

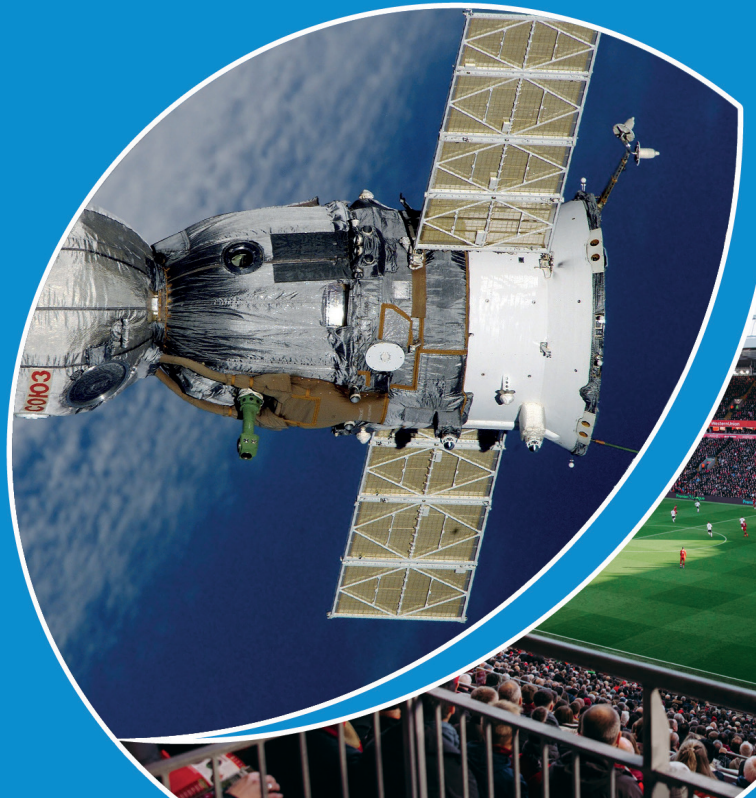
The need for reliable, ubiquitous connectivity

Insufficient coverage for mobile connectivity:

- Coverage of (terrestrial) white spots
- Automotive: Autonomous driving
- Maritime: Cruise ships, offshore platforms
- Aerospace: Passenger aircraft

Temporarily / locally insufficient capacity:

- Agriculture
- Construction areas
- Cultural and sports events
- Disaster recovery



