OneWeb

ACCESS FOR EVERYONE

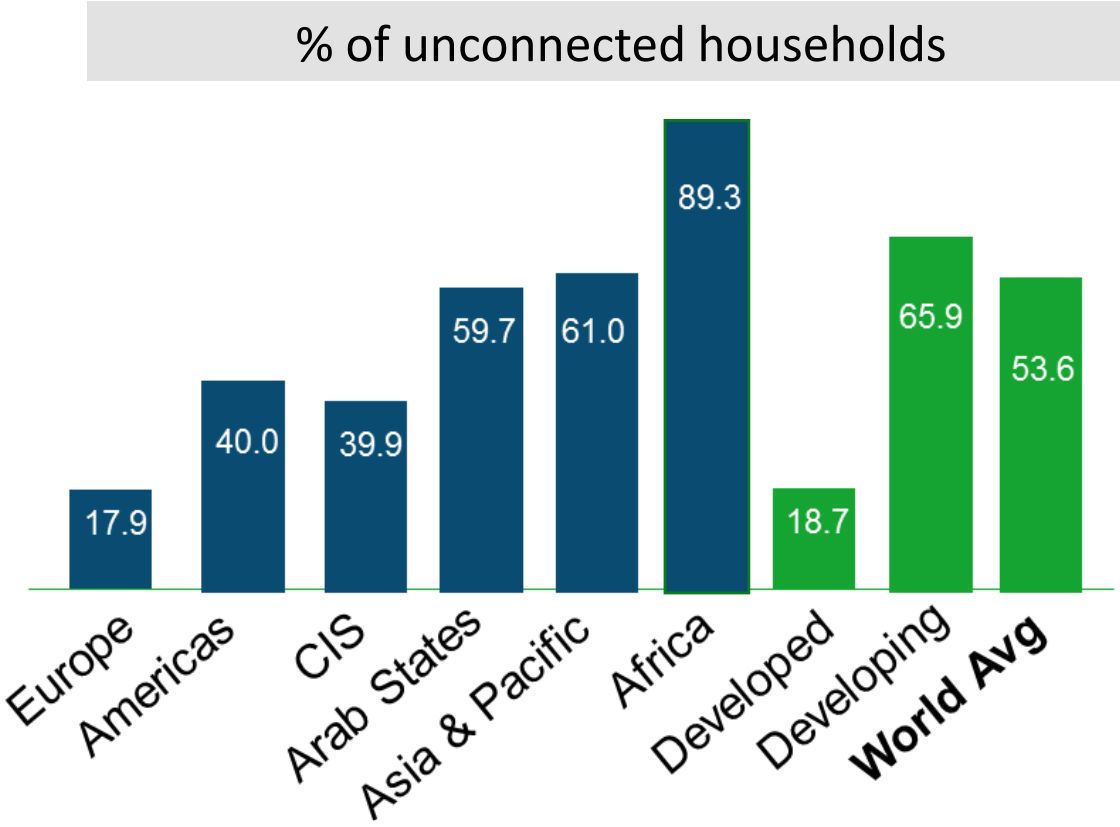
“Global broadband connectivity through LEO constellations”

Broadband India Forum – New Delhi, 20-21 November 2018

Tony Azzarelli - Vice President Global Licensing and Spectrum

Digital Divide is everywhere

Not everyone is connected to the internet …



Source: International Telecommunications Union (Geneva)

