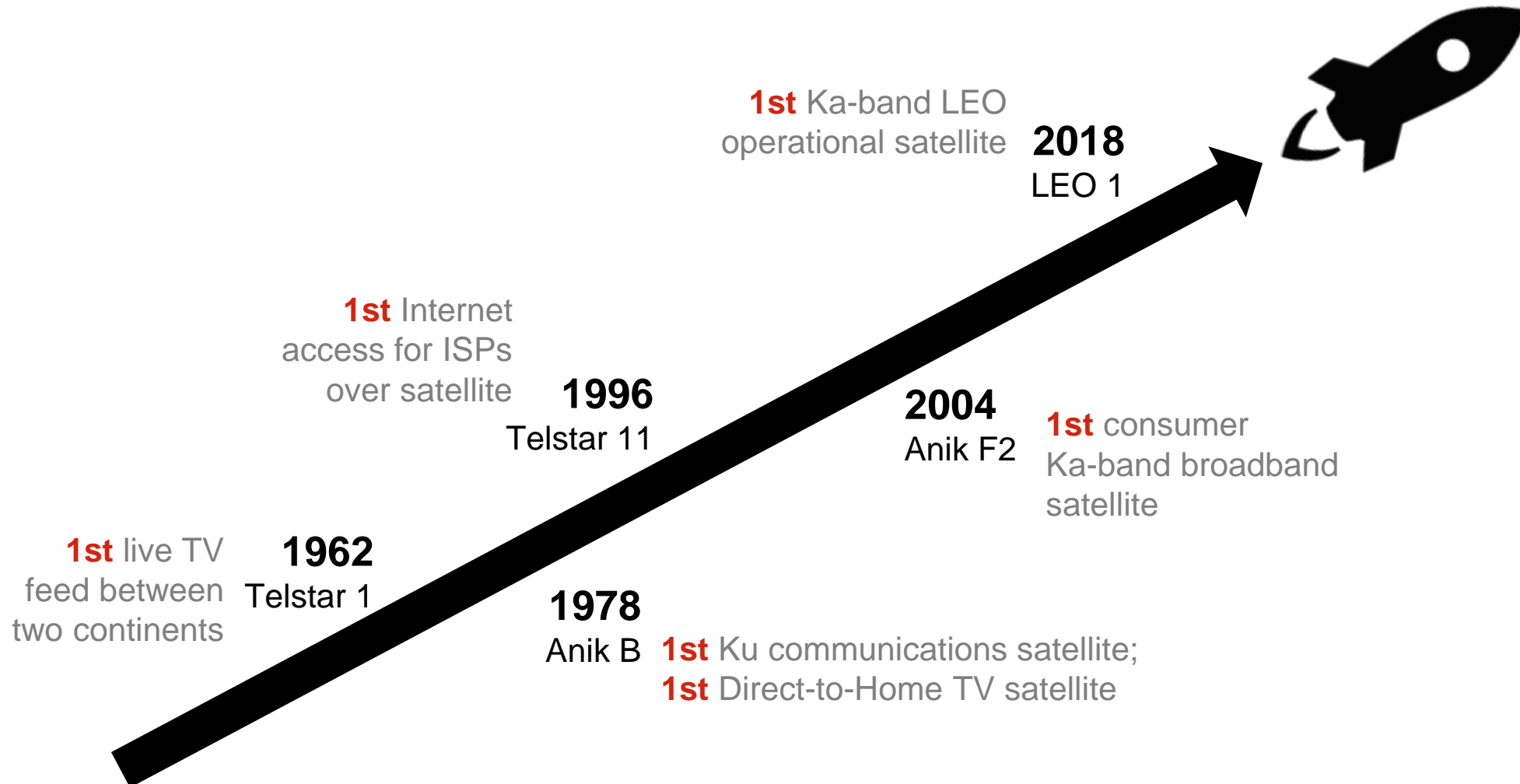


CONSULTING



NON EXHAUSTIVE

50 years of commercial satellite innovation

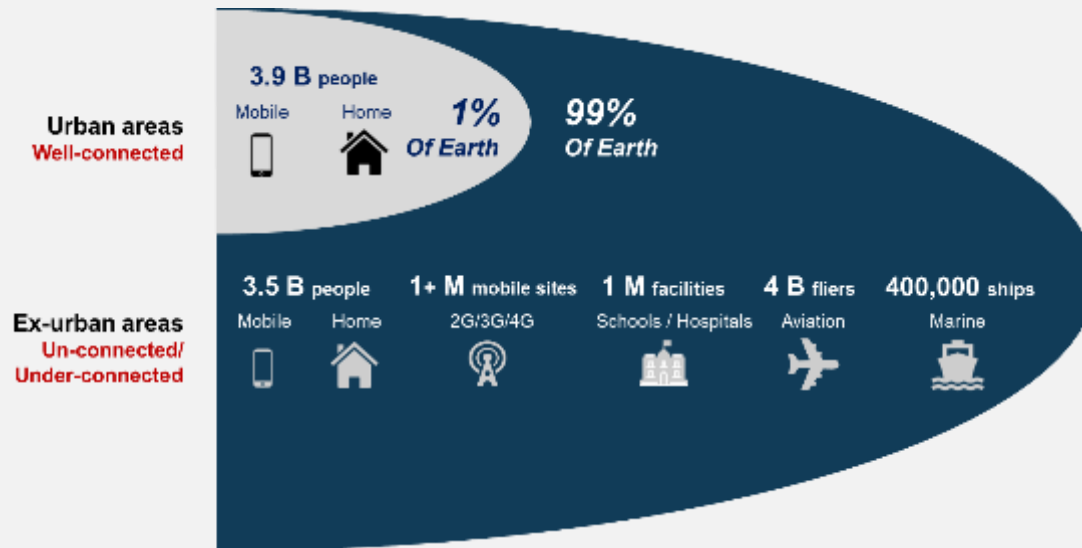


Telesat LEO Network Overview

Market demands broadband everywhere

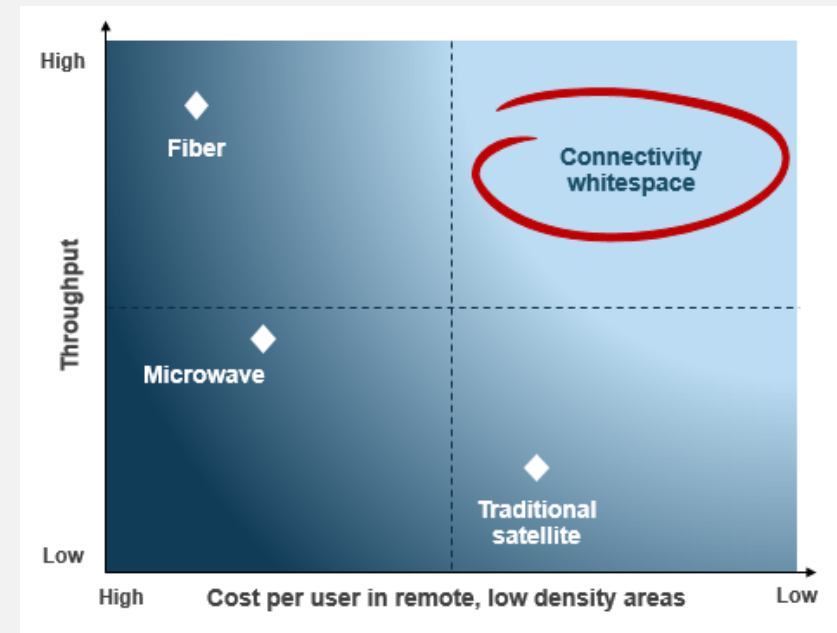
Market demands broadband fiber quality connectivity everywhere...

- Almost half of the population remain unconnected or under connected, with people in remote areas having no access for affordable fiber quality internet
- Aero and Maritime routes remain under-served



