SATELLITE BROADBAND – THE ROAD TO 6G

Daniele V. Finocchiaro, Ph.D
Head of Telecom R&D and Projects

O-RAN NTN Workshop
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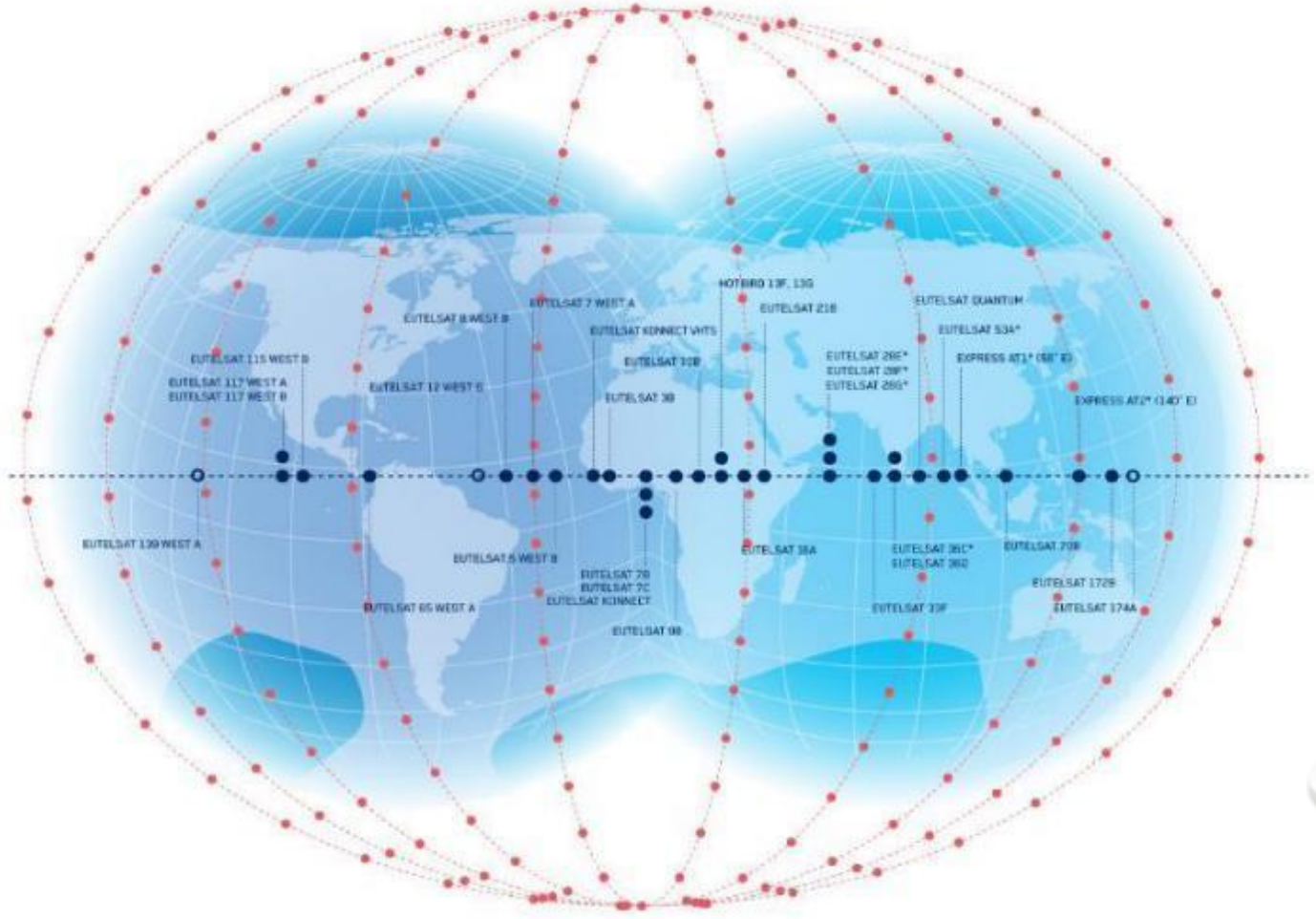
EUTELSAT – GEO/LEO global coverage for broadband connectivity in Ku/Ka bands



