



# DATA CENTER/NETWORK RESILIENCE W/ SATELLITE COMMUNICATIONS

Presented by  
SES

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## Introduction



## Data Centre/Network Resilience

**1**

**DC/Network Resilience  
Problem Statement**

**2**

**Multiple Resiliency Scenarios/Solutions**

**3**

**SES Satcom Resiliency Benefits**

## Data Center + Network Designed for High Availability/Uptime

- ▲ Global Cloud Providers/Hyperscalers build their infrastructure with multiple nines of availability
  - Objective is to deliver higher uptime than a customer can onprem
  - Diverse and redundant buildings, networks, & systems
  
- ▲ Global access and reach of their cloud platforms/services
  - Seeking to address urban and remote enterprises/gov't customers
  - Requiring remote management and operations of the systems
  - Dependent on a global fiber network
  
- ▲ Hyperscalers have multiple DC buildings for geographic separation and improved resiliency with low latency



## Many cloud & data center providers are assessing the risk of their operations and possible threats

- ▲ Geographic risks are both natural and un-natural
  - Weather/Seismic
  - Unrest
- ▲ Technological risks include nefarious or operational
  - Hacking
  - Fiber cuts
  - Improper updates
- ▲ Customers/Governments seek higher level of availability/uptime to trust mission critical applications/services in the cloud/DC infrastructure



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# SES has advanced a range of Resiliency Scenarios

## Global DC/Infrastructure Operations



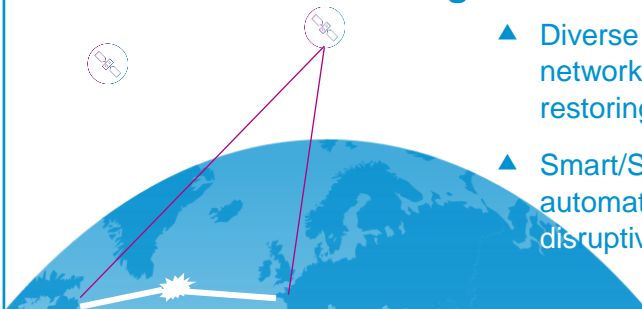
- ▲ Diverse and redundant network overlay for resilient control & management plane services – out of region (back to HQ)
- ▲ No single point of failure

## Global DC/Infrastructure Build/Upgrades



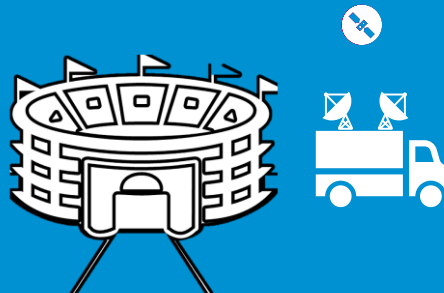
- ▲ Deployable/temporary Out of Band Network prior to the terrestrial network
- ▲ Program managed remotely and test/validate systems prior to the primary network

## Land/Subsea Fiber Outage



- ▲ Diverse and redundant network overlay for restoring specific services
- ▲ Smart/SDWAN solution for automated response to disruptive events

## Scheduled/Unscheduled Events for Customers



- ▲ Permanent or temporary networking that can provide high quality and throughput connectivity as needed
- ▲ Pre-planned or in reaction to an unplanned event



