ITU Regional Forum for Europe

5G Strategies, Policies and Implementation

SES
beyond frontiers

September 2020

Satellites support a broad range of applications
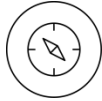## Leveraging Satellite's Strengths to Accelerate Deployment

SES

KEY SATELLITE FEATURES

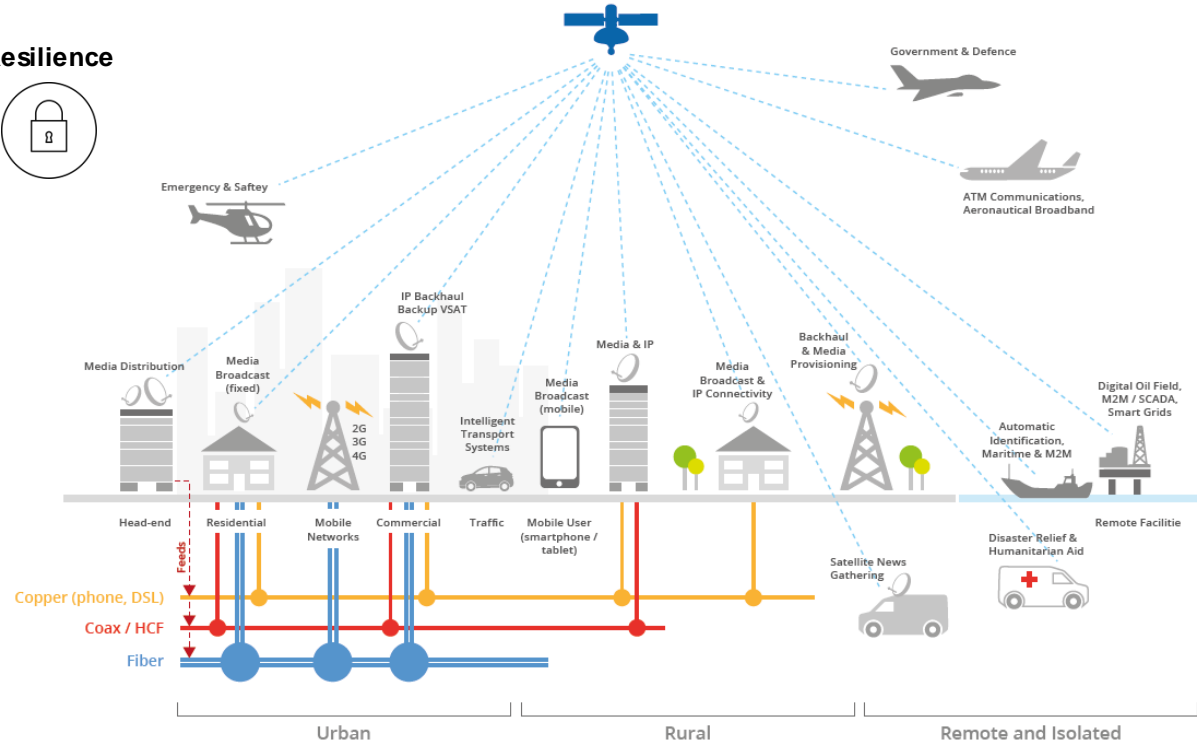**Ubiquity** **Mobility** **Broadcast** **Resilience**

ENABLING 5G DEPLOYMENTS

- ▲ Co-founder and Vice-Chair of the 5G Infrastructure Association (5G-IA)
- ▲ Active proponent of integration of satellite into 5G
- ▲ Collaborative standards and studies, e.g., 3GPP, ITU-R, CEPT
- ▲ Ecosystem and technology development, e.g. SaT5G (EU Horizon2020), SATis5 (ESA)
- ▲ Evolving products and services portfolio

Government & Defence

Emergency & Saftey

ATM Communications, Aeronautical Broadband

IP Backhaul Backup VSAT

Media & IP

Backhaul & Media Provisioning

Media Distribution

Media Broadcast (fixed)

Media Broadcast (mobile)

Media Broadcast & IP Connectivity

Digital Oil Field, M2M / SCADA, Smart Grids

2G 3G 4G

Intelligent Transport Systems

Automatic Identification, Maritime & M2M

Head-end   Residential   Mobile Networks   Commercial   Traffic   Mobile User (smartphone / tablet)

