

NON TERRESTRIAL CONNECTIVITY SOLUTIONS

This Project Group Charter establishes the scope, intellectual property, and copyright terms used to develop the materials identified in this Project Group. Only Participants that execute this Project Group Charter will be bound by its terms and be permitted to participate in this Project Group and shall be considered “Contributors” in the Project Group as defined in the Telecom Infra Project IPR Policy document.

TIP Board of Directors Approval Date: October 16, 2019

1. PROJECT GROUP NAME

Non Terrestrial Connectivity Solutions

2. PURPOSE

The development of persistent, non terrestrial solutions has accelerated in recent years and these platforms are maturing to the point of being viable for telecom services. Their characteristics provide unique characteristics to complement terrestrial solution, generating a future with more heterogeneous networks coexisting. It is now time to consider the platform as an element of the telecom system and focus development on specific use cases, ensuring by design that coexistence is possible and generating greater industrial scale.

By developing the use cases, business models and technical requirements of these solutions as an ecosystem, we can begin the design and development of payload and network solutions for specific use cases that provide direct connectivity to UEs ensuring they will support the service requirements, operating model and cost structure required to unlock the business and generate the first success stories for connectivity HAPs.

We believe that industry collaboration will enable the ecosystem to innovate faster, with bigger scale and lower cost and with a more clear view on the solutions required.

3. GOAL

Collaborate via TIP creating a Non Terrestrial Solutions Project Group to set the minimum requirements for specific use cases to provide coverage and accelerating the time to take to the field these solutions. To reach this objective the group will define common elements between players to make the solutions operationally and economically feasible, including interconnection with terrestrial networks to ensure that they can co-exist with existing networks.

Initially the group will concentrate on use cases, where the technology can be incubated with a clear underlying business value that cannot be addressed with traditional solutions due to terrain/economic challenges (unconnected) or time constraint (emergencies situations). The solutions should work with the currently LTE devices.

The high level technical objectives of the group will be to create reference designs for the connectivity components, agree the minimum service requirements for Non Terrestrial Solutions to coexist with legacy ground networks, providing a comparable performance, addressing new handovers, interference and load balancing policies.

The end goal is to have a Non Terrestrial Solution to provide coverage to the uncovered in low density and a quick response solution to an emergency situations.

4. PROJECT GROUP SCOPE

The project group will focus on accelerating the non terrestrial connectivity solutions to deliver a pilot on the ground based on the two use cases aforementioned. To do this, the group will define the key service, operational and technical requirements. This shall include (not exhaustive) value chain, spectrum management, interconnection with terrestrial network, access and backhaul analysis and fleet and network management.

Non Terrestrial Solutions Project Group seeks to coordinate with other relevant bodies and organizations focused on HAPS and telecom technologies, systems, and networks to design complete telecom solutions for specific use cases.

This Project Group is not focused on developing the aerial platforms or user handsets.

Initial Use Cases:

The initial use cases for high altitude connectivity are rural communities and emergency response. Rural communities are defined as population densities below approx. 15 inhabitants per square kilometer where traditional terrestrial solutions are not cost effective.

5. PROJECT GROUP DELIVERABLES

General Deliverables: The Project Group will collaborate to assemble documents, studies, specifications and solutions including the following items that will be available to TIP members to build effective and sustainable aerial networks. The following lists the Deliverables to be developed by the Project Group.

1. Further refining of the key use cases
 - a. Initial priority on rural and emergency response
 - b. Defining requirements around the type of service, availability, throughput, number of users etc.
 - c. Defining coverage areas, population density, target countries
2. Cost structure and business case
 - a. Define value chain roles, responsibilities and cost structures
 - b. Define business models and set cost goals to allow all players to find a sustainable business
 - c. Identify areas for cost saving, including technology that can we shared
3. Co-existence with terrestrial networks
 - a. Methods for handling users covered by terrestrial and airborne networks
 - b. Data privacy and security
 - c. Interference handling, load balancing, prioritization
 - d. Payload architecture and requirements (focus on LTE/Backhaul back to Earth)