GEO fleet and LEO constellation in 2026

- 34 * GEO
- More than 600 * LEO

The road to 6G
Evolution in satellite communications

- From **telephony** to **TV broadcast**, to **connectivity**, to **broadband**
- From **fixed** services to **mobility**
- From **raw capacity** to **managed services**
- From **regional** to **global** service offers
- From **GEO** (1960+) to **LEO** (1998, 2019+)

- “New Space”
- Direct to device (“D2D”)

- From satcom standards (**DVB**) to **3GPP**

The road to 6G
Why a new standard?

- Distance: 500-36000km+
  - Delay
  - Limited power / SNIR
- Variable Doppler shift
- Specific frequencies
- Blockages

- Scale
- Interoperability (TN+NTN)

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5G/6G NTN

A giant leap for Sat-kind

ETSI 6G-NTN Conference, April 2024

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EUTELSAT activities on NTN

3GPP
A GLOBAL INITIATIVE

NTN-OneWeb trials

EUROPEAN PROTECTED WAVEFORM
EPW
EPW²
SECURE * AGILE * EFFICIENT * INTEROPERABLE

5G-Emerge

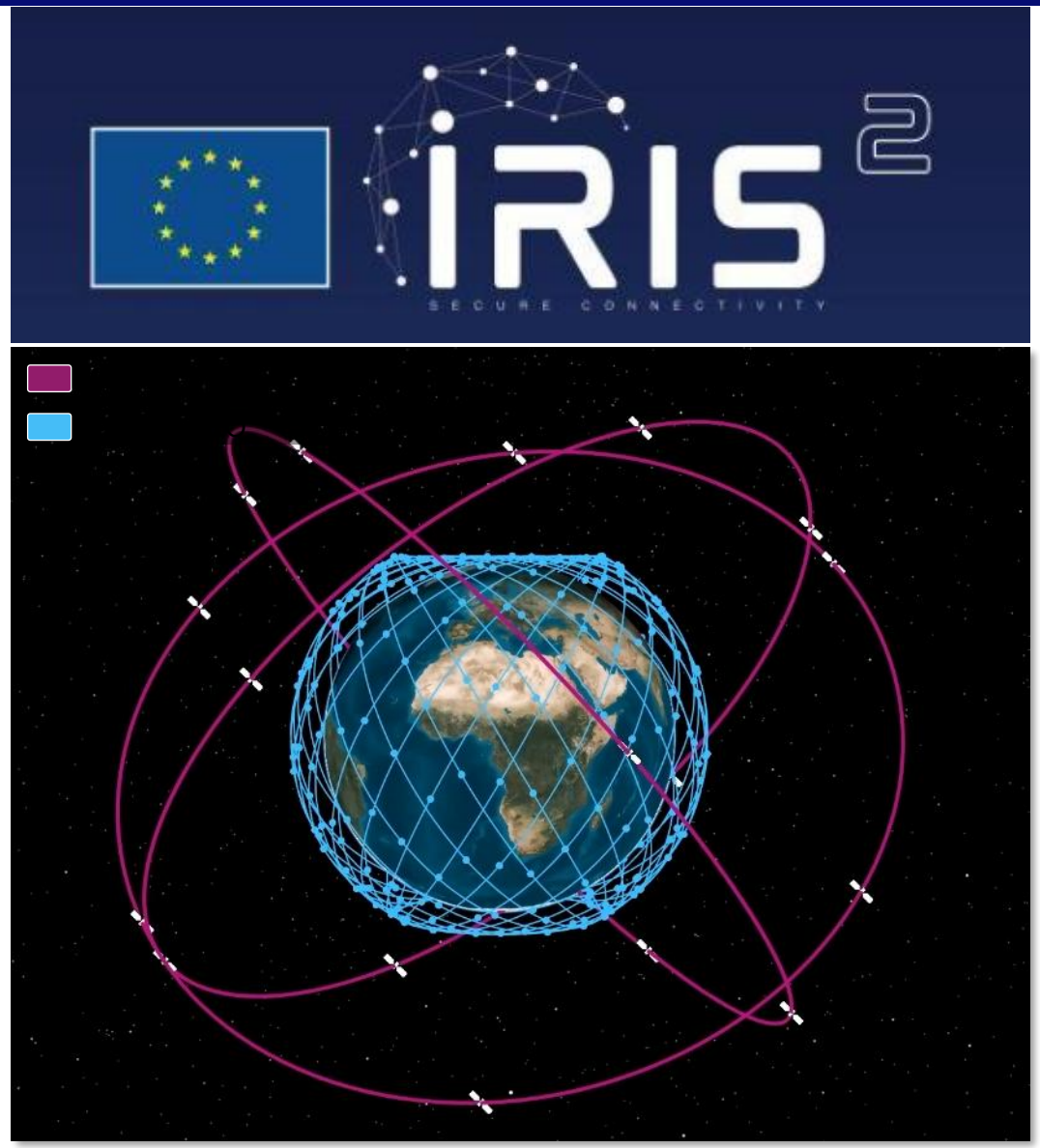
IRIS²
SECURE CONNECTIVITY

ETSI

6GNTN²
NEXUS

Airbus UpNext SpaceRAN demonstrator
5G connectivity beyond limits.

IRIS² - a 5G-based sovereign constellation



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SpaceRISE

Space Segment

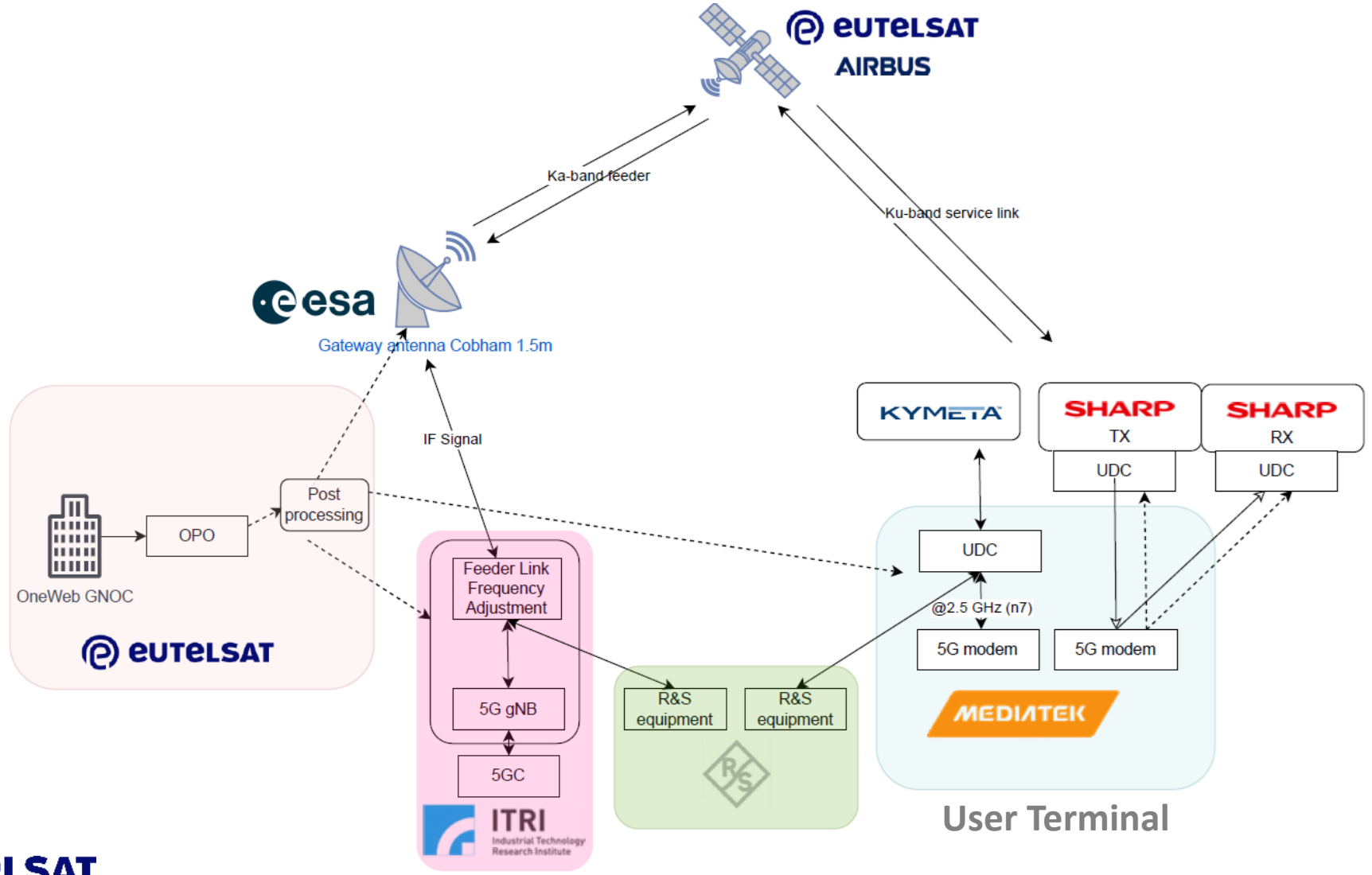
- **264** satellites in **High-LEO** (1200 km)
- **18** satellites in **MEO** (8000 km)
- **10** satellites in **Low-LEO** (≤ 750 km)