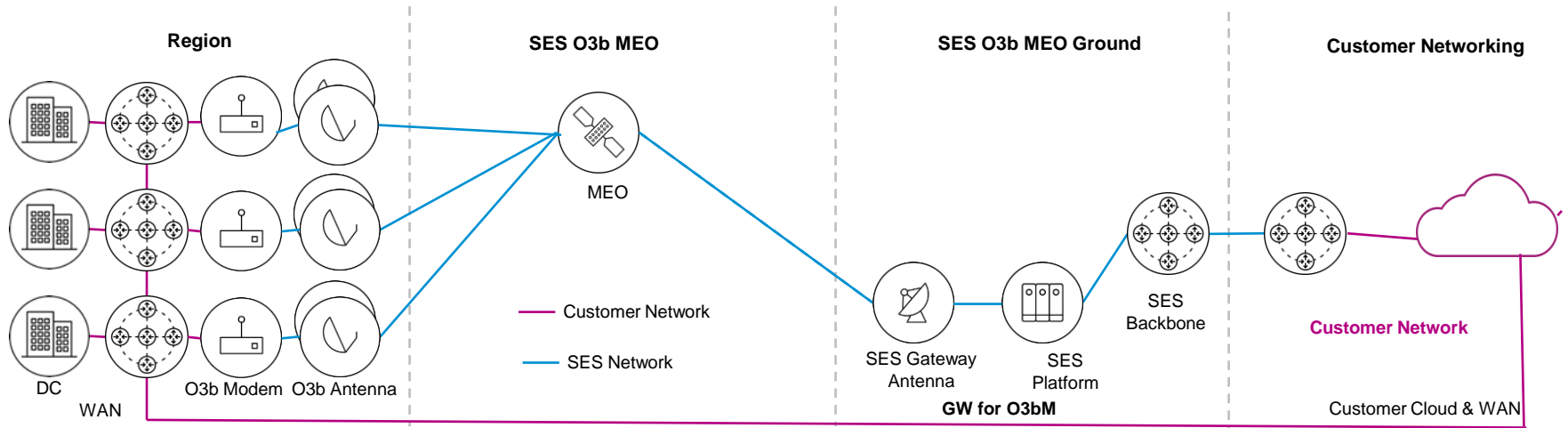
## Satcom Resiliency for Global DC Infrastructure Operations

- ▲ Fallback gbps satellite-based connectivity integrated into redundancy design to address disruption inter and intra-data center region(s)
- ▲ Instantaneous and seamless transfer between primary and secondary network services
- ▲ Able to target specific mission critical applications and/or traffic routes
- ▲ Enables increased availability/uptime – additional nines to the operator and their end-customers



# Resiliency for Global DC/Infrastructure Operations

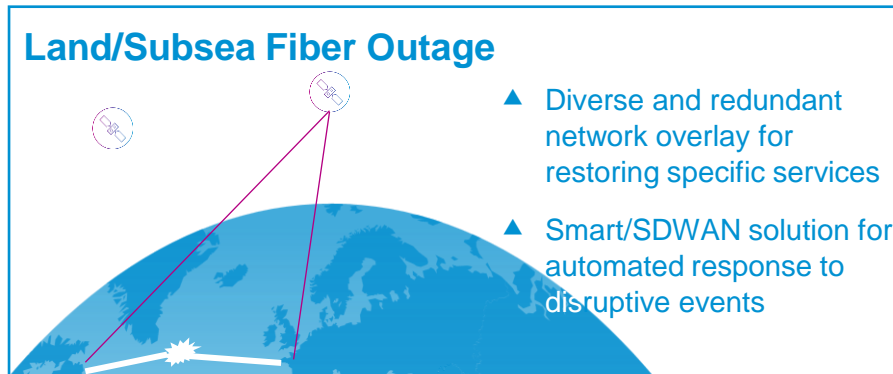
- ▲ Integrate an SES Satcom service at the local region DC/Network and provide diverse/redundant networking out of region  
One Low Latency Hop from your local region to another region for mission critical applications/services
- ▲ Two or more terminals in the region (one per building) provides additional availability/uptime to the solution