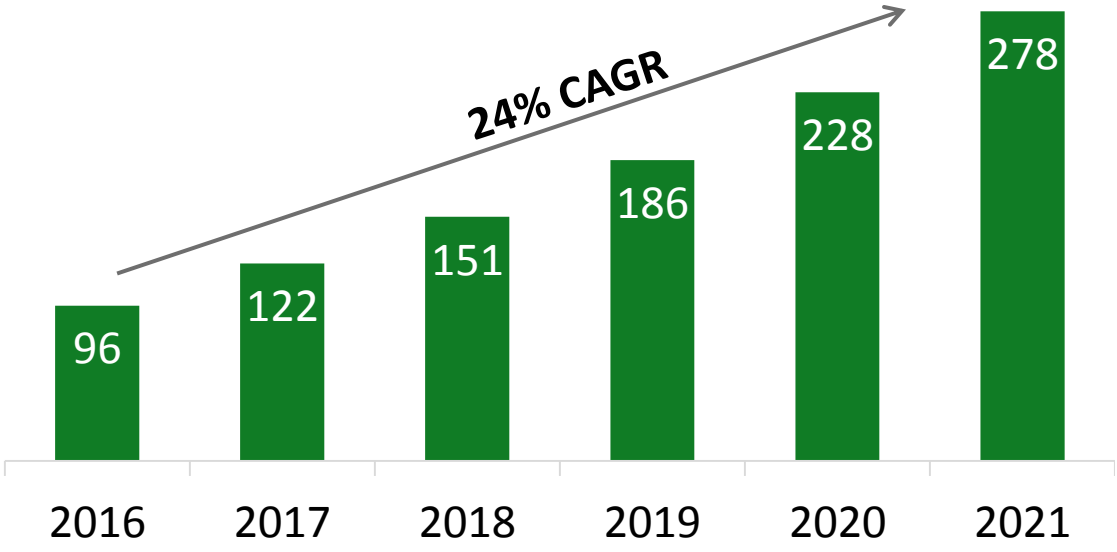
… and Data Consumption is Growing Exponentially

- **Exponential grown in data consumption is causing strain in connectivity**

- **Satellite infrastructure can provide the needed connectivity:**
  - at no cost for governments
  - and at lower cost per bit

Global IP Traffic Growth

(Exabytes per month)