...but existing solutions can't address that demand

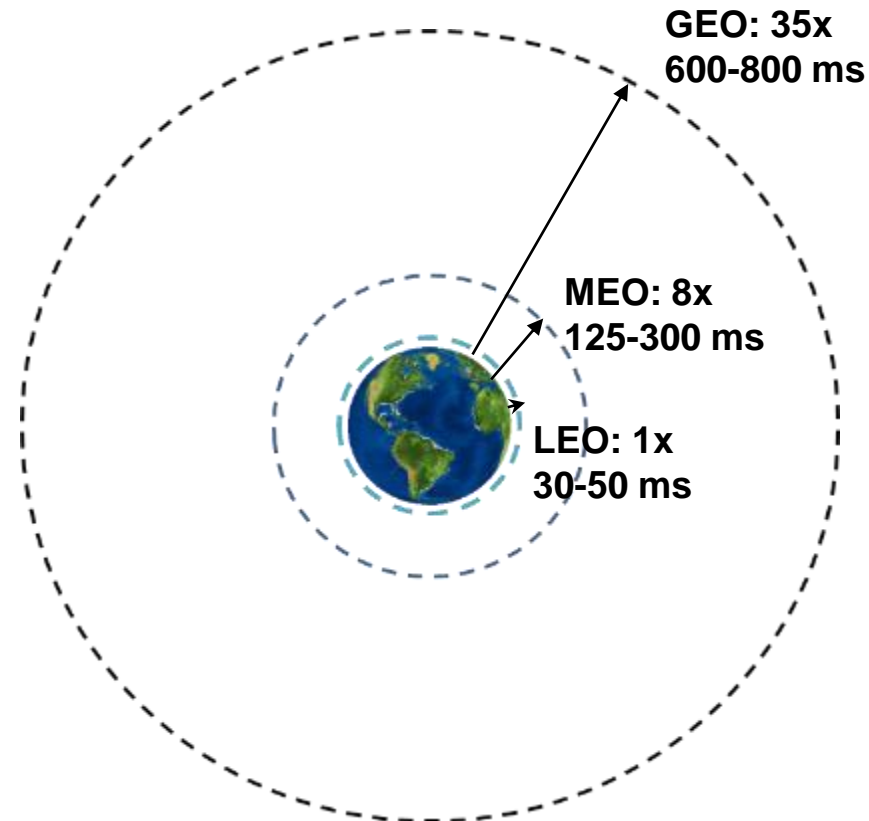
- Fiber or Microwave backhaul uneconomical for traffic from remote areas
- Traditional satellites offer limited bandwidth and have high latency so cannot deliver fiber quality



Low Latency Critical for Fiber Quality

Relative distance of satellites from Earth

1x = 1,000 km



Latency impacts Internet and Cloud applications



No delay loading content heavy webpages or social media applications



Seamless use of e-commerce, from browsing products to checking out



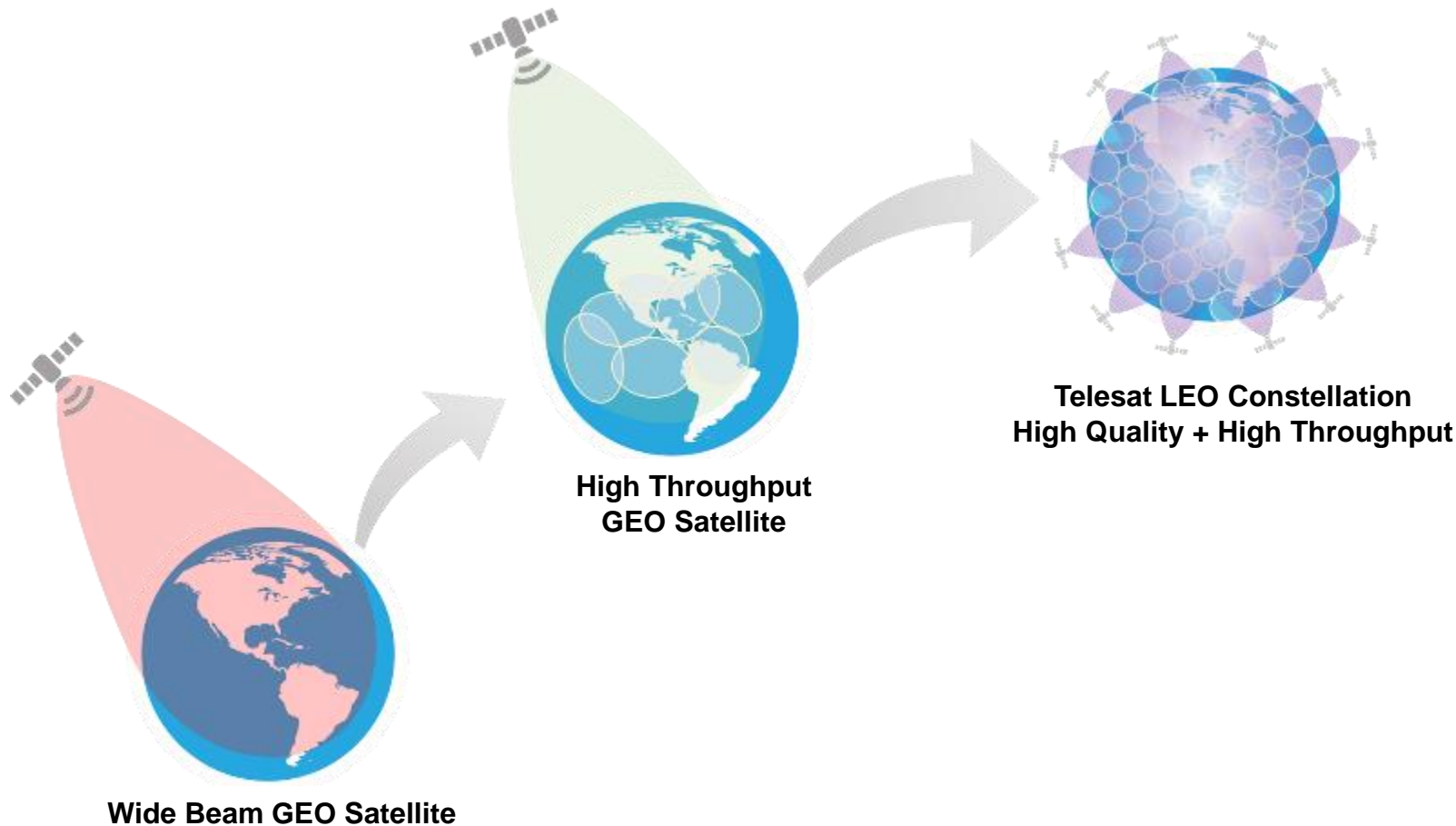
Enables end-to-end encryption (**IP Sec + Encryption eNodeB to Sec Gateway**). No need to split encryption tunnels

