Satellite Integration with 5G and Edge Computing

SES
beyond frontiers

iDirect

ST Engineering

PRESENTED BY

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Acknowledgement

The presented work has been conducted as part of the following projects:

Presentation Aim & Outline

Aim:

▲ Present the satellite integration with 5G and edge computing and its successful live over-the-air demonstrations conducted in several events

Outline:

▲ Satellite Integration into 3GPP Network Architecture

▲ Satellite 5G Integration Over-the-Air Demo Tests

▲ Conclusion

Satellite Integration into 3GPP Network Architecture

Satellite Network Integration into 5G
5G Access Agnostic
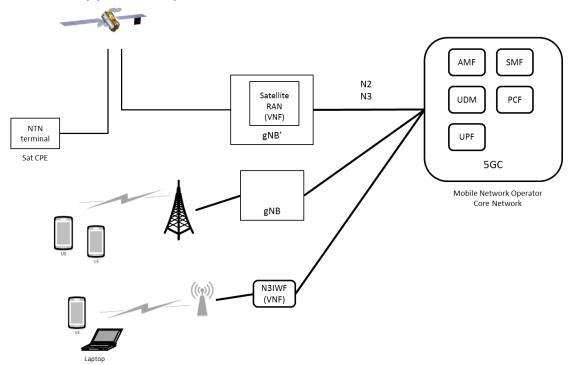
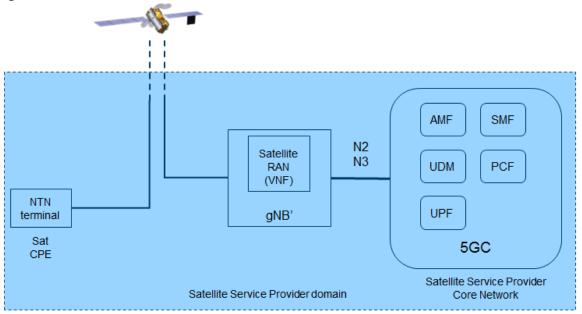▲ 5G core network will support multiple access networks

Satellite Network Integration into 5G
5G Network Integration

▲ Satellite service provider provides and manages service using 5G core network
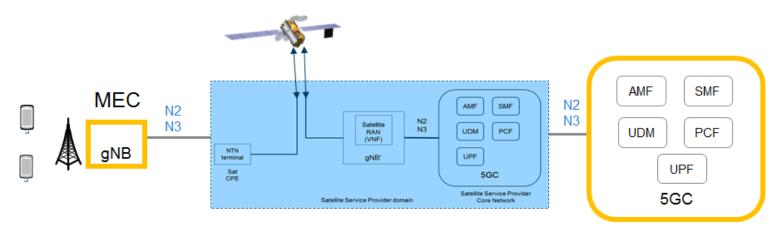
▲ Satellite RAN aligned to 5G
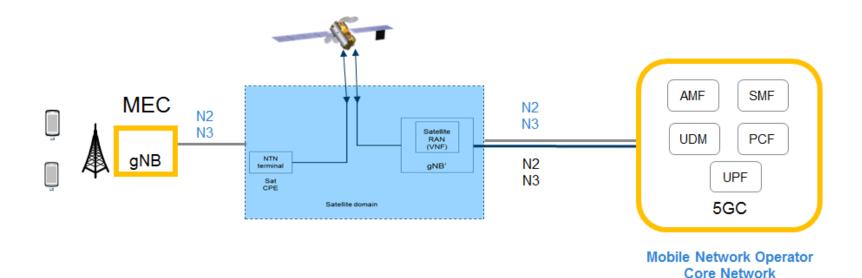
Satellite Network Integration into 5G
Satellite & Mobile Domains
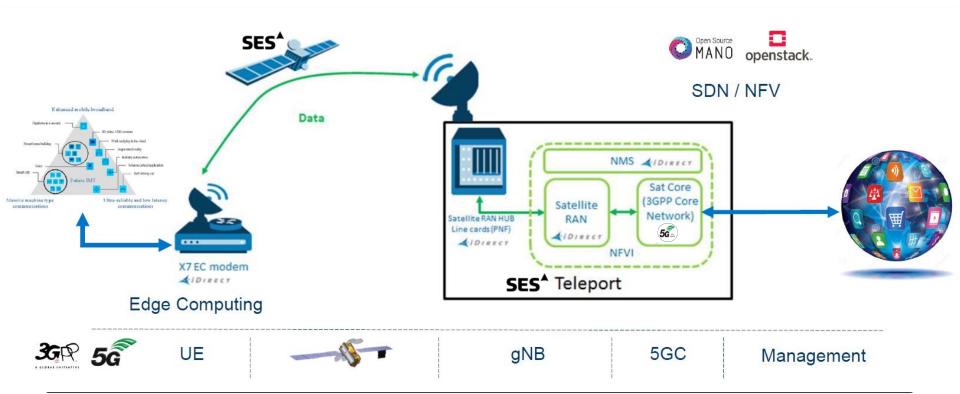
Satellite Integration into 3GPP Network Architecture
Satellite Architecture
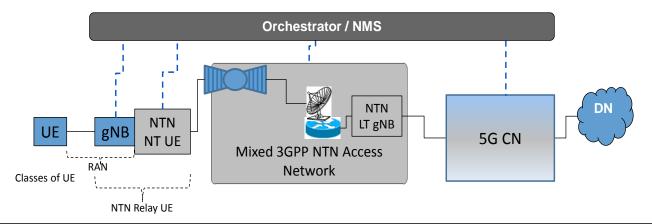
Satellite Integration into 3GPP Network Architecture
ETSI-compliant Architecture Concept

ETSI

▲ **ETSI TR 103 611** - Satellite Earth Stations and Systems (SES); Seamless integration of satellite and/or HAPS (High Altitude Platform Station) systems into 5G system and related architecture options," 2019.