Sources: Cisco VNI Global IP Traffic Forecast, 2016-2021

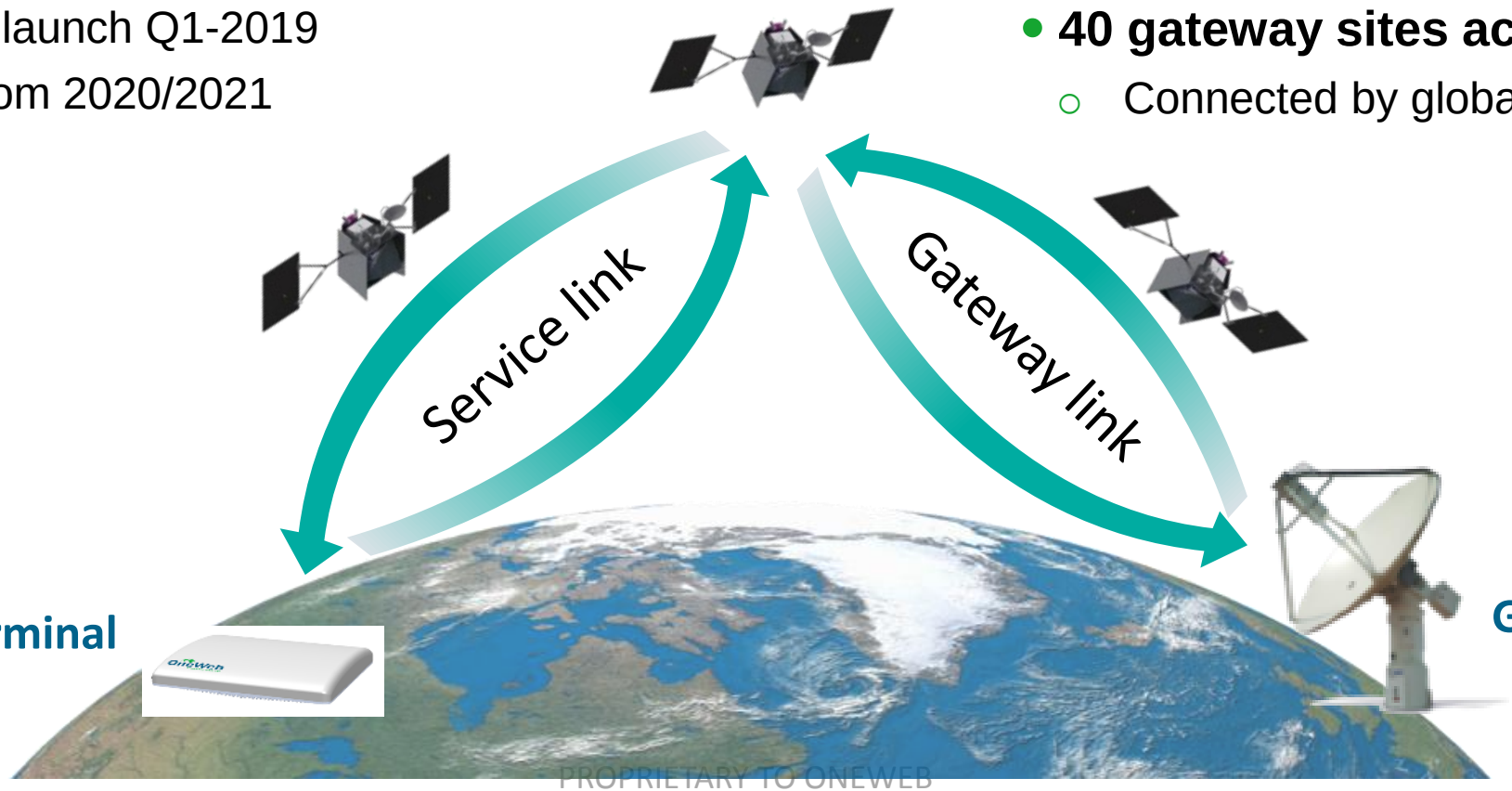
OneWeb System Overview

Constellation

- **Up to 882 satellites**
  - Small & low cost satellites
  - 1200 km altitude in polar orbit
  - 1st satellite launch Q1-2019
  - Services from 2020/2021

Ground Segment

- **Satellite terminals**
  - Low cost and low power
  - Easy to install and without pointing
- **40 gateway sites across the globe**
  - Connected by global core network



Backhaul Architecture

"Fibre in the Sky"