Seamless VPN or encrypted email usage



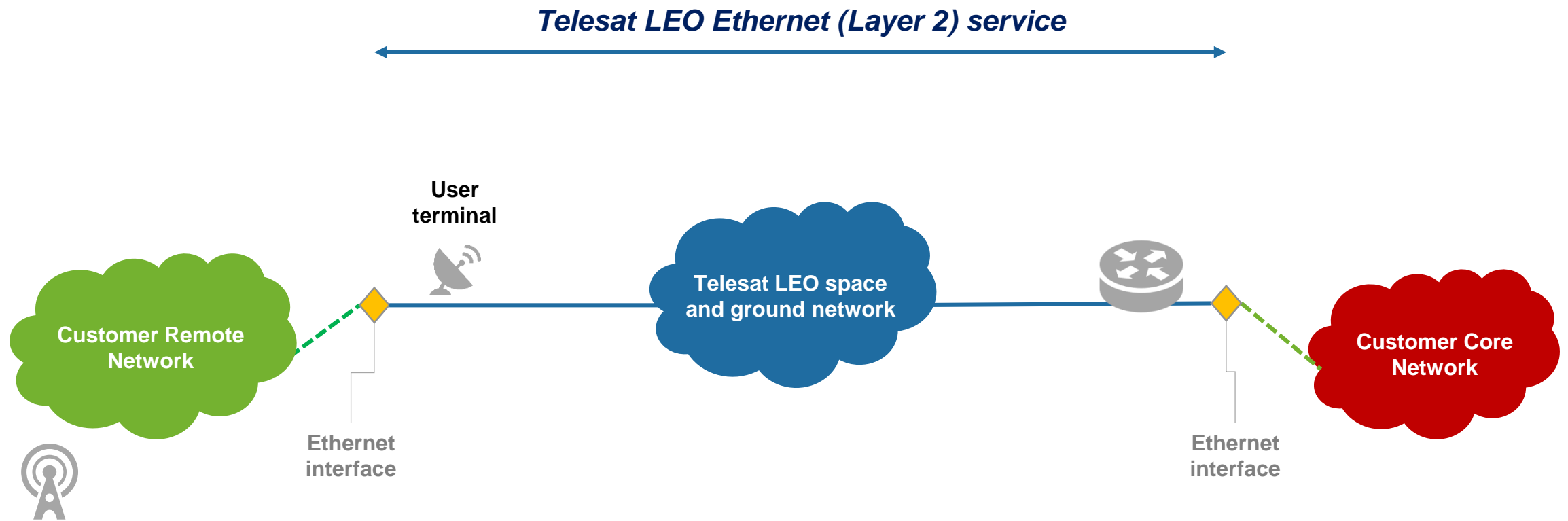
Real-time operational information exchange with ground or shore