Consortium Structure

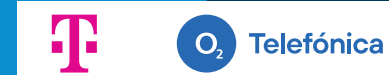
Applications / Vertical industries



Security



Network operators



Aerospace



Micro electronics



Communications



Research and Academia



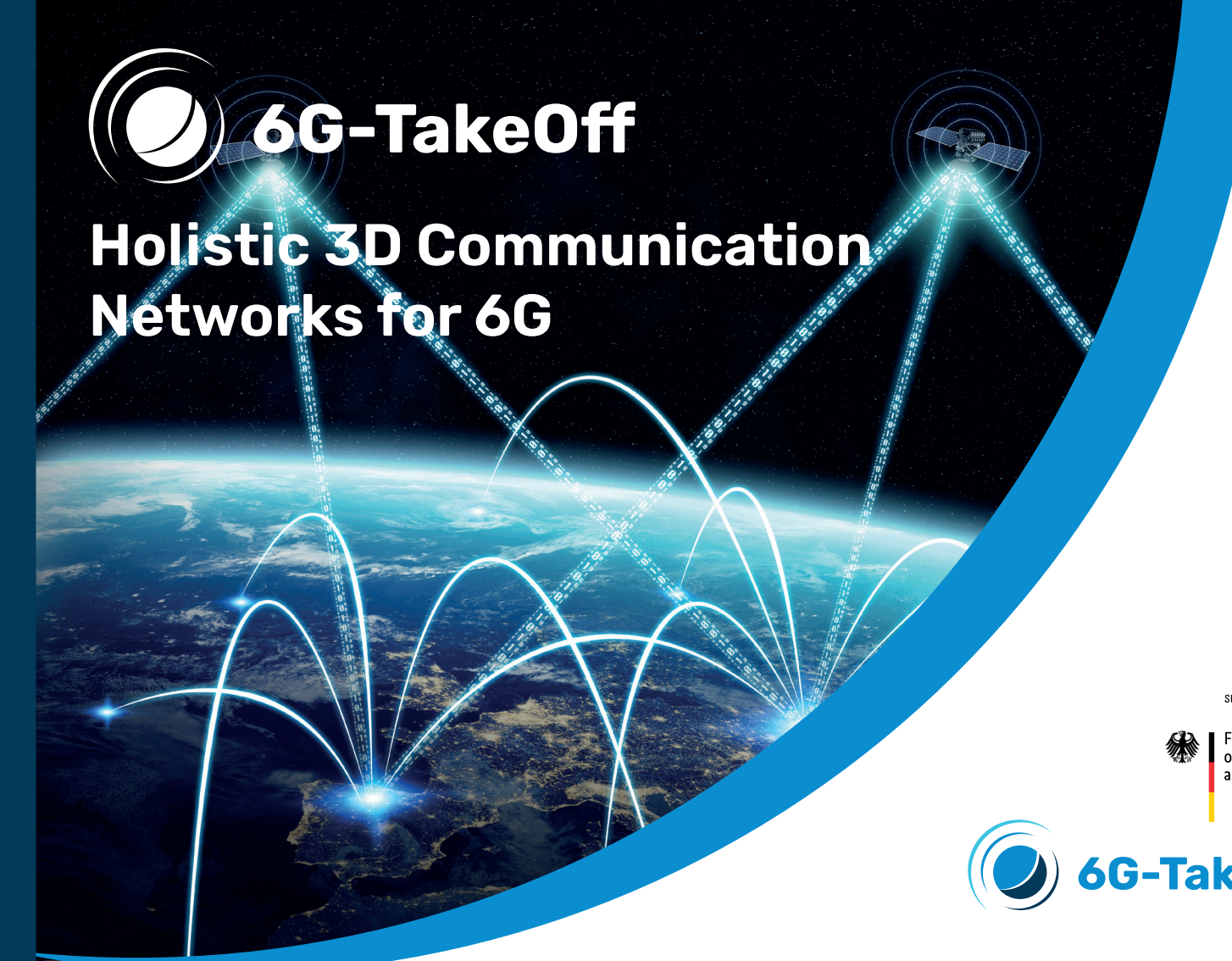
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Holistic 3D Communication Networks for 6G



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3D Networks

Unified processing platforms for network functions on different heights

SPACE SEGMENT

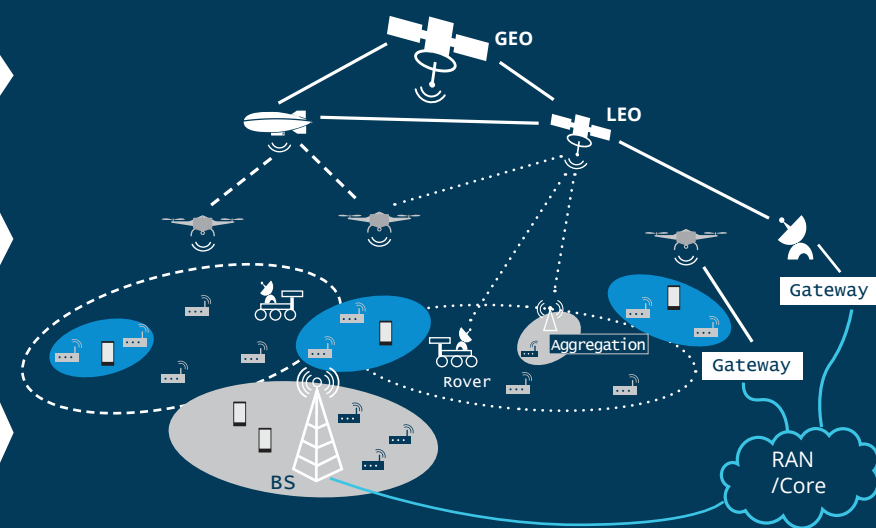
- Multi-orbit
- LEO satellites

AIR SEGMENT

- HAPS: Stratospheric airplanes, balloons
- LAPS: Drones

GROUND SEGMENT

- Terrestrial sites
- User equipment
- Customer premises equipment



Different properties with respect to:

