Usage of satellite technologies in mobile communications

May 22, 2024
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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

**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

More to come
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.
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!