Telesat LEO the Latest Evolution



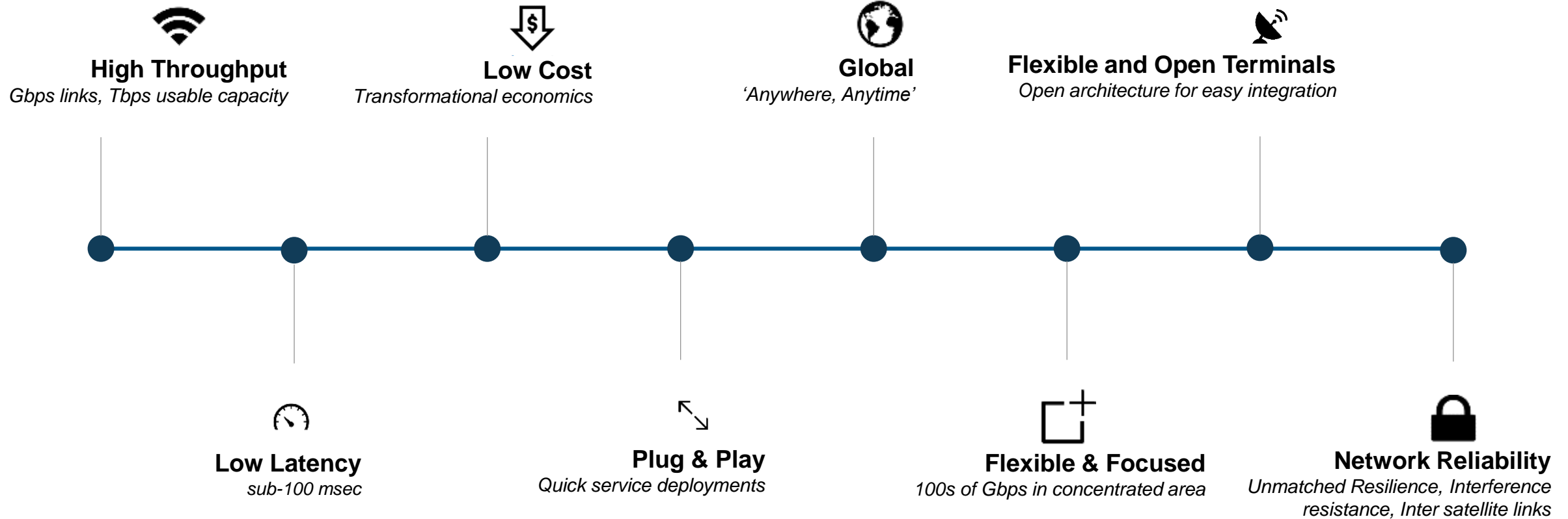
- ✓ **State-of-the-art global network with hundreds of advanced satellites in low-earth-orbit**
- ✓ **Seamless integration with terrestrial networks**
- ✓ **Priority access to 4 GHz Ka-band spectrum**
- ✓ **Deep technical knowledge developed over a 50-year history of space system experience**