Connectivity

- **5G NR NTN air interface** and **5G Core Network**
- Use of **optical inter-satellite links**
- Support for **regenerative** and **transparent** modes
- Support for **star** and **mesh** network topologies

IRIS² or IRIS2 or IRISS?

5G NR-NTN OTA Demonstration over ONEWEB satellites



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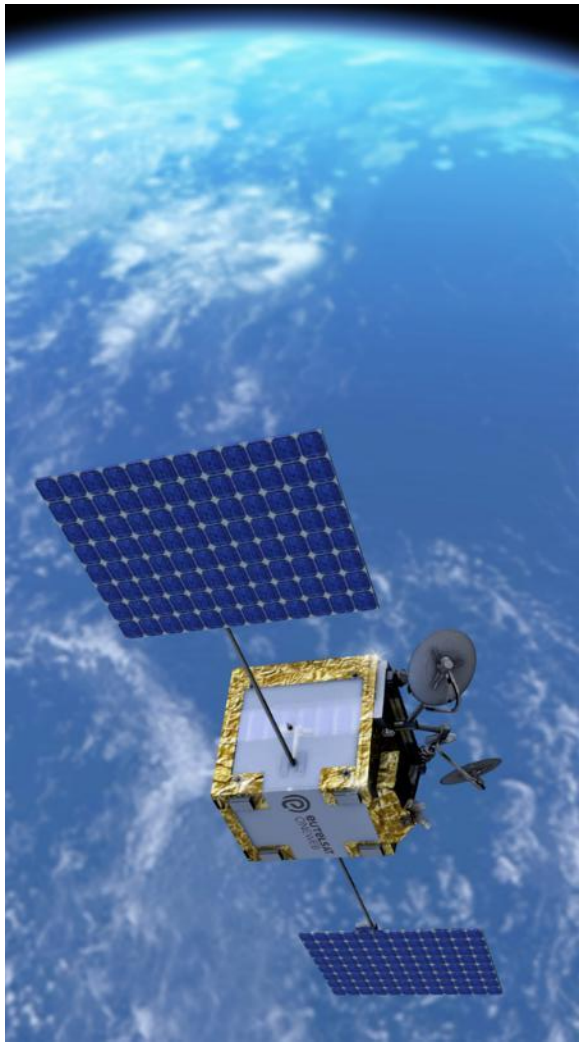
5G NR-NTN OTA Demonstration over ONEWEB satellites