OneWeb Pipe

Global capacity of 8 Tbps

Latency of less than 50 ms

A truly global 5G enabler

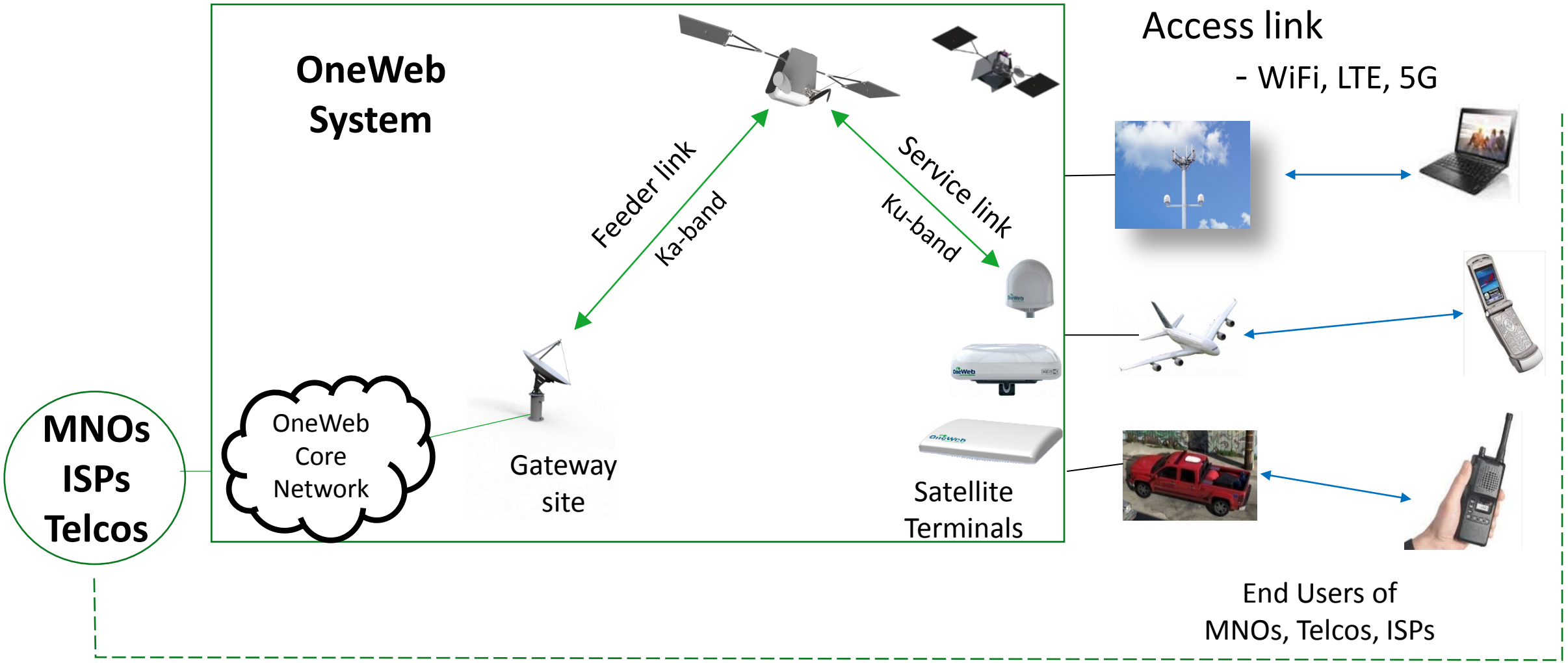
MNOs
ISPs
Telcos

Access link

- WiFi, LTE, 5G

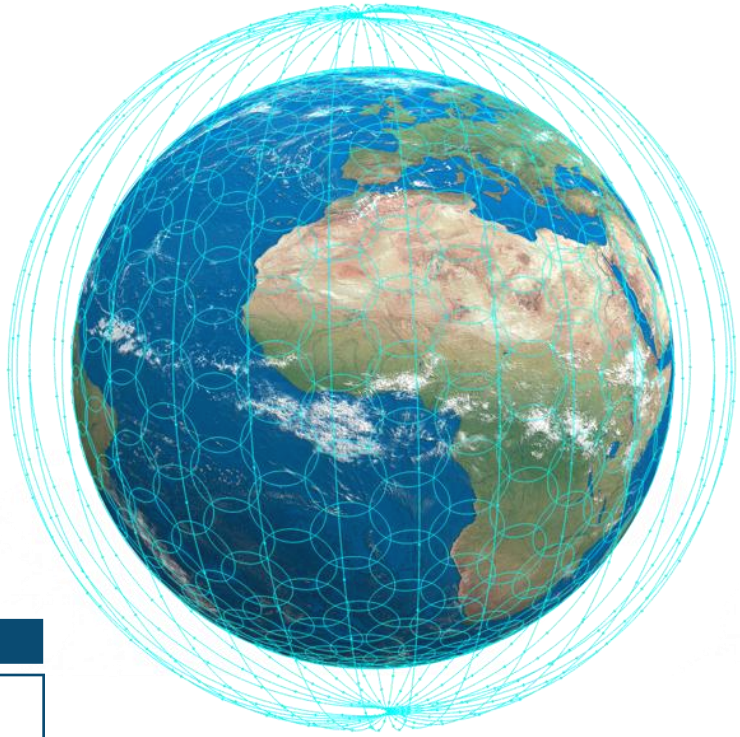
End-Users of
MNOs, Telcos, ISPs

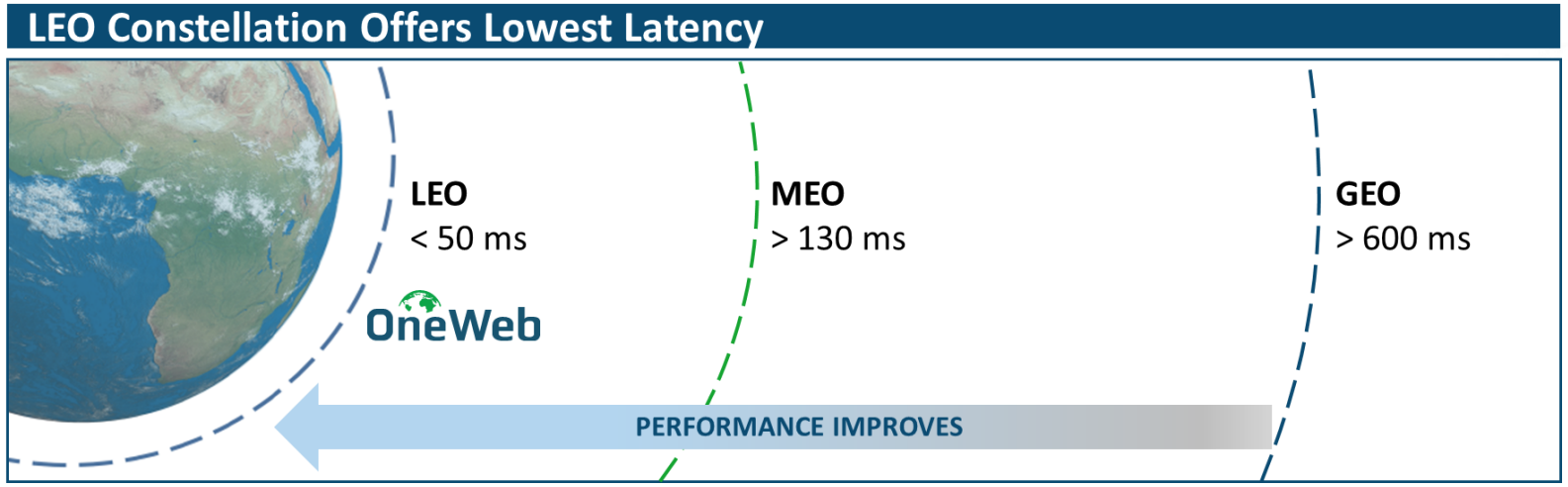
Backhaul Architecture



OneWeb Benefits and Key Advantages

- **Truly global coverage**
- **Works in obstructed terrain** (average elevation ~70°)
- **Low latency** (~50 ms)
- **High broadband speeds** (up to 100/450 Mbps)
- **Seamless and Ubiquitous mobility**





… truly global 5G enabler

OneWeb Serves Multiple Markets

Home / Small Enterprises
IoT / M2M / 5G small cells

Schools and Hospitals

Community Centres

Rural and Remote

Oil and Gas
Maritime

On-bard communications

Trains and vehicles

Connected cars

Public Protection and
Disaster Relief

Emergency

Roads / Motorways

Cellular Backhaul

Satellite Equipment

- **Under development**
- **0.3 to 0.7 m size**
- **Speeds up to 100/450 Mbps**
- **Parabolic & Phased array**
- **Low radiated power (35-39 dBW)**
- **High elevation operations**