Telesat LEO - 'Virtual Fiber' to Connect Networks

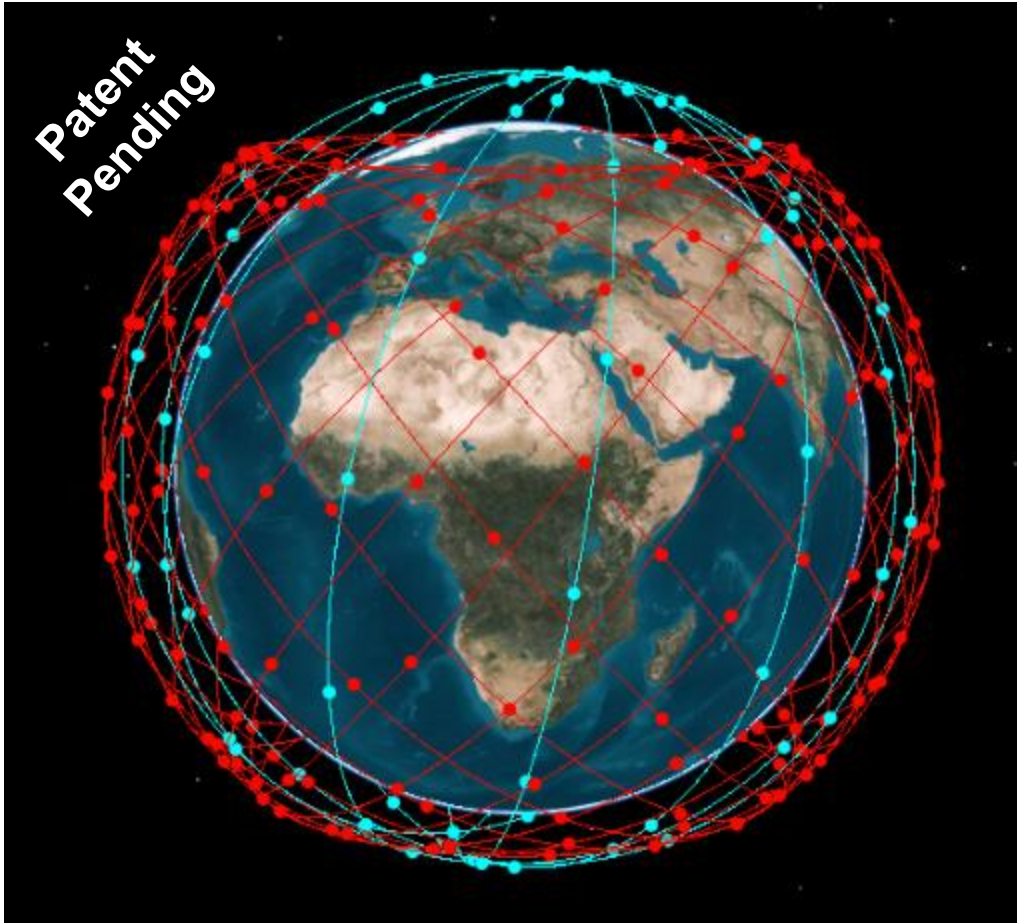


Telesat LEO Designed to Provide Critical Features and Functionality

Flexible High Capacity Global Network



Satellites Concentrated Over Latitudes of Highest Demand



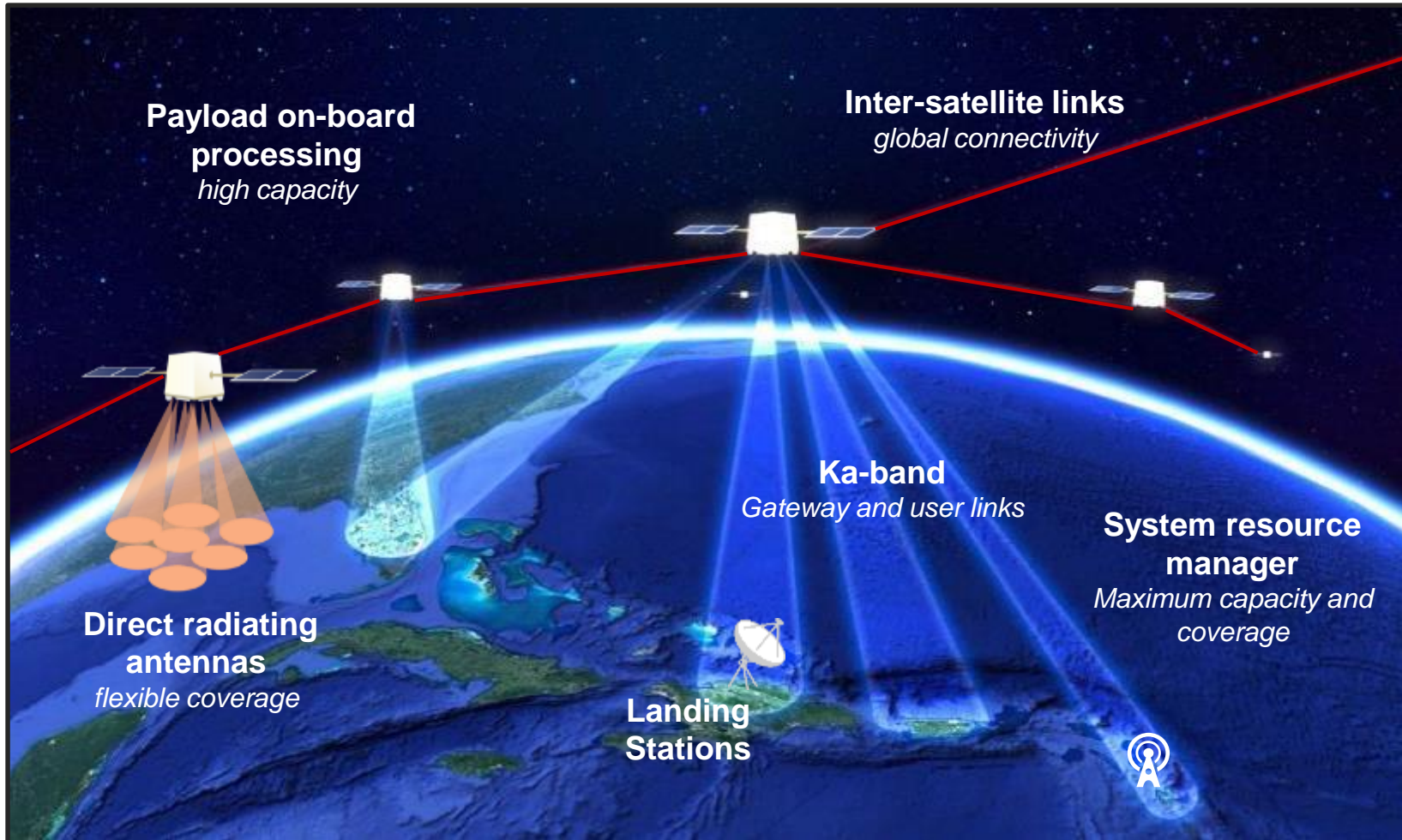
Global constellation ~ 300 satellites

Start of service 2022

Scalable to meet growing demand

 Polar Orbit  Inclined Orbit