CHALLENGES

- Prototype Chipset Rel19
- Commercial-grade gNB and User Antenna
- OneWeb satellites in Ka/Ku bands
- FR1 numerology (15kHz SCS)
- Feeder link frequency adjustment + Doppler compensation

RESULTS

- Different MCS up to 24 (64QAM)
- Inter-beam Conditional Handover
- Mobility
- 5MHz and 50MHz
- International collaboration



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Airbus UpNext SpaceRAN demonstrator

AIRBUS · EUTELSAT · Deutsche Telekom · ACCELERCOMM · Radisys · ITRI · KEYSIGHT TECHNOLOGIES · SENER · AALYRIA · ST Engineering · viavi · CESIUM ASTRO

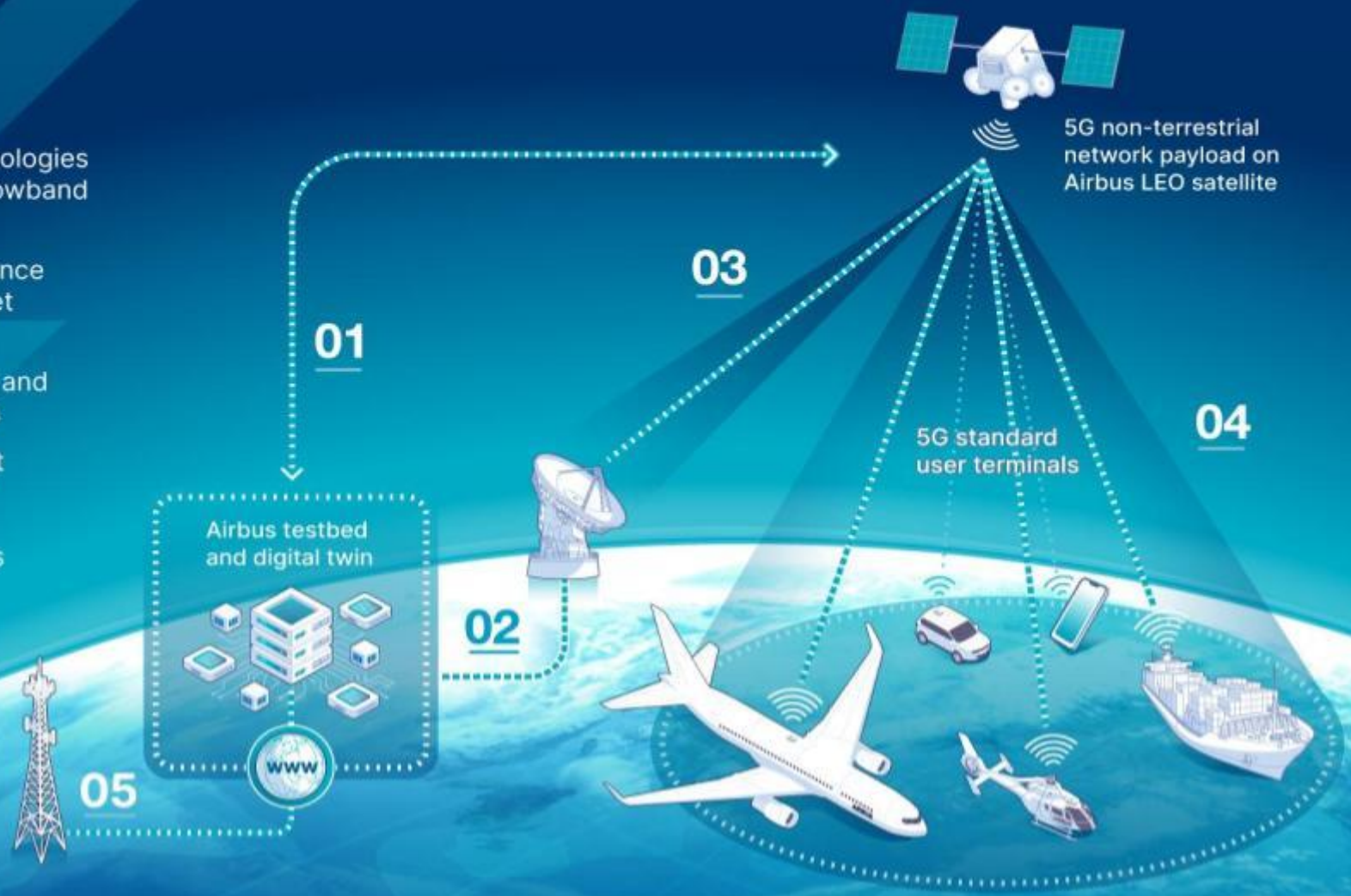
5G connectivity beyond limits.

