Network of Networks Integration Challenge: Bridging Terrestrial and Non-Terrestrial Networks for Enhanced Connectivity

Background:

The Network of Networks Integration Challenge aims to support companies/organisations to develop new systems/components/subcomponents that support the integration of terrestrial and non-terrestrial networks. Eligible companies/organisations here are broad - ranging from satellite communications through to high/low-altitude platform solutions, and the network architectures and hardware/software solutions supporting integration with terrestrial networks. This integration will enable the delivery of high-speed connectivity to hard-to-reach areas, including densely populated urban areas and remote rural regions. By leveraging a combination of terrestrial and non-terrestrial technologies, this challenge seeks to address the connectivity gaps and provide reliable, high-data-speed network access to underserved areas and deliver additional resilience to already-served areas. The ultimate goal is to demonstrate the commercial scalability of pilot systems with a view to its rollout in commercial networks by early 2030s.

Objectives:

- **Integration of terrestrial and non-terrestrial networks:** The primary objective of this challenge is to develop 'network of networks' systems that seamlessly integrates terrestrial (including mobile, Wi-Fi and IoT networks) and non-terrestrial (including but not limited to satellite platforms) networks. This integration will enable the efficient and reliable delivery of high-speed connectivity which is consistent, reliable and resilient to areas that are difficult to reach using traditional networking infrastructure.
- **Enhanced connectivity for hard-to-reach areas:** The challenge aims to demonstrate the pilot system's ability to provide high consistent data speeds to mobile and fixed terminals in underserved areas, including built-up areas and remote rural regions. The proposed solution should overcome geographical limitations and offer a robust network infrastructure to ensure reliable and efficient connectivity.
- **Commercial scalability:** The challenge focuses on developing solutions that are commercially scalable. The proposed network of networks system should be capable of integration into existing commercial networks, with a clear path towards widespread deployment by 2030. This scalability is essential for enabling widespread access to high-speed connectivity across diverse geographical areas.

Scope and Deliverables:

- **Research and Development:** Participants are encouraged to explore innovative technologies, architectures, and protocols that facilitate the seamless integration of terrestrial and non-terrestrial networks. The focus should be on developing practical and scalable solutions capable of providing high-speed connectivity to hard-to-reach and existing covered areas.
- **Prototype Development:** Participants must design and demonstrate prototype products/systems which enable or will be fundamental elements in the integration of terrestrial and non-terrestrial networks. Overall, a selection of prototypes should incorporate the necessary infrastructure, network elements, and technologies to deliver high data speeds to targeted areas.

- **Performance Metrics:** The proposed pilot system will be evaluated based on key performance metrics, including consistency of high data transmission speeds, coverage range, reliability, and scalability. Participants should provide comprehensive data and analysis to demonstrate the pilot system's capabilities and improvements compared to existing networking solutions.
- **Scalability Assessment:** Participants should assess the commercial scalability of their proposed pilot system. This assessment should consider factors such as infrastructure requirements, cost-effectiveness, compatibility with existing networks, and the ability to meet the growing demand for connectivity in both urban and rural areas.

Collaboration and Evaluation:

Collaboration: Participants are encouraged to collaborate with industry partners, research institutions, and relevant stakeholders to leverage collective expertise and resources. Collaboration should promote innovation and help expedite the development of the integrated network of networks system.

Evaluation: The proposed pilot systems will be evaluated by a panel of experts based on their demonstrated ability to integrate terrestrial and non-terrestrial networks, provide consistently high data speeds to hard-to-reach areas, and exhibit commercial scalability. The evaluation process will consider the viability, effectiveness, and potential impact of the solutions on bridging the connectivity gap and adding resilience to networks.