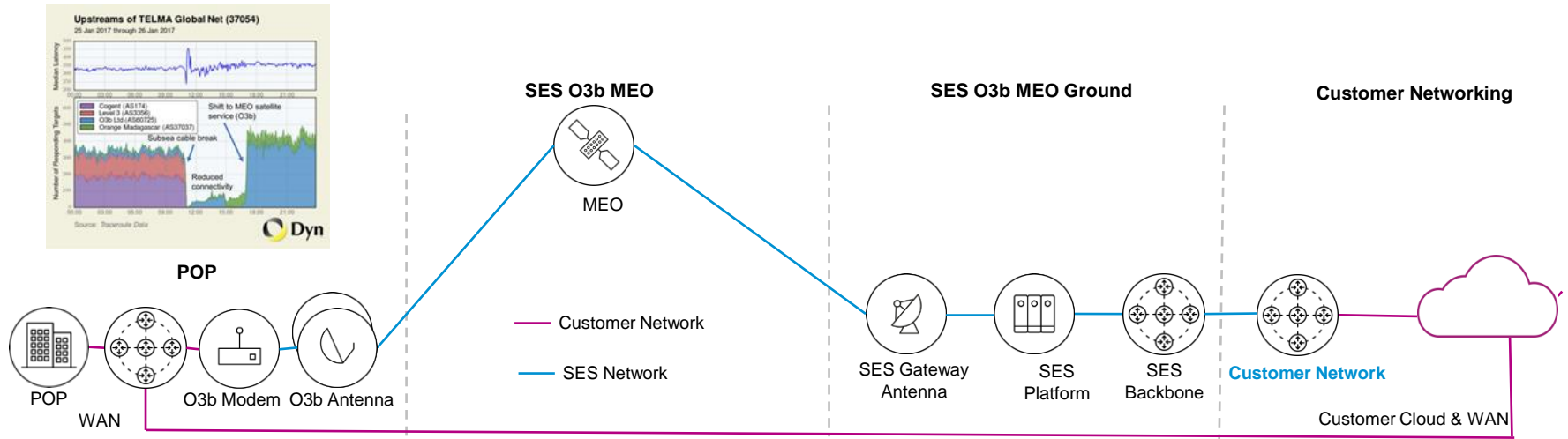
## Satcom Resiliency for Mission Critical Applications During a Fiber Outage

- ▲ Fallback Gbps satellite-based connectivity integrated into redundancy design to address disruption of specific customer/mission critical applications
- ▲ Instantaneous and seamless transfer between terrestrial and/or sub-sea fiber services to satcom
- ▲ Able to target specific mission critical applications and/or traffic routes
- ▲ Enables increased availability/uptime – additional nines to the operator and their end-customers



# Resiliency for Land/Subsea Fiber Cuts/Disruption/Outages

- ▲ Integrate an SES Satcom service at the local region POP and provide diverse/redundant networking out of region  
One Low Latency Hop from your local POP to another POP for mission critical applications/services
- ▲ Augment higher priority or higher risk of outage fiber links with a bandwidth agile satcom service (SES O3b MEO)



## Temporary Satcom Connectivity for New Data Centers and Upgrades

- ▲ Deploy gbps satellite-based connectivity integrated to the local network or out-of-band
- ▲ Brings forward valuable connectivity prior to the primary terrestrial/fiber service
- ▲ Enables increased availability/uptime – additional nines to the operator and their end-customers

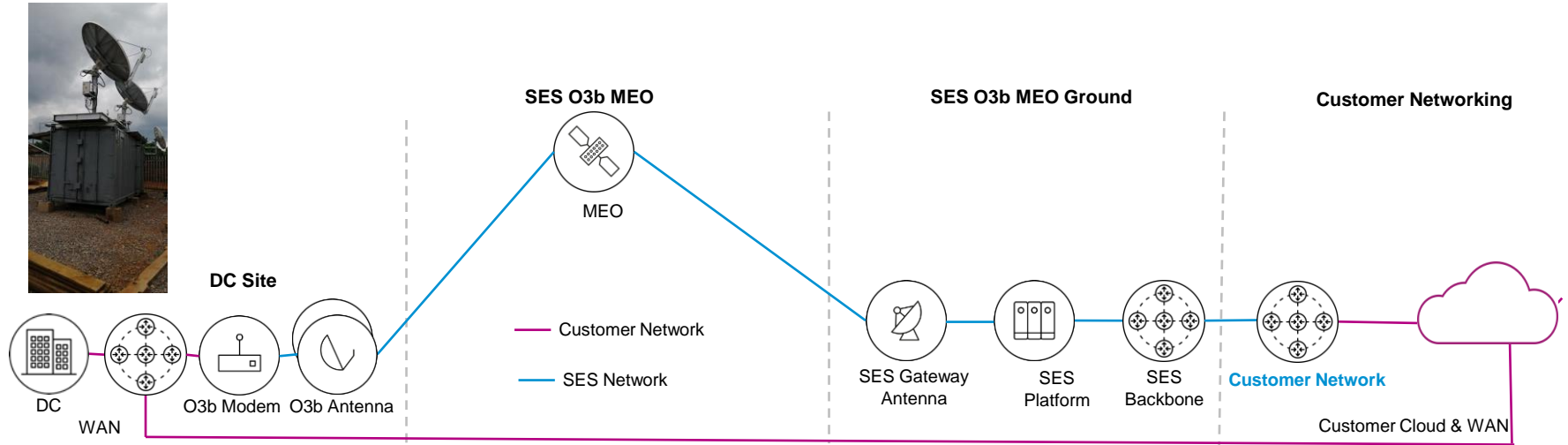
### Global DC/Infrastructure Build/Upgrades