Remote Facilitie

Disaster Relief & Humanitarian Aid

Satellite News Gathering

Feeds

Copper (phone, DSL)

Coax / HCF

Fiber

Urban   Rural   Remote and Isolated

Paving the way with MNOs – 4G Backhaul to Iquitos

- ▲ SES and LatAm ISP Axesat deliver **satellite-based mobile backhaul** to rural areas of Peru for leading telecoms company ENTEL

- ▲ Service areas include **hard-to-reach** communities, such as the remote city of **Iquitos, Peru's sixth largest city (500,000 people)**

- ▲ O3b satellites spot beams help deliver **4G/LTE** services with low-latency, HTS data rates **up to 1Gbps per beam** to a single site

- ▲ Iquitos now has **same connectivity as Lima**, with access to social media and other applications via a low-latency service that **relies exclusively on the 28/18 GHz band**
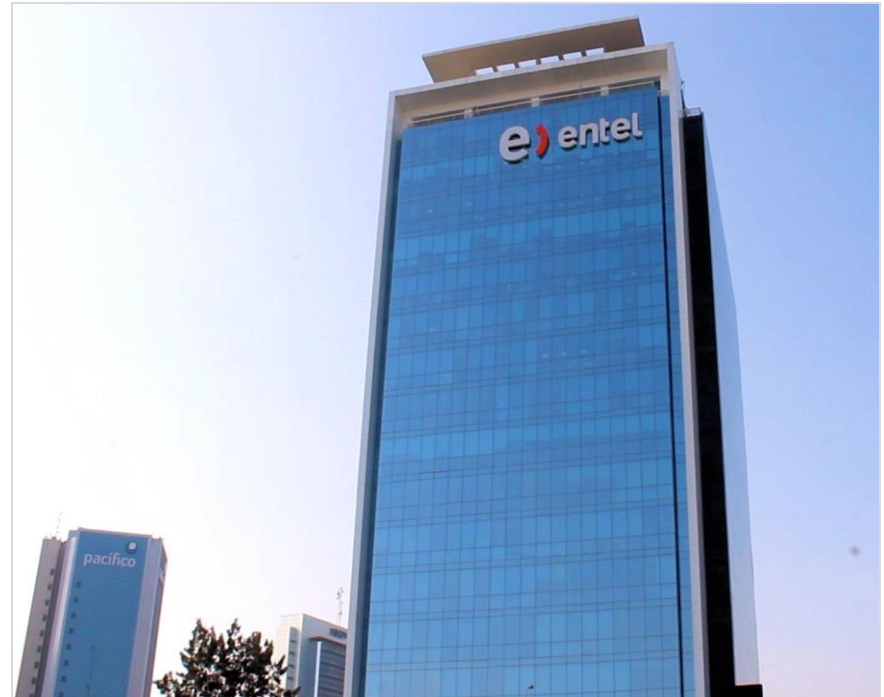
Paving the way with MNOs - Digicel in Pacific Islands

4G deployed where 4G is impossible

Digicel	B2C	B2B	B2G

Situation
- Coverage expansion required
- Upgrades from 2G to 3G, 3G to 4G
- Large coverage area across remote Pacific islands

Solution
- GEO connectivity enabled from customer-owned teleport
- High throughput MEO connectivity managed by SES Networks

Result
- LTE launched in greenfield deployments
- Resultant demand allowed Digicel to upgrade capacity three times

Our customers' need for speed and reliability is at the core of our partnership.