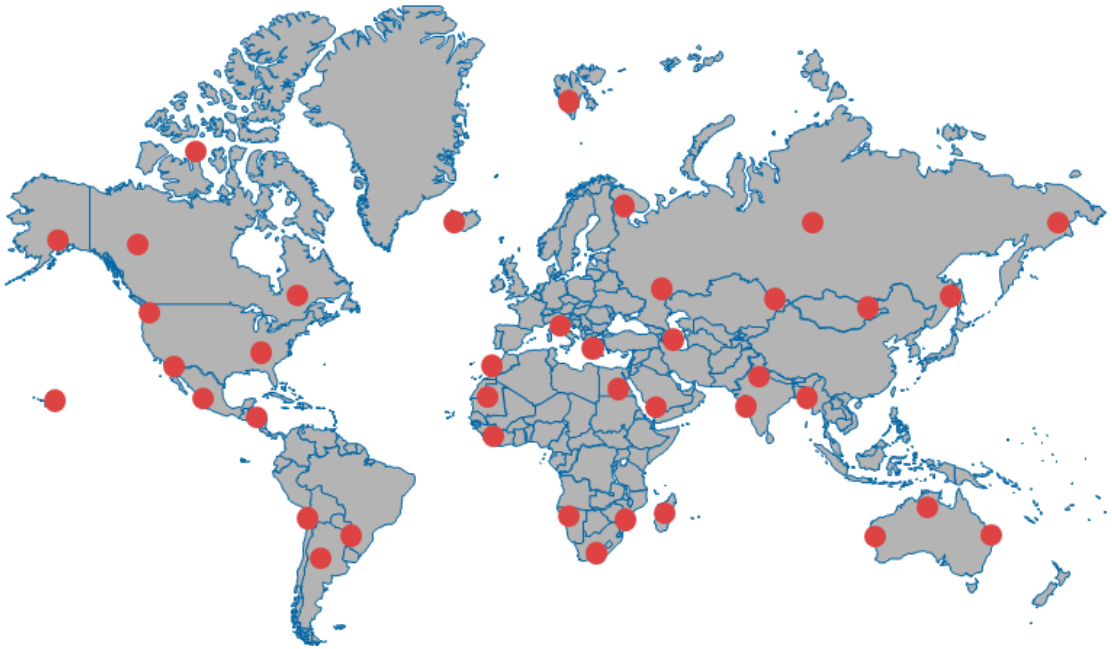
mechanical
parabolic

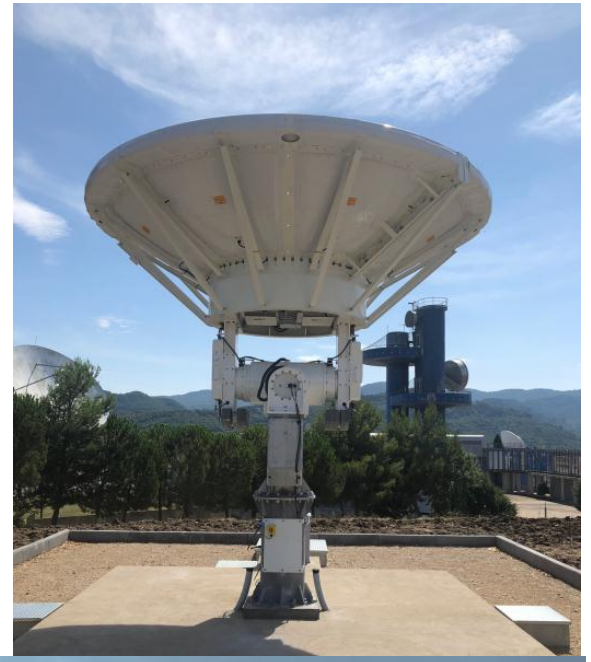
active
phased array

passive
phased array

Gateway Deployment Overview

Indicative Gateway Locations





Satellite Manufacturing

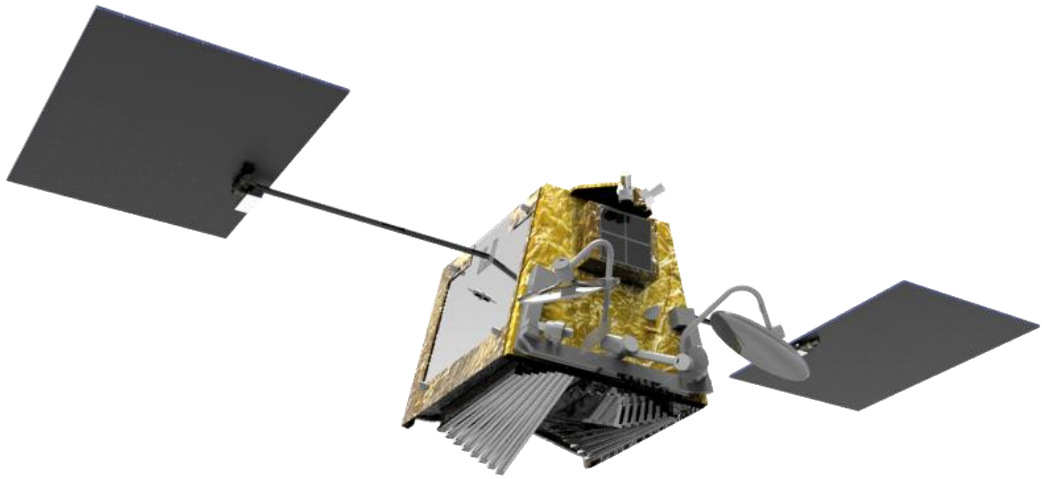
OneWeb Satellites

Joint Venture

AIRBUS DEFENCE & SPACE

OneWeb ACCESS FOR EVERYONE

- **Simple satellite architecture**
- **High volume / Low cost production**
- **Size - ~1 cubic meter & ~150 kg**
- **Lifetime of more than 5 years**
- **De-orbit Capability**



