



Non-Terrestrial Connectivity Solutions

This Amended and Restated 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 Working 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: 12/16/2020

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 clearer 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.



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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 situation.

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.

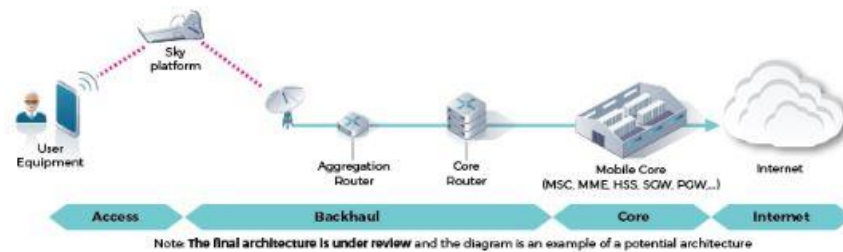
This Project Group is not focused on developing the aerial platforms or user handsets. In addition, the Project Group is not focused on developing interface specifications. Any change of Scope would require a recharter of the Project Group.

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.



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5. PROJECT GROUP DELIVERABLES

General Deliverables: The Project Group will collaborate to assemble documents, studies, recommendations and define 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.

Deliverables, Milestones and Timeline:

1. Define Initial Use Case

- 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
- d. *Deliverable #1: Whitepaper detailing use cases and operator service requirements*

2. Define Non-Terrestrial Solution minimum requirements to provide coverage and coexisting with legacy ground carries.



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- a. Define minimum requirements for Non-Terrestrial Platform to provide E2E solution: Radio, Transmission, Core, operation, optimization.
- b. Define requirements for coexistence with terrestrial and identify potential architectural options
- c. Identify feasibility and timeline to meet the minimum requirements.
- d. Identify cost structure and potential business case
- e. *Deliverable #2: Technical Requirements Document*

3. Cost structure and business case

- a. Define value chain roles, responsibilities and cost structures
- b. Identify areas for cost saving, including technology that can be shared
- c. *Deliverable #3: Define and document business models white paper*

4. Co-existence with terrestrial networks

- a. Methods for handling users covered by terrestrial and airborne networks
- b. Data privacy and pay availability analysis reports.
- c. Interference handling, load balancing, prioritization
- d. Payload architecture and requirements (focus on LTE/Backhaul back to Earth)

e. Deliverable # 4: Guidelines and recommendations for already established technical policies, business case guidelines and operational methods to allow co-existence of terrestrial and non-terrestrial networks.

5. Non-Terrestrial Solution Pilot Goals and Requirements

- a. Select type of solution for the pilot(s)
- b. Select E2E solution architecture defined



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- c. Select leaders and value chain for pilot(s)
- d. Validate and evaluate design for the different areas to deliver the E2E pilot solution (s)
- e. *Deliverable #5: Document pilot requirements, general solution design, metrics and expected results.* [Target for Q1'21]

6. Non-Terrestrial Solution Pilot Launch [Target for Q4'21]:

- a. Launch test flight

7. Non-Terrestrial Solution lessons learned & results . Target Q1'22

Identify leaders for value chain and validate use case in non-customer impact environment (lab, specific test area).

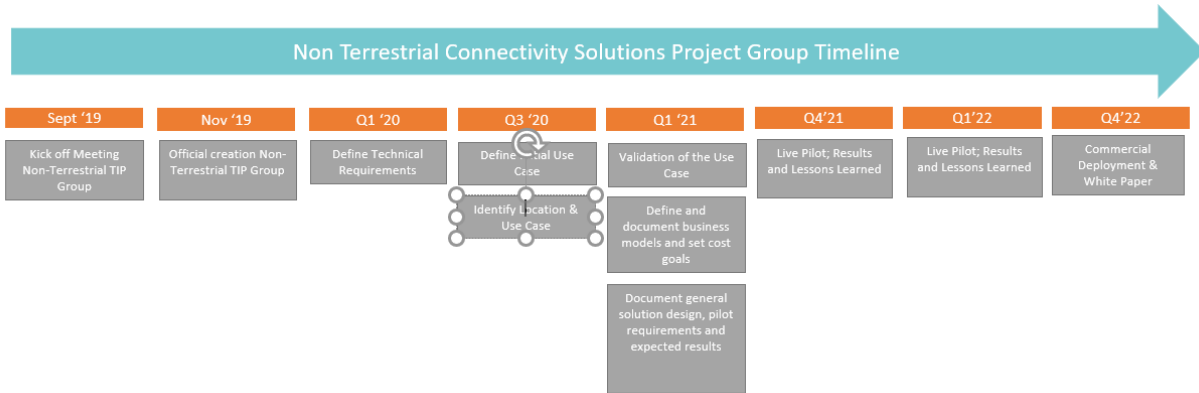
- a. Complete solution pilot program
- b. Evaluate program performance against pilot metrics
- c. Establish lessons learned and recommendations for commercial solutions
- d. Output: Transparently identify vendors and leaders which will help deploy the pilot, , contribute validation results, technical architecture, HW reference design, baseline optimization to coexist with terrestrial solutions. *Deliverable #6 Summary of Live Pilot(s) test results.*

8. Commercial Deployment Target Q4'22

- a. Live implementation of Non-Terrestrial solution(s)
- b. *Deliverable #6: Publish White Paper document of live results, optimization to coexist with terrestrial solutions, real cost, operation model[AM2]*



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Deliverable	IPR Treatment
Deliverable #1: Initial Use Cases	Document IPR Policy
Deliverable #2: Technical Requirements Document	Document IPR Policy
Deliverable #3: Business Models white paper	Document IPR Policy
Deliverable #4: Recommendations on coexistence with terrestrial networks	Document IPR Policy
Deliverable #5: Document Pilot Requirements and Goals	Document IPR Policy
Deliverable #6: Pilot Test Results and Recommendations	Document IPR Policy

Contributions to Deliverables and any license to use the Deliverable upon its finalization are governed by TIP’s Organizational Documents which may be accessed at <https://telecominfraproject.com/organizational-documents/>. The IPR policies and agreements referenced below are TIP Organizational Documents unless otherwise specified and attached to this Charter.

6. INITIAL PROJECT CHAMPIONS

Telefonica, Vodafone, Airbus, AerNavis, Airspan, Altran

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

Co-Chair: Mai Tran Le, Vodafone

Co-Chair: David Martin Lambas, Telefonica



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Charter Update: This PG Charter will be updated to reflect any changes as set forth in the Project Group Charter Revision Policy which may be accessed at

https://cdn.brandfolder.io/D8D115S7/as/q7rnyo-fv487k-2j33tl/Project_Group_Charter_Revision_Policy_-_Telecom_Infra_Project.pdf.
