

Multi-Access Edge Computing (MEC) over NTN for beyond 5G & 6G

Project acronym: **MECON**

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Partners

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Non-Terrestrial Networks (NTNs) are vital for achieving the full potential of 5G and 6G, providing global coverage and reliable connectivity efficiently, namely where terrestrial networks cannot reach. As demand for seamless and resilient communication grows, NTNs play a key role in supporting critical applications and bridging the digital divide. Reflecting this momentum, the global 5G NTN market is projected to grow by USD 18.35 billion from 2023 to 2028, reaching USD 22.7 billion, according to Technavio, as illustrated in Figure 1. The MECON project is thus well positioned to drive innovation in this rapidly expanding sector.

Now completing its first year, MECON focuses on TN-NTN unification and advancing Multi-Access Edge Computing (MEC) over NTNs for next-generation networks. By uniting industry and academic partners, MECON explores technical, regulatory, and market challenges to unlock the full promise of NTNs.

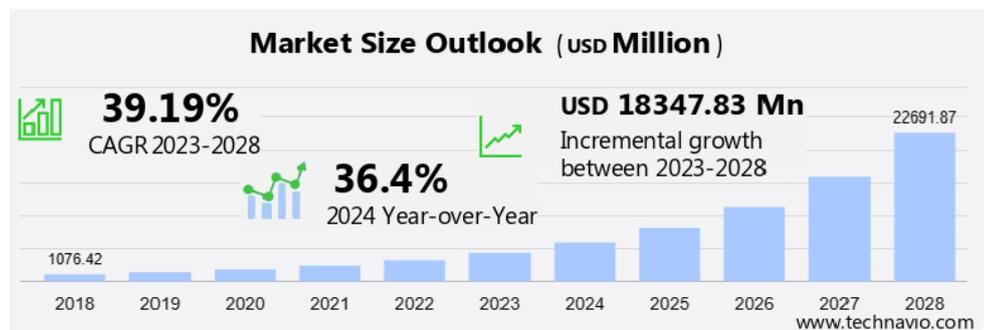


Figure 1: 5G Non-Terrestrial Networks (NTN) Market Analysis

Focus

The MECON project aims to develop advanced technologies for the seamless integration of satellite networks into future Unified Networks. Its primary outcomes include enabling cost-effective, on-demand global coverage -particularly in crowded and underserved areas-while ensuring trunking, backhauling, direct connectivity, energy efficiency, support for global IoT, high-speed mobility, high-throughput services, reduced site infrastructure, and instant coverage activation.

To achieve these goals, MECON will explore diverse deployment scenarios such as UAV-based backhauling for regions lacking terrestrial infrastructure, offering flexible and rapid connectivity solutions. The project will also investigate direct-to-device satellite links, eliminating reliance on ground networks, and optimize gNB deployment strategies on satellites to enhance resource allocation and network performance. These efforts are underpinned by innovative technologies and novel network architectures, as illustrated in Figure 2.

Approach

MECON integrates NTNs with 5G/6G systems through 3 core innovations:

- 1. Native Air-Space Integration:** Merging terrestrial, aerial, and space networks to boost efficiency and prepare for 6G scenarios.
- 2. AI-Driven Optimization:** Leveraging AI, Integrated Sensing and Communication (ISAC), and 3D mobility management to cut operational costs and enhance network autonomy.
- 3. Ultra-Low Latency Solutions:** Reducing end-to-end delays to enable real-time services over NTNs and dynamic terrestrial networks.
- 4. Distributed Multi-tenants, Multi-Domain Orchestrator:** To manage hybrid networks autonomously, Resource Sharing and Neutral Host networking for creation of new market opportunities.

All MECON project solutions are compliant with 3GPP, ETSI, ITU-T and other standards, ensuring smooth interoperability and deployment.