Advanced Technology → Highly Flexible Network

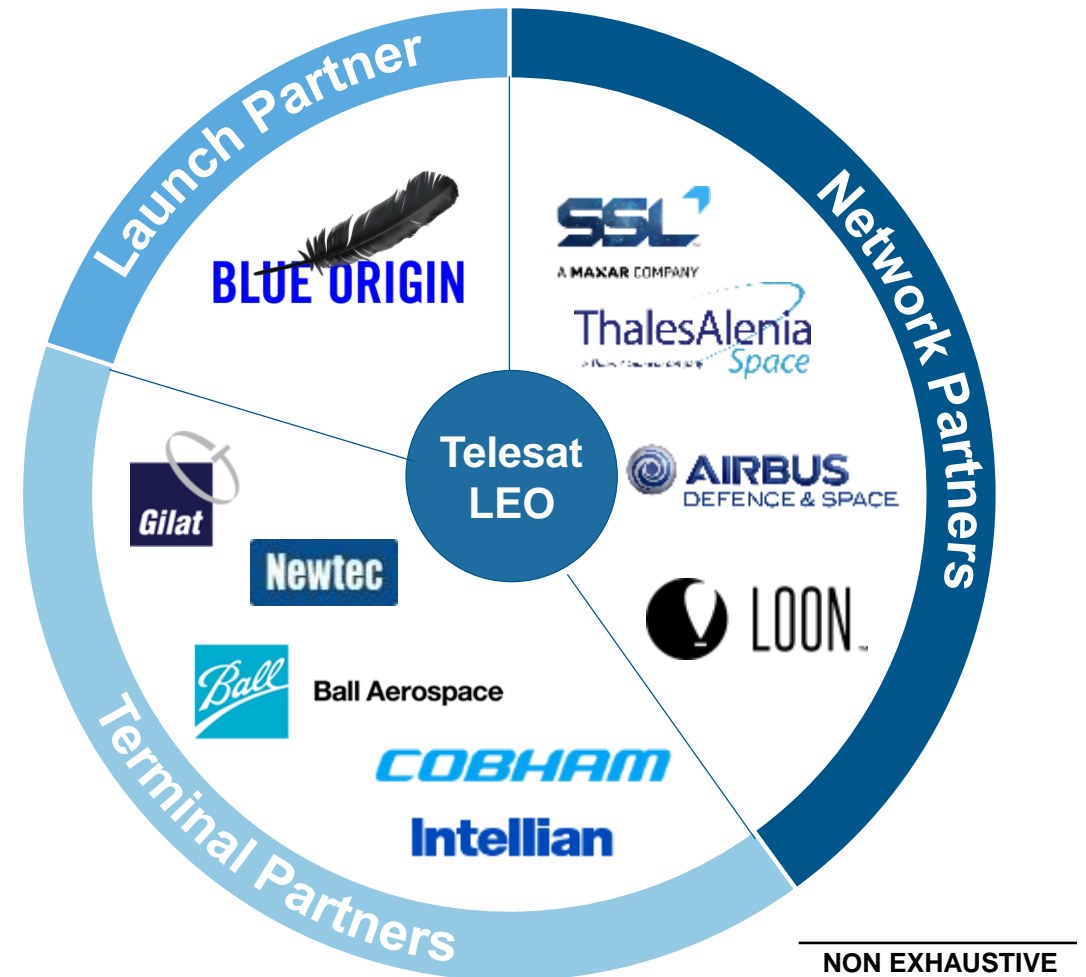


- ✓ ≈ 4 GHz global **Ka-band** spectrum
- ✓ **Direct radiating antennas with agile, hopping beams** for flexible and focused capacity
- ✓ **On-board processing** for efficient routing
- ✓ Orchestration via a global **System Resource Manager**
- ✓ Global network of **Landing Stations**
- ✓ **Optical Inter-Satellite Links** create a global IP mesh

