



ETSI Conference on
Non-Terrestrial Networks,
A Native Component of 6G

Ubiquitous 6G Service through Non-Terrestrial Networks

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NTN in 6G

- NTN should be part of 6G from Day 1.
- Based on principles of NTN in 5G-Advanced.
- Maximize similarity with 6G TN.



Use Cases

- Global coverage for search and rescue.
- Maritime coverage.
- Consumer handheld connectivity in remote areas.
- Service for cars, ships and planes.
- Backup for disaster relief.
- Global IoT coverage for full range of IoT devices.
- Solving the digital divide

Key components for 6G NTN

NTN support for all UE types

- From 6G LPWA to smartphone and CPE
- Extreme coverage for smartphones by falling back to 6G LPWA

Integrated Location Services

- 6G NTN to be independent from external GNSS

TN - NTN Interworking

- Seamless mobility between TN and NTN

Architecture

- Support for transparent and regenerative architectures.

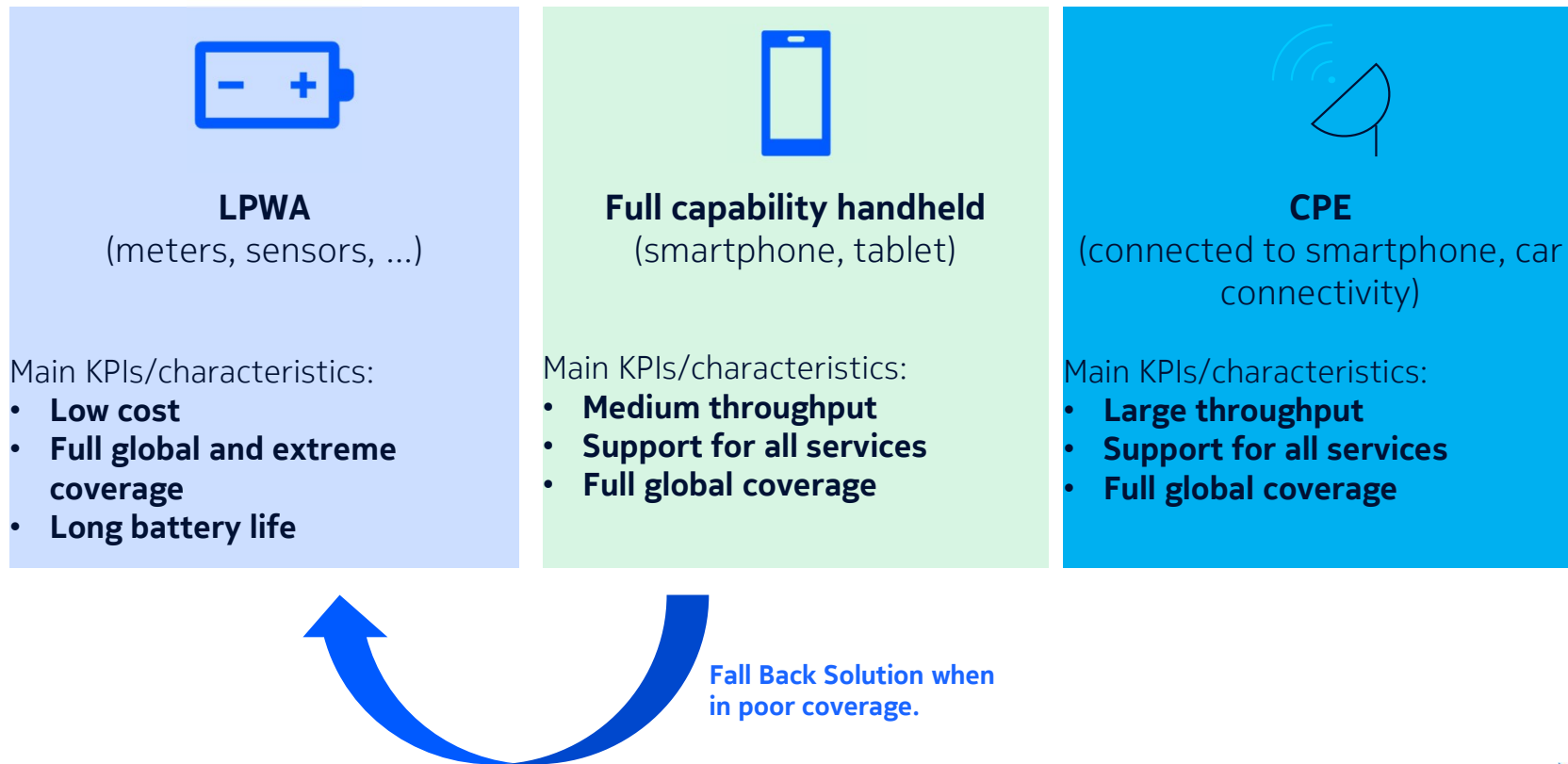
Multi Orbit support

- GEO – LEO – HAPS networks



6G NTN support for full range of UE types

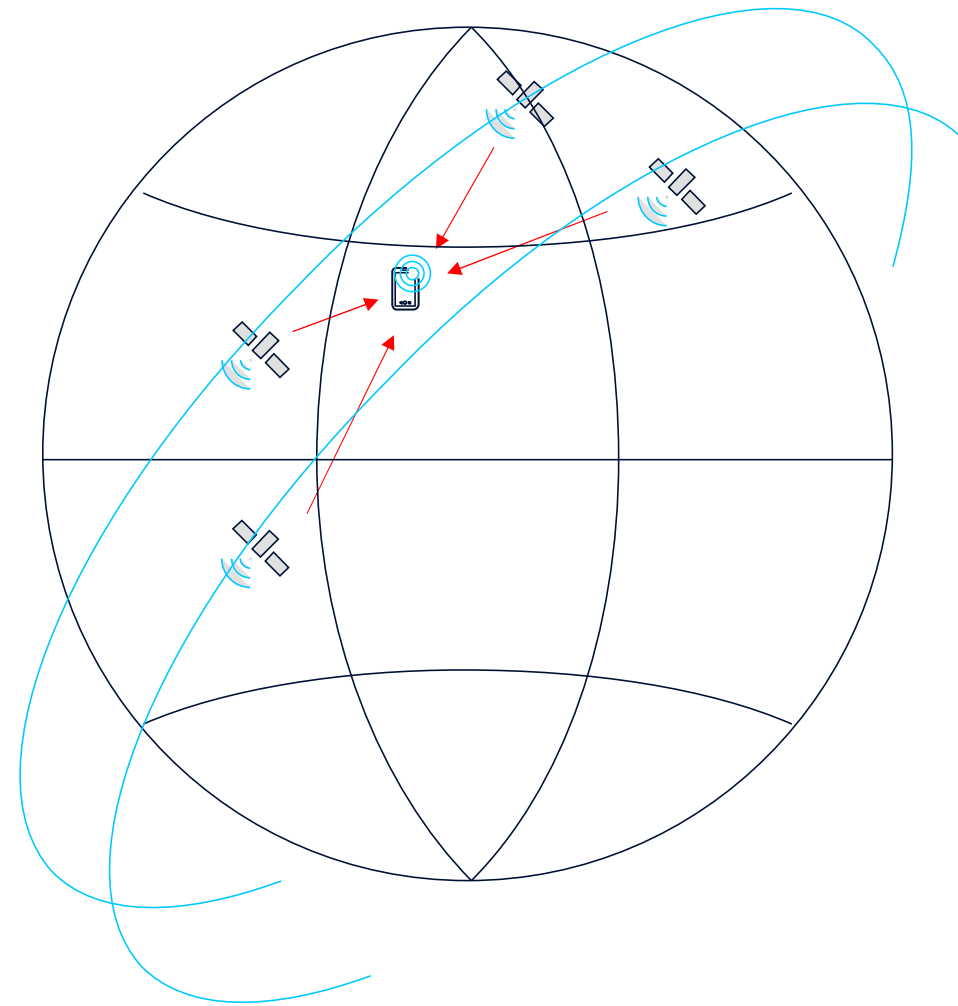
Examples



Integrated Location Services

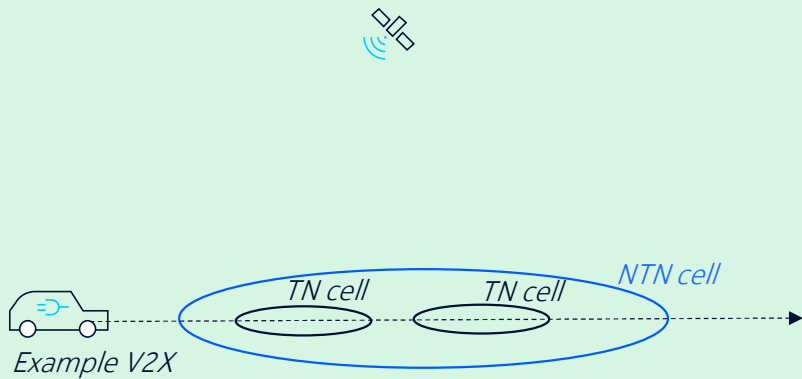
Use 6G NTN for positioning and initial access

- Synchronization based on 6G satellites.
- Advantages of independence from external GNSS are reduced cost, lower power consumption and potentially (light) indoor coverage.
- UE autonomous position determination based on network reference signals.
- Tradeoff between accuracy and initial access efficiency.



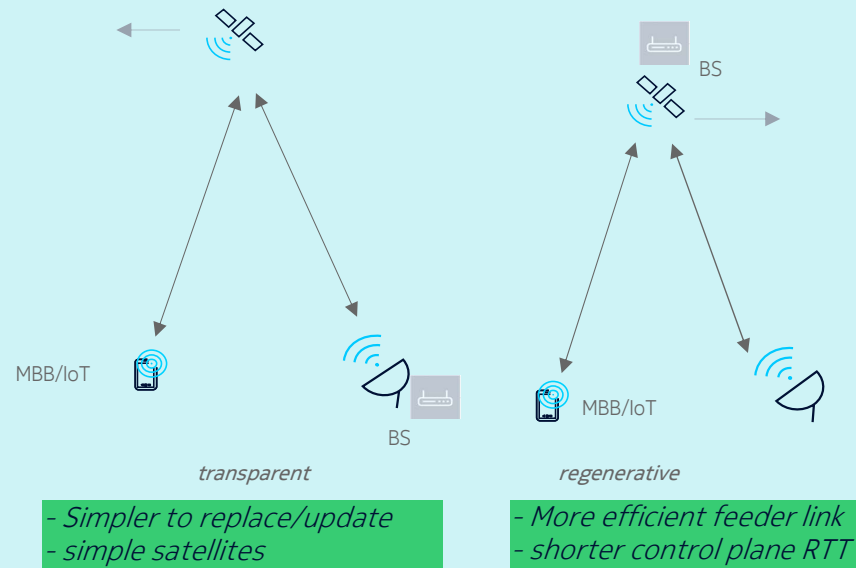
TN – NTN Interworking and Architectures

TN – NTN Interworking



