

# GIVING TECHNOLOGY A HEARTBEAT

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# Digital equity and resilience

Complementing terrestrial networks with NTN towers



Our mission at Deutsche Telekom is to provide always best connected services from a resilient network. Non-terrestrial networks (NTN) technologies complement our terrestrial network (TN) in the delivery of present and future network services to both people and things. We have a vision to create a 3D orchestrated network of TN and NTN infrastructure that leverages AI capabilities to provide a seamless experience anywhere, anytime for a fast response to restore coverage in crisis situations, extend coverage to remote areas, and ensure more resilient, secure connectivity for future communications.

## Key facts

- Extends reachability, improves service continuity, and strengthens network resilience
- 3D network orchestration for disaster recovery
- Real-time 3D digital twin emulates end-to-end orchestration of network layers
- Combined 5G cellular and satellite connectivity ensures global service availability
- With Satellite IoT we ensure that 100% of your assets in a given country are connected
- We are closing the gaps – 100% connectivity
- Deutsche Telekom and partners are driving early research on 6G architecture for NTN





Deutsche Telekom views non-terrestrial network (NTN) solutions as a complementary infrastructure to achieve constantly available connectivity services. The 3D orchestration of TN and NTN offers a solution for future communications and coverage challenges. This addresses the challenges of reachability and service continuity in remote areas, enhances reliability through connectivity between various access technologies, and improves network resilience in response to natural and man-made disasters.

In a 2023 field trial, Deutsche Telekom and partners demonstrated the delivery of 5G from a HAPS platform operating in the low stratosphere using a satellite backhaul system. It shows the potential role of NTN to provide wide area coverage in a disaster recovery scenario if ground infrastructure is damaged. The 3D network orchestration was validated via a digital twin. The lab-based emulation used traffic input from the field trial as well as weather forecasting data. This provides a holistic view of traffic demand needs and available resources including NTN components that automatically manage themselves to ensure constantly available services, even in cases of disruption.

### **5G NTN standardization**

At 3GPP, work is progressing on satellite inclusion in Rel-17+ technical specifications. It supports NR-based as well as NB-IoT- and LTE-M/eMTC-based satellite access to address massive IoT use cases in areas such as agriculture, transport, and many more. This joint effort between cellular and satellite industries will enable the full integration of satellites into the 3GPP ecosystem and define a global standard for future satellite networks. We show how this convergence is already happening today for several IoT use cases at some of our customers. Furthermore, we will provide a preview of a forthcoming converged connectivity product.

### **Research towards 6G**

Deutsche Telekom is leading the 6G-TakeOff research project, a program funded by the German government. The project is focused on developing a uniform 6G architecture for integrated TN and NTN base stations. A key research aspect is the use of AI for the fully automated management of networks in which structures change dynamically.



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