

Usage of satellite technologies in mobile communications

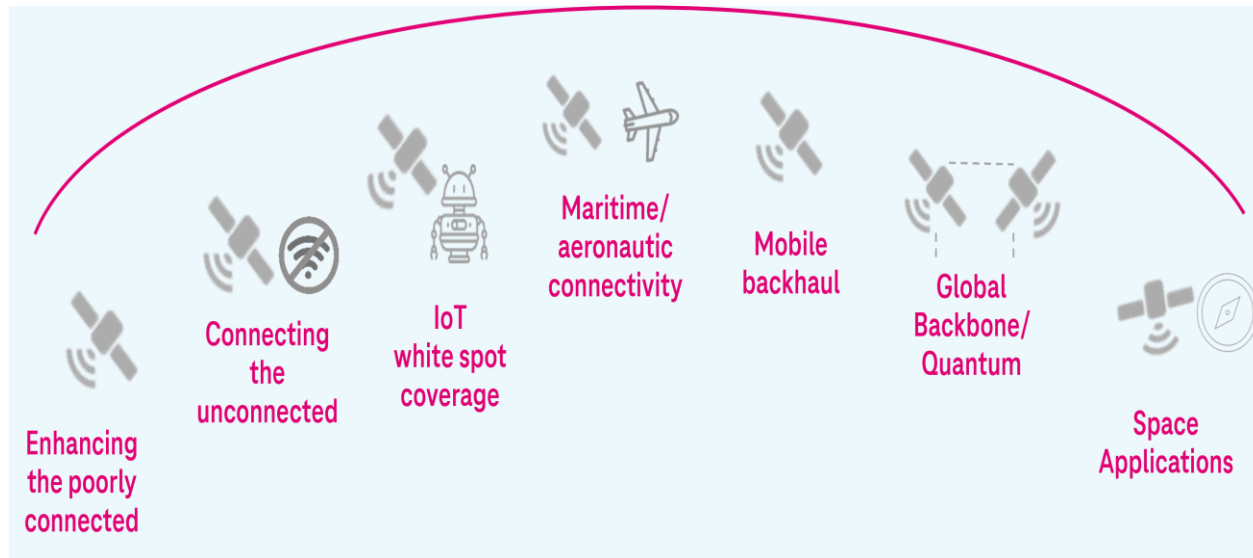
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NTN-solutions as a supplement to terrestrial business

Satellite connectivity



Exemplary use cases

Direct to handheld device

- Complementary IMT
- IoT

Broadband

- Network resiliency
- Backhaul
- Remote areas

Vertical applications

- IoT

Disaster recovery

- Crisis response
- Potential faster recovery time

Deutsche Telekom has existing assets to shape the future of space segment in Europe



Galileo Navigation System

Galileo MPLS Data Distribution Network and IT services to manage Galileo core systems.



Copernicus Data Access

Design and operation of the infrastructure systems for Copernicus since 2012

https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7374



EAN

LTE-based complementary ground network for EAN since 2018, integrated with Inmarsat's S-band satellite to deliver a truly seamless service

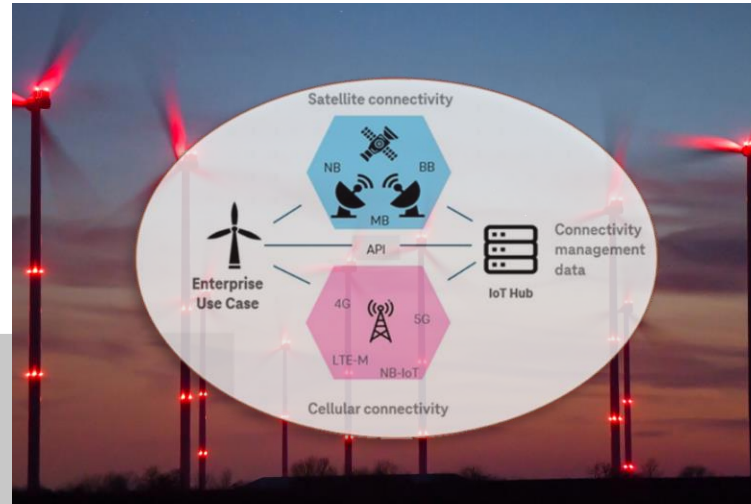
Space Connectivity: Resilience & Coverage are main driver

Added value: Conn. Management & Data processing



Teleport / Fixed & Mobile Sat. Service

OTE operates Teleport service and offers solutions for satellite services



Satellite IoT / Satellite Broadband

Provide satellite connectivity in addition to cellular/wireline networks for B2C, B2B, Public



IRIS² EU Secure Constellation

Deutsche Telekom inside

New Sat Capabilities: Cellular Connectivity from Space & Space Data + IoT to drive business development



Direct to Device

SpaceX to connect cellphones via sat.

ESA collaboration / biz acceleration

Offer access to space data ecosystem, DT cloud, APIs to stimulate ideation. Create Applications and business with Startups and verticals



Regulatory status for NTN



Broadband by Satellite, IoT by Satellite

- Served on frequencies already identified for satellite
- Regulatory framework already in place



D2H – Integrated services by hardware

- No service integration but hardware integration of both terrestrial and satellite service
- Services operate separately under dedicated regulatory framework



D2H – Satellite service supplementary to terrestrial IMT

- New LEO systems using 3GPP technology and operating in mobile bands
- Satellite usage in IMT bands not covered by Radio Regulation -> WRC-27 agenda item
- Protection of terrestrial mobile networks is key
- Licensing regime to be developed - approval from MNOs is a prerequisite

Regulatory provisions for satellite services complementary to terrestrial mobile service need to ensure protection of mobile and need to define clear usage conditions.

MSS @WRC-27

WRC-27 will discuss additional allocations for MSS in 3 agenda items:

- **1.12:** to consider, based on the results of studies, possible allocations to the mobile-satellite service and possible regulatory actions in the frequency bands **1 427-1 432 MHz (space-to-Earth)**, **1 645.5-1 646.5 MHz (space-to-Earth) (Earth-to-space)**, **1 880-1 920 MHz (space-to-Earth) (Earth-to-space)** and **2 010-2 025 MHz (space-to-Earth) (Earth-to-space)** required for the future development of low-data-rate non-geostationary mobile-satellite systems, in accordance with Resolution 252 (WRC-23);
- **1.13:** to consider studies on possible new allocations to the mobile-satellite service for direct connectivity between space stations and International Mobile Telecommunications (IMT) user equipment to complement terrestrial IMT network coverage, in accordance with Resolution 253 (WRC-23); **Range: 694/698 MHz and 2.7 GHz**
- **1.14:** to consider possible additional allocations to the mobile-satellite service, in accordance with Resolution 254 (WRC-23); Bands: **2010-2025 MHz (E2S)**, **2160-2170 MHz (S2E)**, **2120-2160 MHz (S2E)**



Thank You!