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6G-NTN Project Standardisation Work Paves Way for Satellite-Terrestrial 6G Integration

Brussels, Belgium – The **6G-NTN Project**, nearing its conclusion, has unveiled its key contributions to global standardisation activities related to the integration of **Non-Terrestrial Networks (NTN)** into future **6G systems** and the wider **satellite and mobile communications ecosystem**.

Through active engagement, coordinated contributions, and leadership within key forums, 6G-NTN partners have made contributions to **Standards Development Organisations (SDOs)** aimed at steering the definition of NTN in the 5G Advanced and 6G tracks.

6G-NTN's Key Standardisation Contributions

The 6G-NTN Project drove its standardisation initiatives through direct and active engagement with major SDOs.

3GPP

6G-NTN partners supported and promoted the introduction of **regenerative payload support** in **3GPP Release-19**, an important step toward more advanced 6G NTN architectures.

6G-NTN concepts and results were presented through contributions and panel participation in the 3GPP Stage 1 Workshop on IMT2030 Use Cases on 8-10 May 2024 in Rotterdam, The Netherlands, highlighting NTN's critical role in achieving ubiquitous and resilient 6G connectivity across various domains.

Based on project findings, 6G-NTN partners submitted proposals contributing to a presentation addressing inputs towards a potential Release-20 6G study item and corresponding NTN-relevant use cases, including:

- Direct connectivity to smartphones/wearable devices
- Broadband connectivity to land vehicles and drones
- High speed broadband connectivity to public transportation platforms

European Telecommunication Standards Institute (ETSI)

6G-NTN partners contributed to the **ETSI conference, "Non-Terrestrial Networks: A Native Component of 6G," on 3-4 April 2024**. The event gathered more than 200 participants from industry, academia, and standardisation bodies, presenting the 6G-NTN Project's vision for NTN in 6G.

6G-NTN consortium members also co-authored the white paper: "**Vision on Non-Terrestrial Networks in 6G system (IMT-2030), Use Cases, Requirements, and Possible Standardisation approach: A Perspective from the 6G-NTN Project**," which is now referenced in NTN standardisation discussions.

Radio Spectrum Policy Group (RSPG) & NTN Forum

Following **the project's response to the European Commission's RSPG Opinion on 5G/6G spectrum needs**, some 6G-NTN partners have continued to emphasise the importance of Q/V-band NTN operations, spectrum sharing, and resilient global coverage, **helping shape policy discussions**.

Throughout the project, some of the 6G-NTN partners maintained active collaboration with the **NTN Forum**, a community of now more than 200 industry stakeholders, **facilitating information exchange and coordination** to strengthen alignment within the 3GPP ecosystem for what concerns NTN.

Ongoing and Upcoming Activities

Some of the 6G-NTN project partners plan to continue to support standardisation preparation for the Release-20 study items according to the legitimate interest of each of the parties and with contributions on topics including:

- GNSS free operation
- Seamless NTN/TN service continuity
- Compact and self-tracking FPA for vehicle/UxV mounted devices
- High-accuracy and low-latency positioning
- UE–NTN–UE mesh connectivity
- Autonomous private network (NTN+TN) operation over a specific area
- Smart NTN/TN combination for sustainability and resilience
- Multi-tenant non-terrestrial network infrastructure
- Spectrum coexistence and optimisation strategies

About the 6G-NTN Project

6G-NTN is a 36-month **Research and Innovation Action** funded under the **Smart Networks and Services Joint Undertaking (SNS JU)**. The project started in January 2023 with an aim of designing and **validating NTN's key technical, regulatory, and standardisation enablers for the integration of TN and NTN components into 6G**, focusing on multidimensional network infrastructure, multi-constraint RANs, and multi-user terminals.

Its consortium brings together **13 partners from eight European countries**, including major industrial players, innovative SMEs, leading research organisations, and a not-for-profit association focused on sustainable digital technologies. This mix ensures strong expertise across satellite and mobile communications, network architecture, and sustainability domains.

Throughout its span, 6G-NTN has engaged a wide community through its participation in several 3GPP activities, ETSI events, dedicated workshops, and exchanges within the Satellite Standardisation Interest Group (SSIG), helping connect the project with key stakeholders in the satellite and mobile ecosystems.

During the implementation of the project, the partners have defined use cases and sustainability requirements, a 3D multi-layered network architecture spanning HAPs, LEO, and GEO systems, regulatory insights for Q/V and C bands, candidate waveforms for 6G NTN, antenna and payload concepts, AI-enabled RAN and orchestration solutions, and a preliminary deployment roadmap for 6G NTN, contributing to forming a strong basis for the project's ongoing final validation activities.

About the Standards Development Organisations

Note: Some 6G-NTN partners are not members of some of these SDOs and are therefore not responsible for communications associated in relationship with 6G-NTN.

3GPP (3rd Generation Partnership Project): A global collaboration that unites several telecommunications standard development organizations (SDOs) to create globally applicable technical specifications and technical reports for mobile communication technologies. It was originally established in 1998 to develop the specifications for 3G (UMTS) and has since evolved to encompass 4G (LTE), 5G (NR), and future generations of cellular technology. Its work ensures the worldwide compatibility, performance, and long-term evolution of mobile broadband systems.

ETSI (European Telecommunications Standards Institute): A non-profit organization established in 1988 that creates global standards for information and communications technologies (ICT). It develops internationally applicable standards for telecommunications,

broadcasting, and other electronic communications networks and services, serving as a key player in supporting European regulations and ensuring the interoperability and security of ICT products and services worldwide.

RSPG (Radio Spectrum Policy Group): The European Commission’s high-level advisory body on radio spectrum strategy. It brings together representatives of the EU Member States and the EEA EFTA countries to provide the Commission with expert opinions and reports that guide spectrum harmonisation across Europe. Its work helps shape long-term spectrum policy, including for emerging 5G and 6G services.

NTN Forum: A platform for satellite industry stakeholders that facilitates information exchange and coordination among organisations involved in satellite-related standardisation. It aims to strengthen alignment within the 3GPP ecosystem and provides a platform for participants to rally support for standardisation initiatives consistent with the community’s shared objectives.

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