- ▲ Deployable/temporary Out of Band Network prior to the terrestrial network
- ▲ Program manage remotely and test/validate systems prior to the primary network

# Temporary Networking for Data Center/Infrastructure Builds or Upgrades

- ▲ Temporarily deploy an SES Satcom service at the build/upgrade site prior to or in supplement of the primary terrestrial network  
One Low Latency Hop from your site to a node into your core network
- ▲ Provides network access for remote program management and validation of core systems prior to the primary network

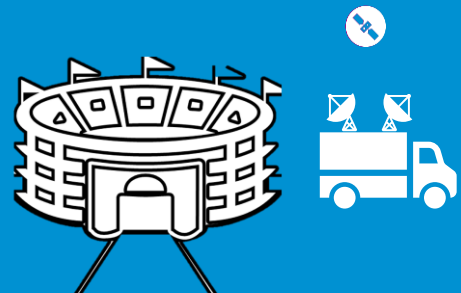




## Satcom Connectivity for Scheduled and Unscheduled Events (COTP)

- ▲ Deployable and vehicle mounted satellite-based connectivity on-demand for planned and unplanned events
- ▲ Planned – e.g., major world sporting events
- ▲ Unplanned – e.g., disaster recovery scenarios
- ▲ Enables increased availability/uptime – additional nines to the operator and their end-customers

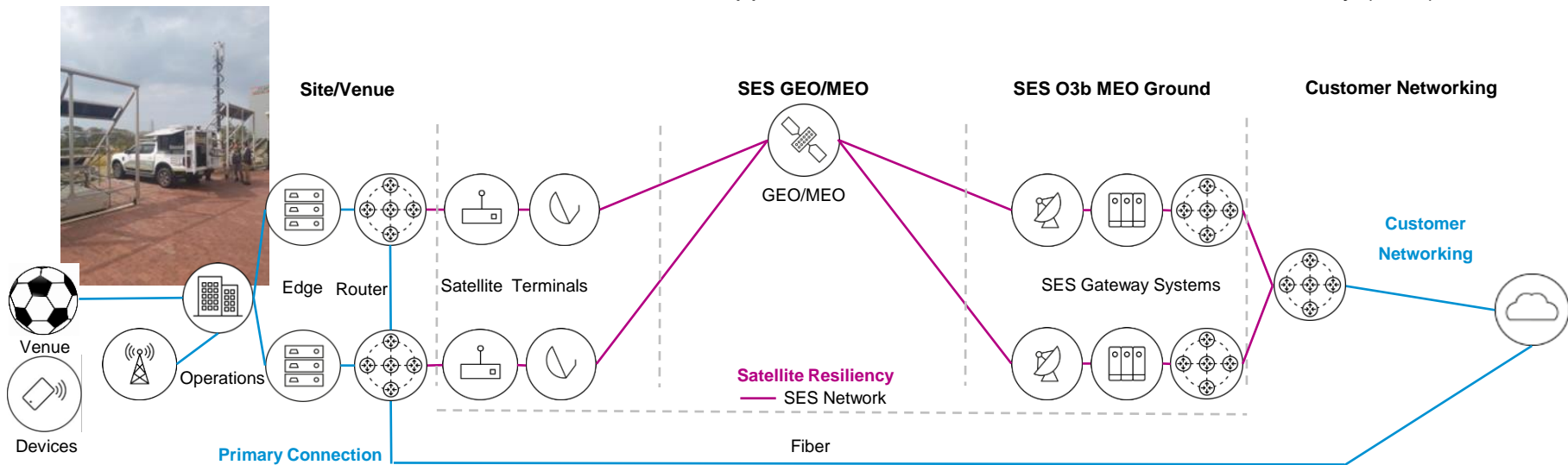
**Scheduled/Unscheduled Events for Customers**