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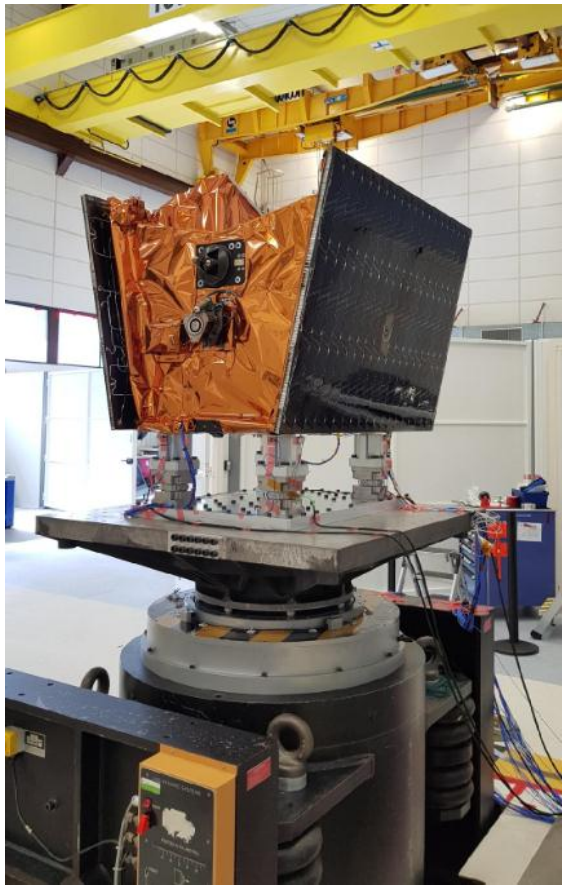
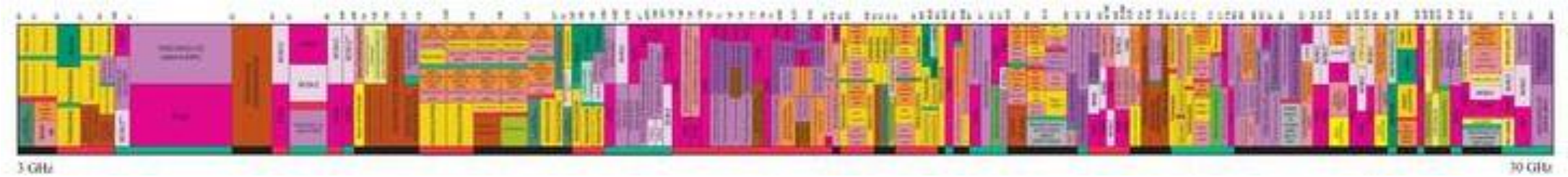
OneWeb Satellites



Spectrum Requirements



- **OneWeb operates in the Ku-band and Ka-band frequency allocations**

	User Link (Ku-band)	Gateway Link (Ka-band)
Space-to-Earth	10.7 - 12.75 GHz	17.8 - 20.2 GHz
Earth-to-space	14.0 - 14.5 GHz	27.5 - 30 GHz

- **Allocations are assured by the ITU Radio Regulations set at WRC-2000**
- **Protection of GSO systems assured through Article 22 limits**
  - ITU confirmed (Jan 2018) that OneWeb complies with these limits

OneWeb fosters Clean Space by Taking Responsible Measures

- Launch license from the UK
- OneWeb system features:
  - Positional knowledge of satellites (by GPS and radars)
  - Maneuverability and deorbiting of satellite
  - Spacecraft designed for demise at re-entry
  - High reliability of deorbit components (e.g., electric propulsion)
  - In-orbit flight coordination
  - Deorbiting infant mortality at launch phase

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