  • **Scenario A3 - Indirect Mixed 3GPP Non Terrestrial Network (NTN) Access with Bent-Pipe Payload**

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5G Milestone Over-the-Air Tests Showcasing Satellite's Strategic Role in 5G

Successful Live Over-The-Air Demos in 2018 Validating Key Technologies for Satellite Integration into 5G

Demonstrated key benefits of satellite backhaul integration into standard 3GPP core network architecture using SDN/NFV/MEC-enabled 5G testbed as proof-of-concept for satellite integration into 5G
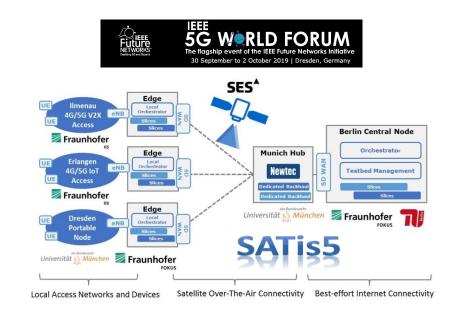
Successful Live Over-The-Air Demos in 2019 Validating Key Technologies for Satellite Integration into 5G

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Satellite 5G Integration
1st Proof Point @ EuCNC 2018 Demo, Jun'18

- ▲ **First-of-its-kind over-the-air live demo towards satellite integration into 5G**

- ▲ Satellite integration into standard 3GPP network architecture

- ▲ SDN and NFV integration into satellite communications

- ▲ Efficient edge content delivery over satellite

- ▲ Multi-access Edge Computing (MEC)

Satellite 5G Integration
2nd Proof Point @ Berlin5GWeek (FUSECO) 2018 Demo, Nov'18

- ▲ Satellite integration into standard 3GPP network architecture

- ▲ SDN and NFV integration into satellite communications

- ▲ Network Slicing of eMBB and mMTC (mIoT) Use Cases over Satellite

- ▲ Multi-access Edge Computing (MEC)

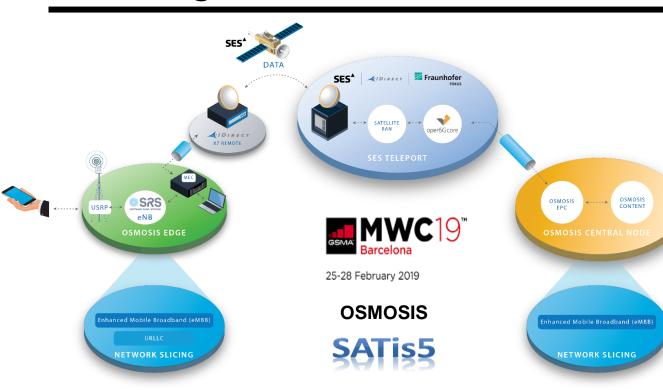# Satellite 5G Integration
3rd Proof Point @ MWC 2019 Demo, Feb'19

- ▲ Satellite integration into latest 3GPP Rel'15 compliant 5G Core Network

- ▲ SDN, NFV and MEC technologies integration into satellite communications

- ▲ eMBB and URLLC network slicing use cases over satellite

- ▲ Efficient multi-access content delivery and edge caching over satellite

- ▲ ABR streaming and CDN integration

Satellite 5G Integration
4th Proof Point @ IEEE 5G World Forum, Sept-Oct.'19

Demo Key Features:

▲ Edge-Central 5GC functionality split
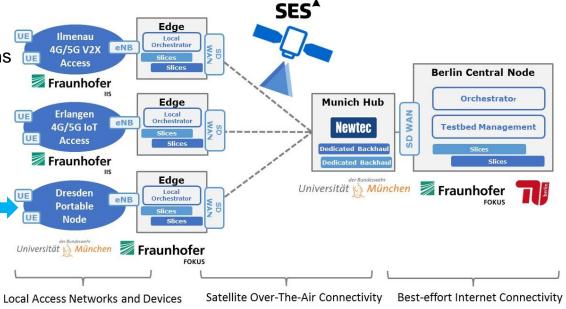
▲ NB-IoT applications

▲ Comms on the Move applications

▲ Multiple sites interconnection

▲ GEO satellite backhauling

Live Exhibition

Local Access Networks and Devices Satellite Over-The-Air Connectivity Best-effort Internet Connectivity

Satellite 5G Integration
5th Proof Point @ FOKUS FUSECO Forum 2019 Demo, Nov'19

- ▲ Satellite is now an integrated part of the 5G system

- ▲ Providing large benefits for multimedia and IoT use cases

- ▲ Enabling very high flexibility with NFV and MEC

- ▲ Providing management for on-premises deployments

Conclusion

Key Takeaways

▲ Satellite can deliver secured high bandwidth and ubiquitous coverage for many use cases, accelerating 5G roll-out

▲ Satellite industry is investing in global network infrastructure which can be used to support 5G roll-out worldwide

▲ Operational plug & play integration of satellite backhauling into 5G with focus on higher layer enablers (SDN, NFV, Network Slicing, MEC) is possible in short/mid-term

▲ Several successful live over-the-air demonstrations validating key technologies for satellite integration into 5G

• Seamless operation of satellite network as standard 3GPP 5G cellular access network

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THANK YOU !

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