- Seamless mobility through optimization of existing solutions (including cases with different CN for TN and NTN).

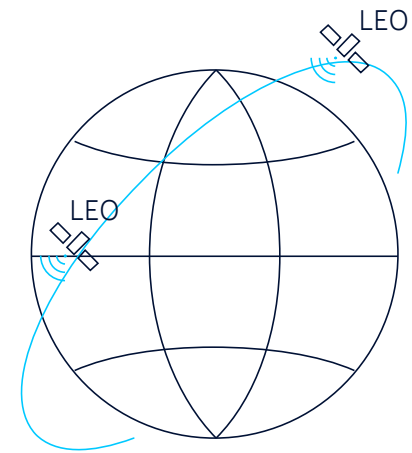
Architectures



- Support for transparent and regenerative architectures.

Multi Orbit Support

- Use advantages of different orbits and interworking between them.
 - For instance:
 - GEO: no movement relative to Earth, so fewer mobility events
 - LEO: better link budget and lower delay.
- Solutions enabling these benefits should be considered in 6G.



An aerial photograph of a coastal landscape. In the foreground, a sandy beach meets the turquoise ocean with white waves. A paved road runs along the coastline, curving through the landscape. The background features rolling hills and mountains under a clear sky, with a warm, golden light suggesting sunrise or sunset.

NTN in 6G:
Natively included for all device types
without dependence on external GNSS

NOKIA