ENI PoC #17: Intelligent

Satellite-Terrestrial

Integration Network

Architecture Progress

Update

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ENI PoC project #17: Intelligent Satellite-Terrestrial Integration Network Architecture

PoC Goals and PoC member task

Host/Team Leader:


Team members:

- ✓ **PoC Project Goal #1: Hand-and-Arm based Architecture. Demonstrate the architecture design with inherent wide-area coverage capability and the unified management of user access with ubiquitous signaling coverage.**

- ✓ **PoC Project Goal #2: Intelligent On-demand Coverage. Demonstrate the intelligent on-demand coverage technology to provide dynamic resource allocation for traffic steering to meet diversified user demands.**

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NR NTN Mobility Management and Endpoint Location Escalation Technology

NR NTN mobility management and terminal location reporting technology are mainly different in terms of delay, synchronization, mobility and other aspects of terrestrial and satellite mobile communication. Network verification is performed on the terminal location report to meet relevant regulatory requirements (such as legitimate interception, emergency call, public early warning system, etc.), so that terminals can dynamically select the ground or satellite network no matter when and where, and intelligently access the network according to service QoS requirements to obtain the best user experience.
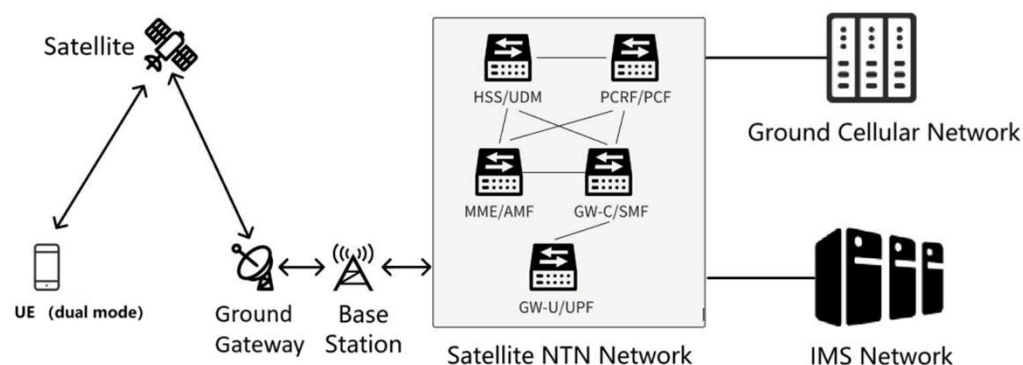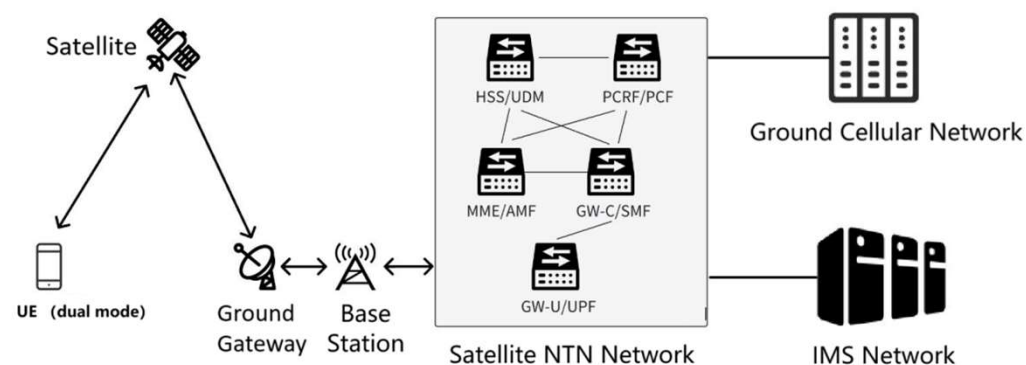