Michael Murphy
CEO of Digicel Pacific

Paving the way with MNOs - Tcell in Tajikistan

Tcell overcomes mountains to serve customers and public safety

Tcell

B2C	B2B	B2G

Situation
- Coverage expansion required
- 2G and 3G, cities and border controls
- 93% mountainous country <7,500m

Solution
- 14 sites, hub in Dushanbe
- Satellite backhaul, 30% compression
- Off-grid power, wind and solar

Result
- Low maintenance cell sites
- 3G expanded to major cities
- Border control communications

Kulma pass, 4,362m

A 4G Use Case For Inspiration – MNO in Africa

① Full managed turn-key solution

- ▲ Transportation to Chad and all the way to the sites
- ▲ Customs Clearance supported and Warehousing in Chad
- ▲ Installation and Commissioning of the 53 sites
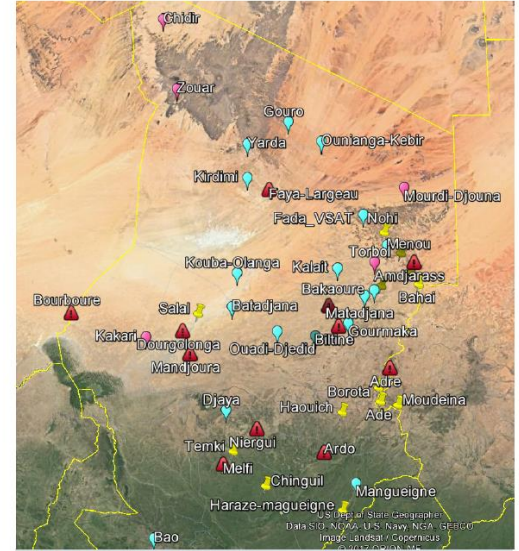- ▲ FLM with local network of technicians to deliver SLA nationwide

② Revamp and modernization of domestic network

- ▲ Migration from SCPC to Dynamic SCPC, new Comtech Heights Hub
- ▲ MEO/GEO hybrid link for international voice

③ Tier 1 SLA

- ▲ One uptime number
- ▲ Accelerated outage credits

④ Single provider of all satellite connectivity

- ▲ 50 sites
- ▲ 200 Mbps
- ▲ Fully Managed End to End service

C-Band satellite contributes to Broadband for All

- ▲ In Greenland, the world's largest island, 10% of the population depends purely on satellite due to the rough geography or large distance between them and the incumbent terrestrial telecom network

- ▲ SES partnership with Tele-Post (TP) will enable to respond to the Universal Service Obligation and bridge the digital divide: service to start in November 2020

- ▲ With the new connectivity, TP plans to provide 4G services using ground infrastructure from Ericsson

- ▲ Satellite capacity is C-band from GEO satellite

3G/4G Backhaul in DRC Combining GEO & MEO

Category: Networks
Region: Africa

- **Hybrid GEO/MEO solution using C/Ka spectrum**

- Fully managed service based on delivery platform combining voice, SMS, 3G data, with pilot sites for 4G/LTE

- Connectivity provided in all big and medium sized cities of the country

- SES partnering with Orange DRC & GILAT Telecom

SHARE
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## SES's and Gilat Telecom's Resilient Network Restores Connectivity in Africa

Written on 10 Feb 2020

Satellite-based connectivity services provided jointly by the long-term partners enabled internet in the Democratic Republic of Congo to be up and running within just four days from a submarine cable outage