One Test Satellite In-Service, Strong Ecosystem to deliver Global Network

First Ever Broadband Link from LEO

- In January 2018, LEO Phase 1 satellite launched
 - 1,000 km sun synchronous orbit, inclined 99.5 degrees
- In October 2018 Telesat and partner Global Eagle, completed the first ever LEO in-flight broadband connection
 - Tested multiple low latency applications including video conference calls and secure cloud and VPN applications



Telesat LEO applications for Terrestrial Operators



Backhaul

- Mobile (2G/3G/4G/5G)
- Fixed Wireless

Trunk

- Trunk line for inland/remote areas to Fibre PoP



Backup Connectivity

- Fully diverse routes for high availability and continuity of networks



Connect Remote Institutes

- Schools, Banks, Hospitals, etc.

Backhaul IoT gateway traffic

- Factories, Mines, etc.



Occasional Usage

- Surge events, Concerts, etc.

Antenna technologies being explored

Below are illustrations of antenna technologies being explored to serve various markets
Development effort targeted at providing affordable enterprise grade terminals for this market

Mechanically Steered Parabolic Reflector



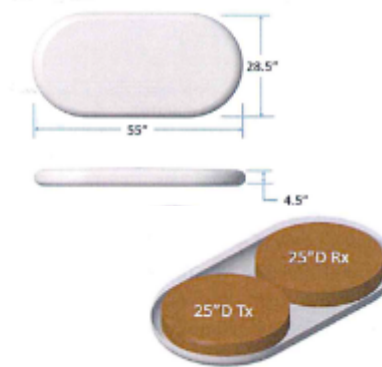
Two antennas needed for satellite handover for continued connectivity

Electronically Steered Phased Arrays

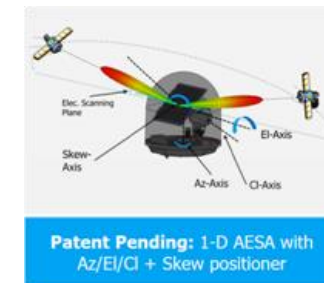


All in one low profile terminal. Single aperture capable of fast beam switching for satellite handover.

Hybrid Antennas



Variably Inclined Continuous Transverse Stub (VICTS)



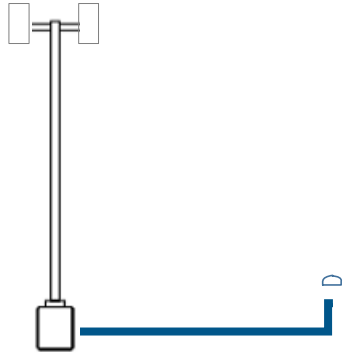
Hybrid ESA/Mechanical

Antenna deployment options being explored

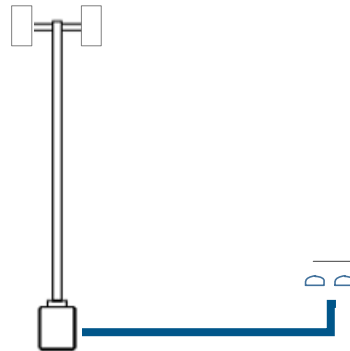
ON-GROUND DEPLOYMENT

- a. Standard power
- b. Low power

1-antenna solution



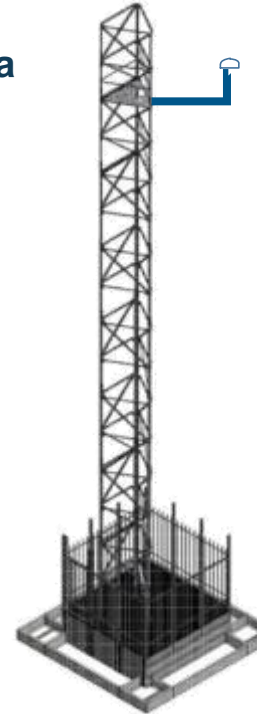
2-antenna solution



ON-TOWER DEPLOYMENT

- a. Standard power
- b. Low power

1-antenna solution



2-antenna solution



Conclusion

- Telesat, a leading satellite operator, is building the world's most advanced LEO satellite constellation
 - Fiber-like connectivity everywhere
- Telesat is excited about the opportunity to work with you