Performance

Coverage, capacity, data rate / link budget, latency, processing capabilities

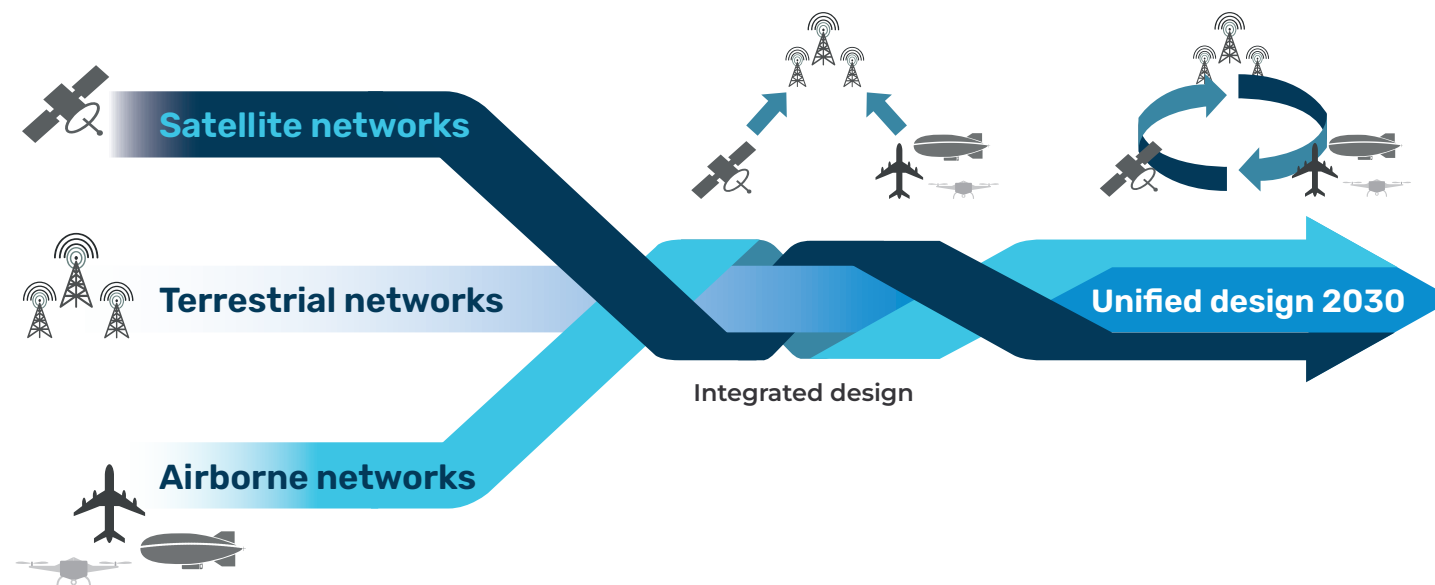
Geography / economics

Global business model needed for LEOs; local business model sufficient for HAPS

Flexibility, mobility

dynamically deploy or recall nodes, dynamically adjust coverage areas

Unified 3D Networks



4G & Before

Design optimized **independently** and exclusively for terrestrial networks

5G & B5G

Design optimized for terrestrial network component **Minimum impact to support integration** of satellite for coverage and availability extension

6G & Beyond

Design optimized for both **terrestrial and space** components against a set of common goals

The infrastructures of 3D Networks will be moving

Key challenges:

- Nodes can join / leave network dynamically
- Security requirement: authentication of joining nodes
- Connectivity management for air interface and backhaul
- Dynamic reallocation of network functions
- Steerable high-gain antenna systems
- Reconfigurable hardware / micro electronics

Novel Network Architecture:

- 3D: Ground, LAPS, HAPS, LEO, GEO
- Organic behaviour

Key Technologies:

- Dynamic connectivity management and allocation of network functions
- AI-driven automatic operation

Key Components:

- Innovative antennas and processing platforms