Role of the Satellite in the 5G Ecosystem

TRUNKING & HEAD-END FEED
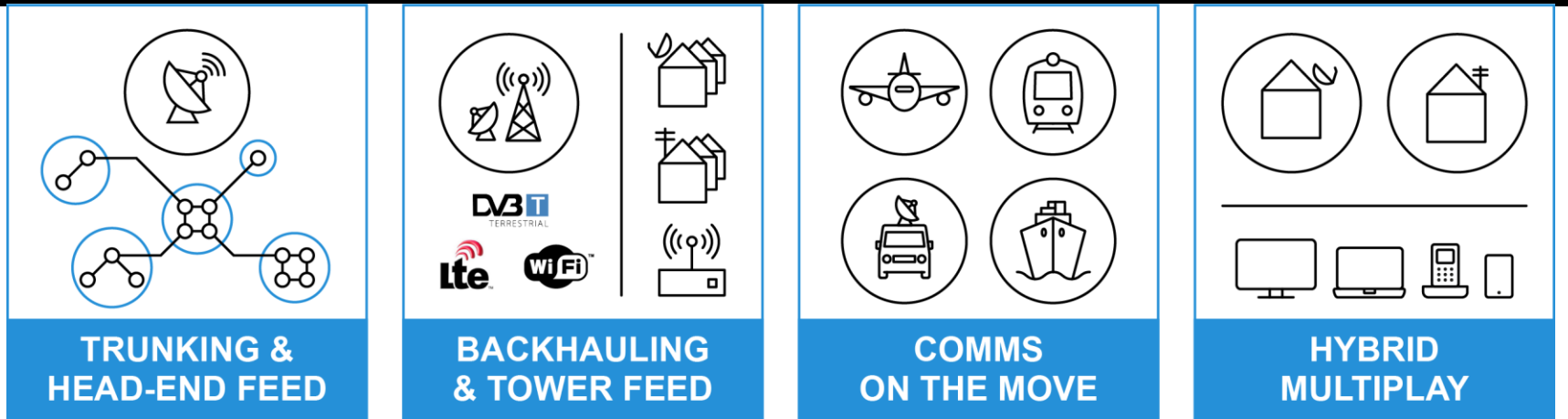
Satellites provide a very high speed direct connectivity option to remote / hard-to-reach locations
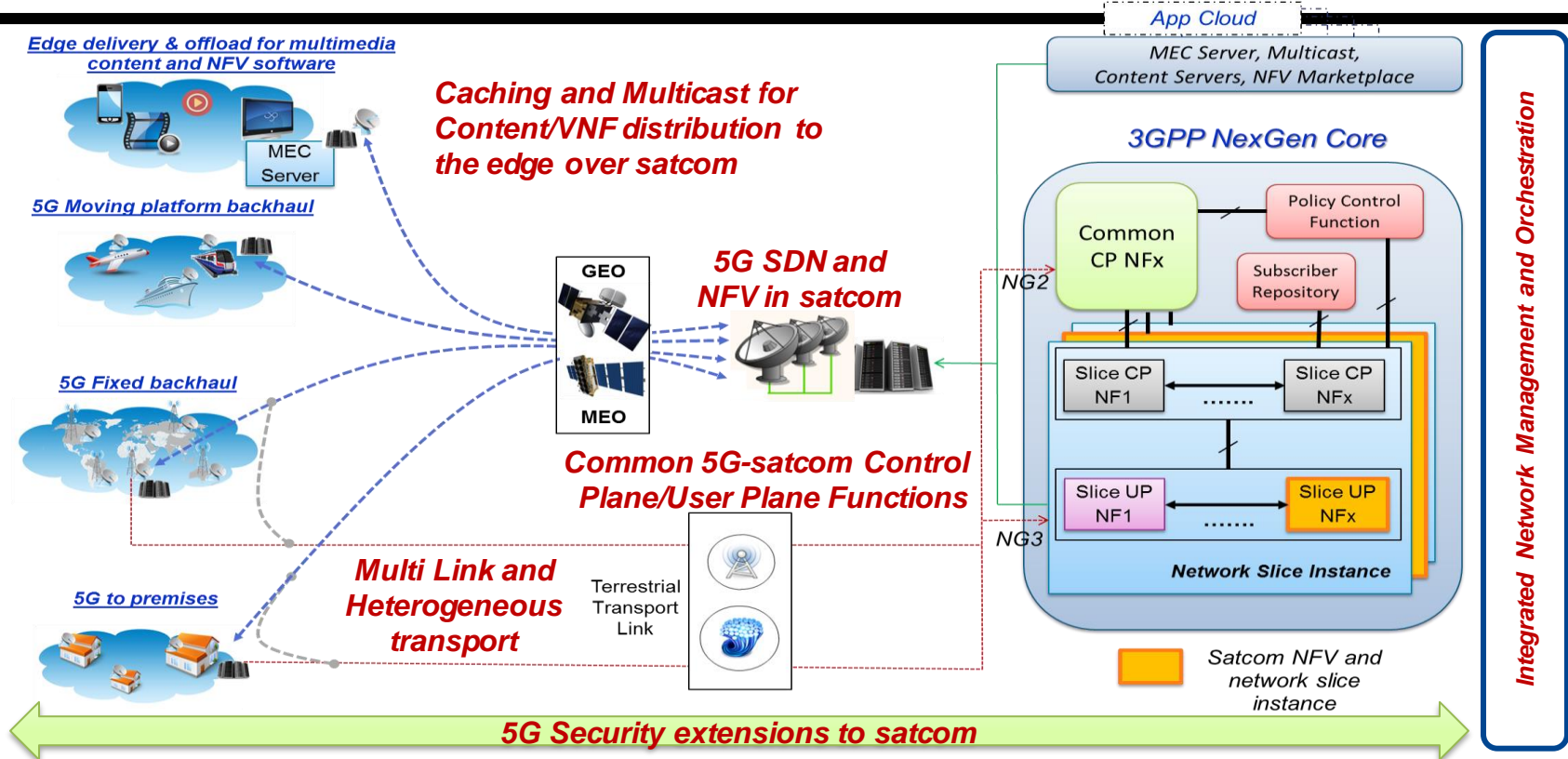
BACKHAULING & TOWER FEED