Ambition

Explore

- 5G non-terrestrial technologies for broadband and narrowband applications
- seamless high performance connectivity to all market segments
- integration of terrestrial and non-terrestrial networks

To foster the development of global, standard and interoperable solutions enabling sovereign access to connectivity.



01 Software defined payload configuration

02 Ground segment configuration

03 Feeder link connectivity

04 User Link connectivity

05 Terrestrial mobile and Internet connectivity

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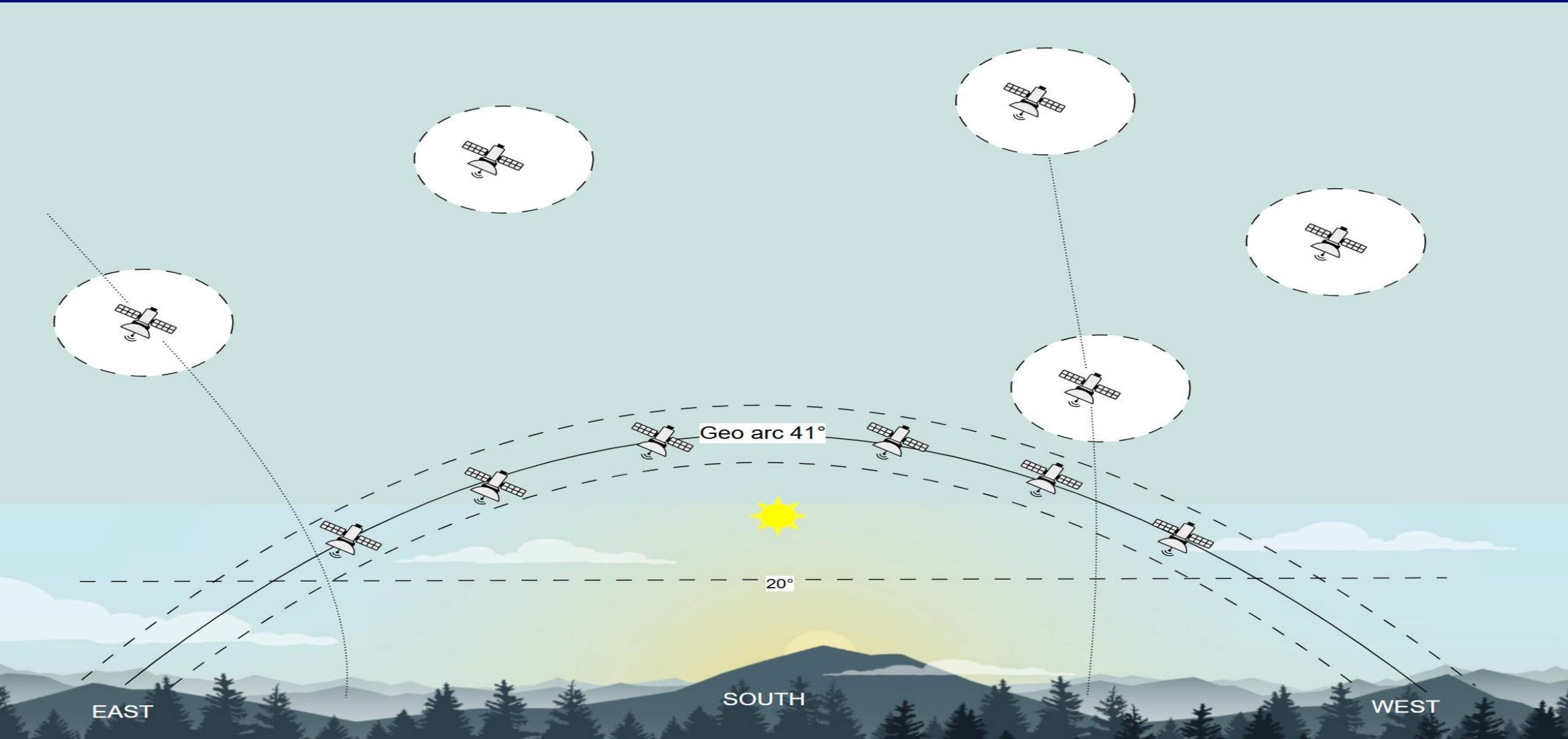
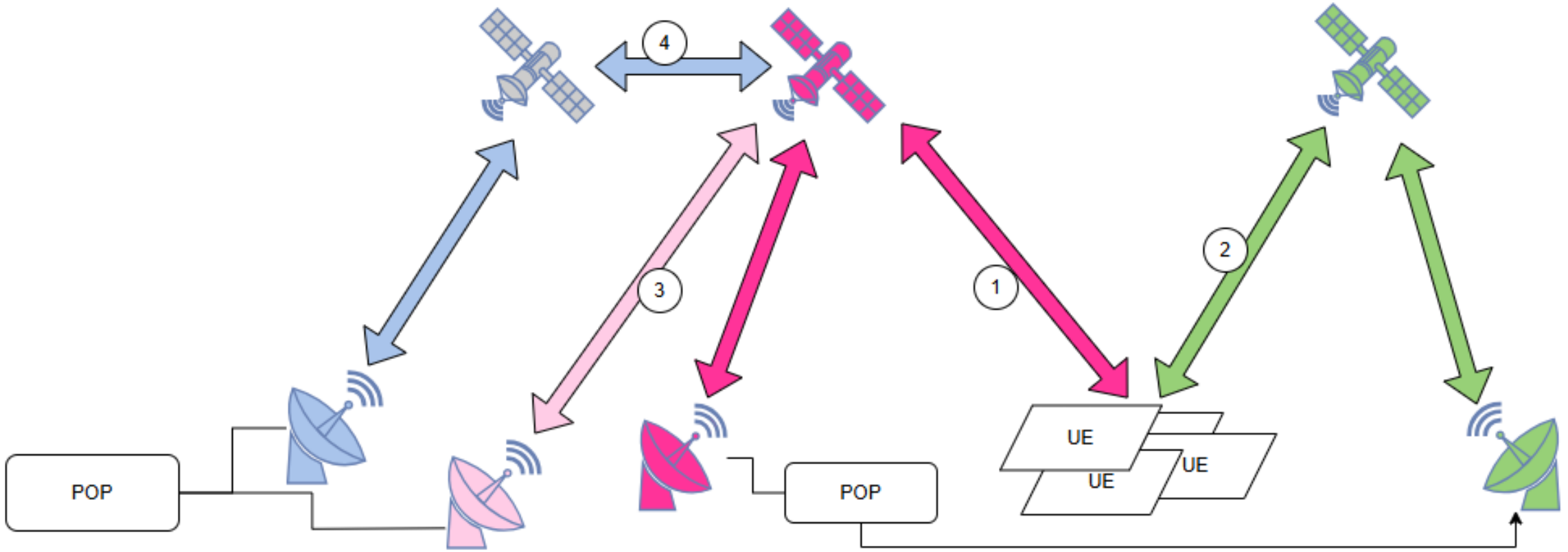
AIRBUS