China Telecom 5G NTN network architecture

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ETSI

NR NTN adaptive network

Based on the separation architecture of the 5G access network and the 5G NTN application scenario, a more flexible satellite-ground convergence adaptive network architecture can be considered to support more efficient satellite-ground resource coordination. The on-board gNB-CU-CP can make decisions and perform data offload between satellites and ground, and hand over the data processed by the on-board gNB-DU to the on-board gNB-CU-UP for further processing, or directly hand over the data to the ground gNB-CU-UP for processing. In this way, the satellite payload can be used as the center, and flexible data distribution between satellites and ground can be realized according to the load status of the satellite payload.
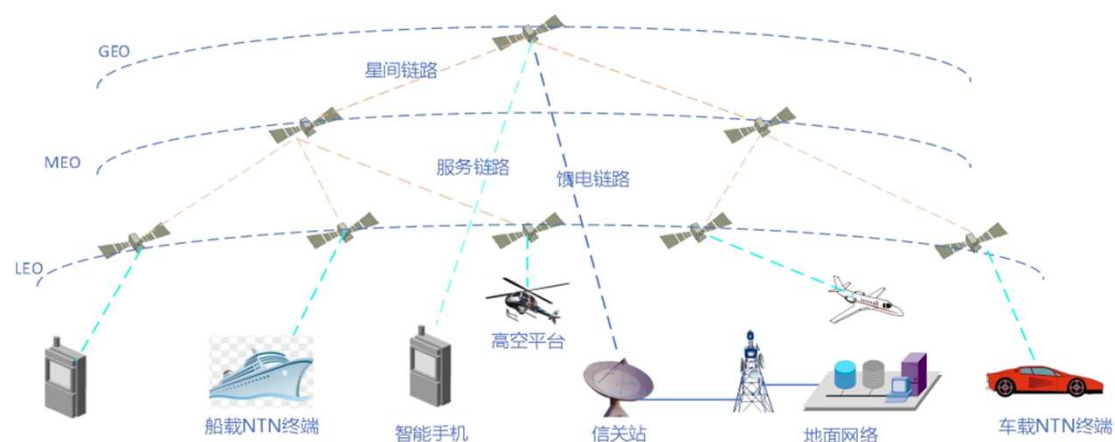

China Telecom 5G NTN network architecture

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5G NTN can provide the same service services as terrestrial mobile communication networks, including voice, SMS, IoT, social networking, video, etc. On the one hand, 5G NTN technology is suitable for emergency communications, transportation, mining, oil and gas, power grids, maritime and other industry scenarios, and on the other hand, 5G NTN technology is gradually expanding to the general consumer group with the help of technologies such as mobile phone direct connection to satellites, which not only increases the stickiness of existing users, but also improves the APRU value of users. The space-ground convergence network built based on 5G NTN technology supports the coordination of high, medium and low orbit satellite resources through the inter-satellite chain, and forms a network with the ground to serve handheld, shipborne, vehicle-mounted, and airborne user groups, as shown in Figure 1.

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PoC Milestones and Current Progress

Current →

Target →

PoC Milestone	Stages/Milestone description	Target Date	Additional Info
P.S	PoC project submission	09/2023	Presentation during #ENI 27
P.TP.1	PoC Test Plan 1	12/2023	Initial testbed up and running
P.D1	PoC Demo 1	12/2023	Webinar demo at the ENI#28 plenary meeting
P.D2	~~PoC Demo 2~~	~~06/2024~~	~~Demo at shanghai MWC2024~~
P.D3	PoC Demo 3	TBD	Demo at Intel AI summit
P.C1	PoC Expected Contribution 1	05/2024	Contributions to ENI use case
P.C2	PoC Expected Contribution 2	07/2024	Contributions to ENI requirement
P.C3	PoC Expected Contribution 4	07/2024	Contributions to ENI terminology
P.C4	PoC Expected Contribution 5	09/2024	Contributions to ENI data mechanism
P.R	PoC Report	09/2024	PoC-Project-End Feedback
P.E	PoC Project End	12/2024	Presented to ISG ENI for information