Satellites provide a high speed connectivity (incl. multicast content) to wireless towers, access points and the cloud

COMMS ON THE MOVE

Satellites provide a direct and/or complementary connection for users on the move (e.g. on planes, trains, automobiles and ships)

HYBRID MULTIPLAY

Satellites deliver content complementing terrestrial broadband (as well as direct broadband connectivity in some cases)

Satellite's ubiquitous availability helps accelerate global 5G deployment on the ground, at sea and in the air

SaT5G - Built and Validated the 5G Satcom Platform

Edge delivery & offload for multimedia content and NFV software

MEC Server

Caching and Multicast for Content/VNF distribution to the edge over satcom

5G Moving platform backhaul

5G SDN and NFV in satcom

5G Fixed backhaul

GEO

MEO

Common 5G-satcom Control Plane/User Plane Functions

5G to premises

Multi Link and Heterogeneous transport

Terrestrial Transport Link

App Cloud

MEC Server, Multicast, Content Servers, NFV Marketplace

3GPP NexGen Core

Policy Control Function

Common CP NFx

Subscriber Repository

NG2

Slice CP NF1 .... Slice CP NFx

Slice UP NF1 .... Slice UP NFx

NG3

Network Slice Instance

Satcom NFV and network slice instance

Integrated Network Management and Orchestration

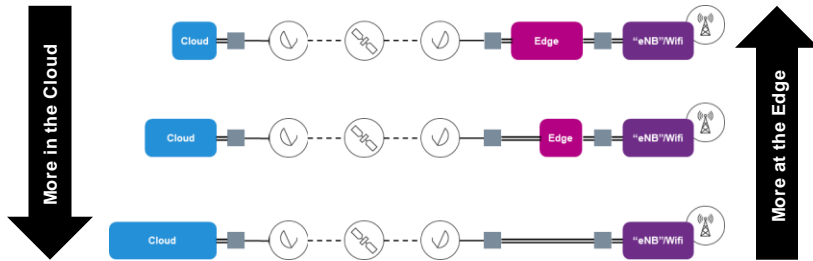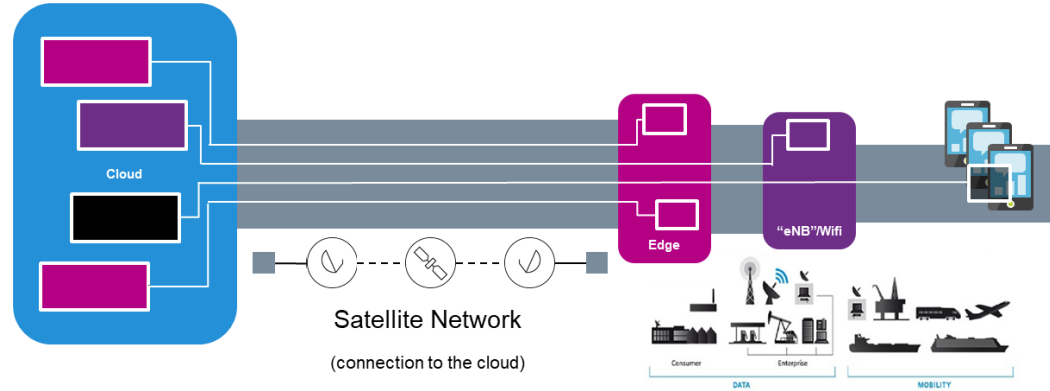**5G Security extensions to satcom**