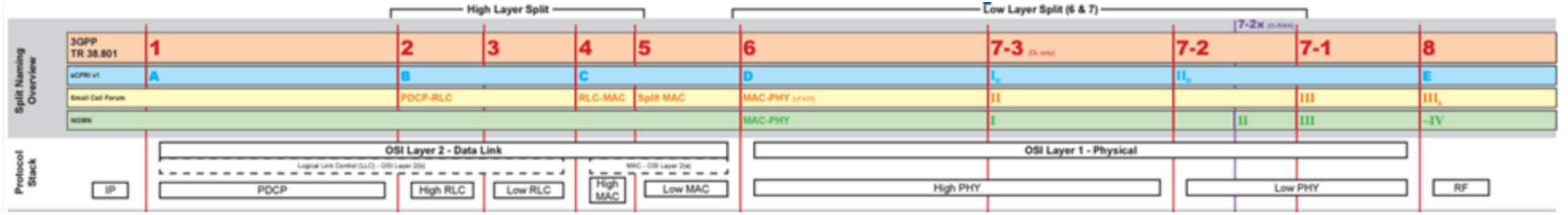
ITU Radio Regulation, filings, and handovers



NTN Handover scenarios

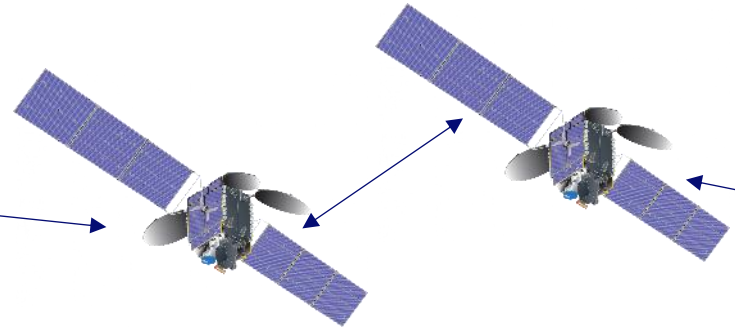


NTN RAN network architectures and “splits”



POP

Gateway



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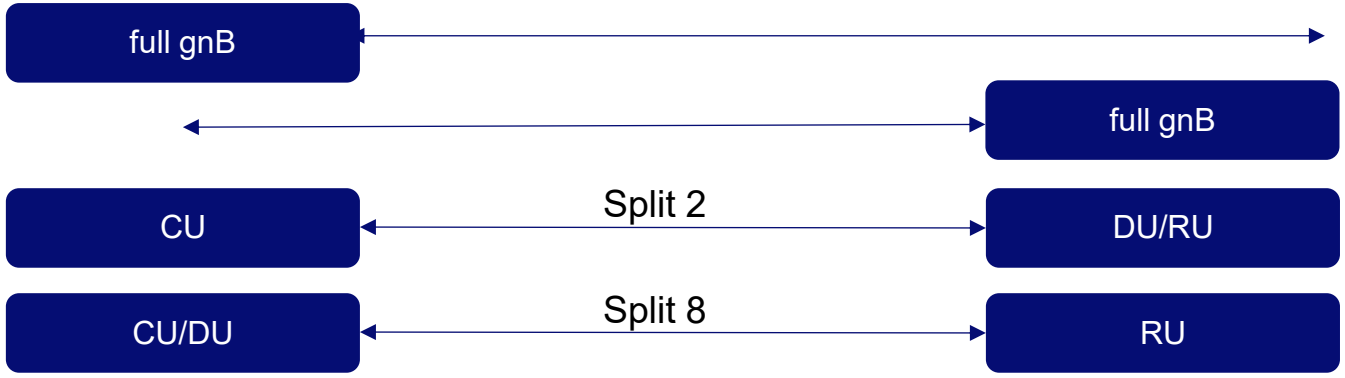

NTN: The road to 6G Recommendations

- NTN in 6G from day one
- Evolution, not revolution
- Improved coverage (link budget)
- Resiliency (GNSS-free, jamming resistance)
- Better efficiency
- Interoperability
- Sovereignty

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Thanks!

dfinocchiaro@eutelsat.com