- ▲ Permanent or temporary networking that can provide high quality and throughput connectivity as needed
- ▲ Pre-planned or in reaction to an unplanned event

# Temporary Networking for Scheduled/Unscheduled Events

- ▲ Temporarily deploy an SES Satcom service in advance or in response to a major event for high throughput networking  
One Low Latency Hop from your site to a node into your core network
- ▲ Provides/restores fiber-like network service for critical applications and can include a local wireless overlay (P5G)



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## SES Satcom Resiliency Benefits

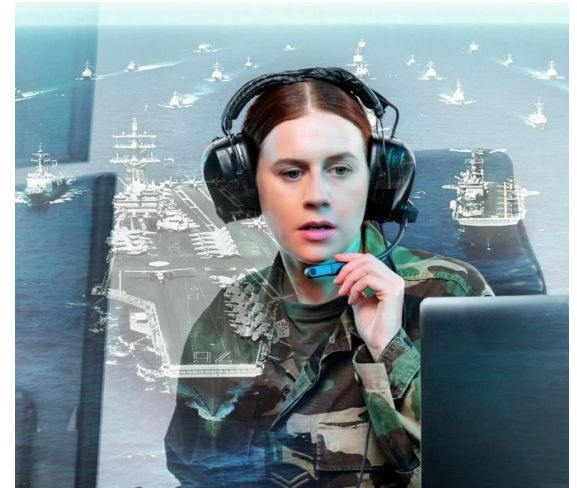
- ▲ Increased availability/uptime for mission critical applications/services
- ▲ Integrated into core infrastructure design with low capex investment



- ▲ Diverse and redundant network to augment core primary network
- ▲ Maintain mission critical applications/services during a disruption event



- ▲ Increase adoption of mission critical workloads due to increased uptime
- ▲ Attract more Gov't tactical business