SES Role in 5G-VINNI

SES brings in the satellite element to the 5G-VINNI end-to-end facility

▲ SES provides access to its owned and operated **multi-orbit (GEO/MEO) and multi-band (C/X/Ku/Ka-band) satellite** fleet, IP/MPLS global access teleport network, and satellite uplink/downlink facilities for 5G-VINNI live over-the-air demos and validation of the target 5G KPIs and use cases
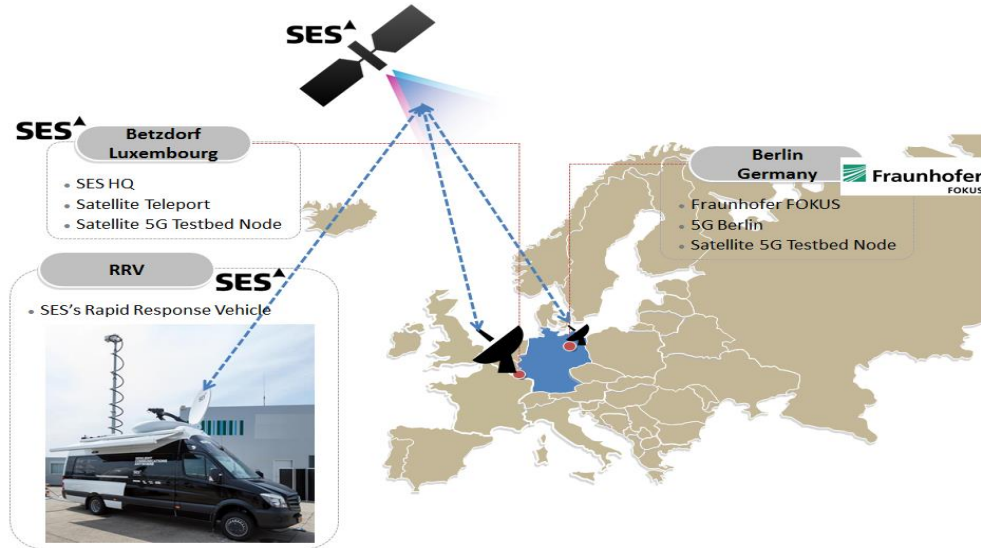
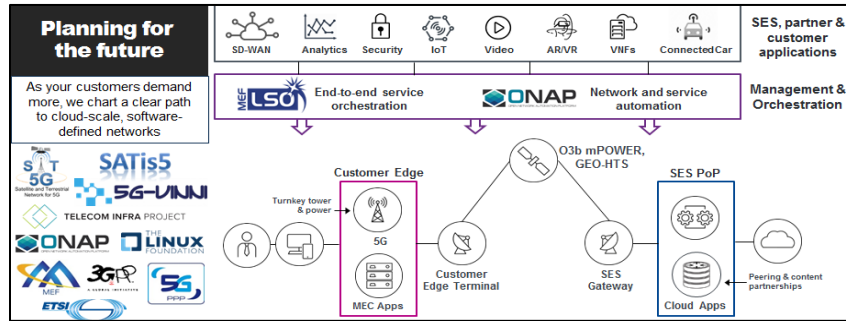# Satellite Connectivity supports a flexible Cloud-Edge Architecture

Network Slicing over the satellite network enables flexible and differentiated quality of service, end-to-end

Cloud

Satellite Network

(connection to the cloud)

Edge

"eNB"/Wifi

Consumer | Enterprise
DATA | MOBILITY

More in the Cloud

More at the Edge

Satellite extends the Cloud-Edge architecture everywhere

Building the Satellite Infrastructure to Support 5G Roll-out

70+ satellites (incl. 20 MEO) covering **99%** of the globe and world population

Planning for the future

As your customers demand more, we chart a clear path to cloud-scale, software-defined networks

O3b mPOWER, GEO-HTS

O3b mPOWER

ENABLING GLOBAL CONNECTIVITY

LAUNCH 2021

Coverage — 2019

+Capabilities — 2020

+Capacity — 2022+

2019   2020   2021   2022+

Massive investments in satellite and ground infrastructure to support new capabilities and requirements