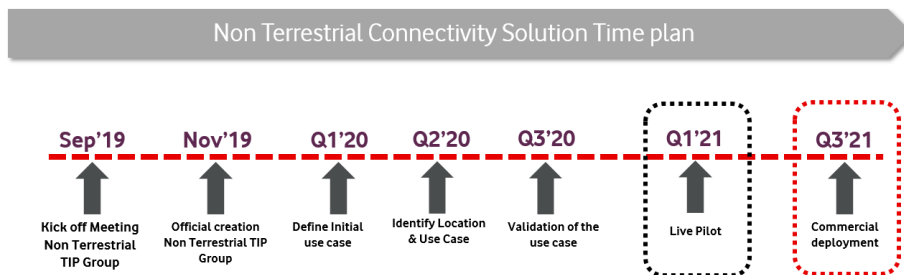
Timeline:

1. Define Non Terrestrial Solution minimum requirements to provide coverage and coexisting with legacy ground carries.
 - a. Phase 1 [Target for Nov '19]: To create a new Non Terrestrial Solution Project Group within the TIP community. Output: To start working in the solution within TIP.

- b. Phase 2 [Target for Q1 '20]: Define initial use cases.
 - i. Define minimum requirements for Non Terrestrial Platform to provide E2E solution: Radio, Transmission, Core, operation, optimization.
 - ii. Define requirements for coexistence with terrestrial and identify potential architectural options
 - iii. Identify feasibility and timeline to meet the minimum requirements.
 - iv. Identify cost structure and potential business case
 - v. Output: Contribute baseline requirements, initial use cases, cost, business model and learnings

- 2. Pilot(s) for Non Terrestrial Solution(s)
 - a. Phase 1 [Target for Q2 '20]: Define pilot(s) requirements.
 - i. Select type of solution for the pilot(s)
 - ii. Select E2E architecture and deliver the design
 - iii. Output: Contribute general solution design and expected results.
 - b. Phase 2 [Target for Q3 '20]: Identify leaders for value chain and validate use case in non customer impact environment (lab, specific test area).
 - i. Select leaders and value chain for pilot(s)
 - ii. Validate and evaluate design for the different areas to deliver the E2E pilot solution (s)
 - iii. Output: Publicly identify leaders, contribution of validation results, technical architecture, HW reference design, baseline optimization to coexist with terrestrial solutions.
 - c. Phase 3 [Target for Q1 '21]: Live Pilot(s) of the use case:
 - i. Live implementation of Non Terrestrial solution(s)
 - ii. Output: Contribution of live results, optimization to coexist with terrestrial solutions, real cost, operation model

- 3. Non Terrestrial Solution commercial deployment. Target Q3'21



6. PATENT LICENSING

The patent license for all Contributions, Draft Specifications and Final Specifications within this Project Group shall be:

[Check one box]

- RAND License Option, as set forth in Section 5.2.1 of the Telecom Infra Project IPR Policy.
- Royalty-free License Option, as set forth in Section 5.2.2 of the Telecom Infra Project IPR Policy.

7. FINAL DELIVERABLE COPYRIGHT LICENSING

Project Group agrees to grant the following copyright license for the Final Specification:

[Check one box]

- Creative Commons Copyright Attribution 4, Each Project Group Contributor agrees that its Contributions are subject to the Creative Commons Attribution 4.0 International license - <http://creativecommons.org/licenses/by/4.0/legalcode>.
- Full Release of Copyright into the public domain, Each Project Group Contributor agrees to release its Contributions to the public domain and waive all copyrights associated with them.
- TIP Supplemental Copyright Policy, Option 2

8. INITIAL PROJECT CHAMPIONS

Initial champions are Vodafone and Telefonica.

9. CHAIR AND (OR) CO-CHAIR OF PROJECT GROUP

CHAIR

David Martin Lambas, Telefónica

Mai Tran Le, Vodafone

ACCEPTANCE

Contact Name

Contact Title

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Date

Signed by (print name)