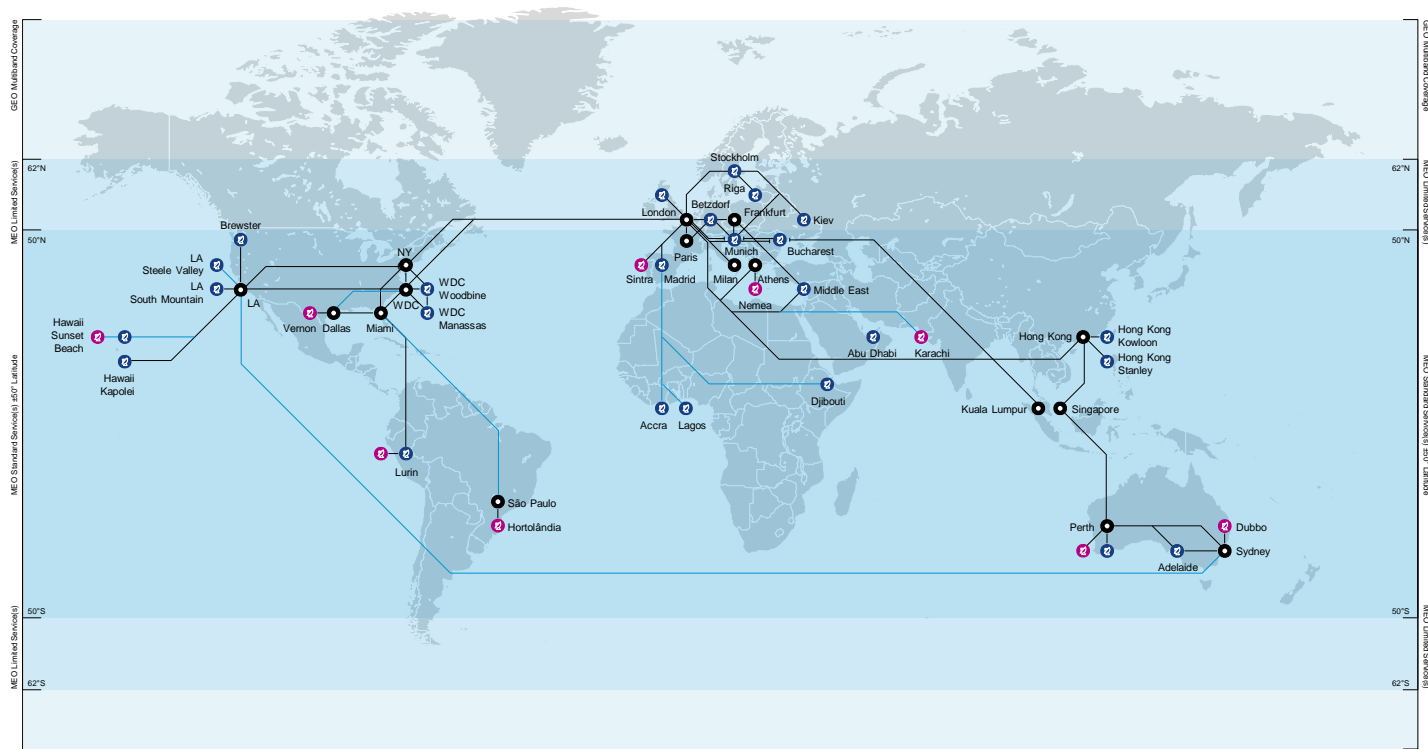


## Sergy Mummert & Gunjan Hooja

sergy.mummert@ses.com &  
gunjan.hooja@ses.com

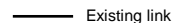
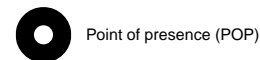


# SES Global Coverage

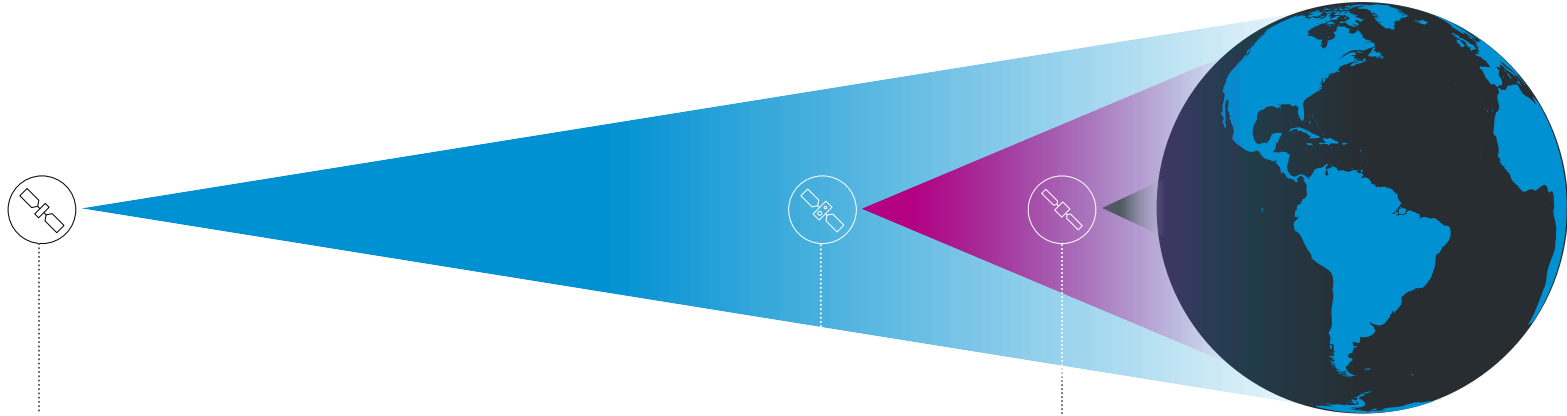


Industry-leading network performance:

- ▲ Throughput
- ▲ Latency
- ▲ Flexibility
- ▲ Availability



## Orbits at a Glance – SES’s multi-orbit strategy



**GEO**

36,000km

E.g., Wideband global system

Broad coverage—3 satellites

High latency—operationally simple

Expansive coverage

**MEO**

~ 8,000km

E.g., O3b mPOWER

Extended reach—6 satellites, scalable

Low latency—operationally simple

High throughput, high flexibility,  
high performance

**LEO**

~ 1,000km

E.g., Starlink

Limited view—hundreds of satellites

Low latency—operationally complex

Low, contended bandwidth,  
requires operator’s nearest gateway