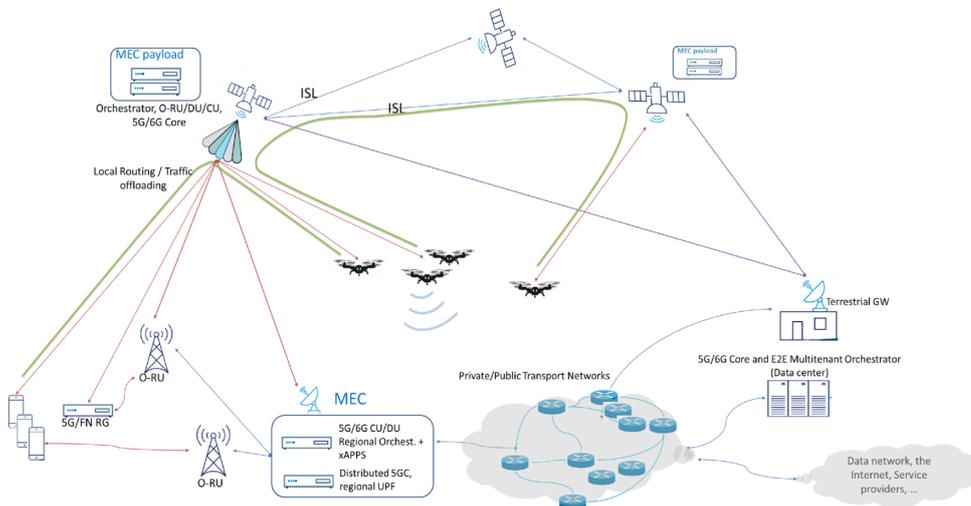


Figure 2: MECON deployment scenario architecture

Results

The MECON project is driving the seamless integration of NTN with 5G/6G systems to enable ubiquitous, cost-effective, and high-speed global connectivity. By unifying networks, MECON aims to improve cost efficiency, broadband coverage, and user experience, with a strong focus on reducing latency and supporting real-time services in underserved areas.

Key innovations include native air and space integration, enhanced MEC efficiency through automation and steerable beams, and self-organizing networks for automated slicing and traffic management. MECON also optimizes end-to-end network slicing across hybrid TN-NTN platforms and reduces delays for critical services using AI/ML-driven automation and smart resource management.

The project's effectiveness will be validated through real-world use cases such as post-disaster recovery, precision farming, remote monitoring, and eHealth, highlighting its potential to bridge the digital divide.

Impact

MECON aims to transform the satellite communication market, projected to reach USD 71.6 billion by 2030, by overcoming the limitations of siloed providers through an innovative service orchestration platform integrating NTN with 5G/6G. The MECON project targets influencing over 8% of the NTN market, with an expected market share of around 2.8%.

The MECON platform to be proposed enables hybrid connectivity solutions that meet growing demands in sectors like public safety, agriculture, shipping, and healthcare. By unifying NTN and terrestrial services, it creates a new marketplace that simplifies service discovery and provisioning, fostering new opportunities through a revenue-sharing business model, to be further elaborated and validated, benefiting platform operators.

Ultimately, MECON enables satellite operators to expand their reach and offer innovative services, while consumers gain tailored, cost-effective connectivity regardless of location.

About CELTIC-NEXT

CELTIC-NEXT is the EUREKA Cluster for next-generation communications enabling the digital society. CELTIC-NEXT stimulates and orchestrates international collaborative projects in the Information and Communications Technology (ICT) domain.

The CELTIC-NEXT programme includes a wide scope of ICT topics based on new high-performance communications networks supporting data-rich applications and advanced services, both in the ICT sector and across all vertical sectors.

CELTIC-NEXT is an industry-driven initiative, involving all the major ICT industry players as well as many SMEs, service providers, and research institutions. The CELTIC-NEXT activities are open to all organisations that share the CELTIC-NEXT vision of an inclusive digital society and are willing to collaborate to their own benefit, aligned with their national priorities, to advance the development and uptake of advanced ICT solutions.

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