

3GPP RAN Rel-19 Workshop

RWS-230172

June 15th-16th, 2023, Taipei, Taiwan

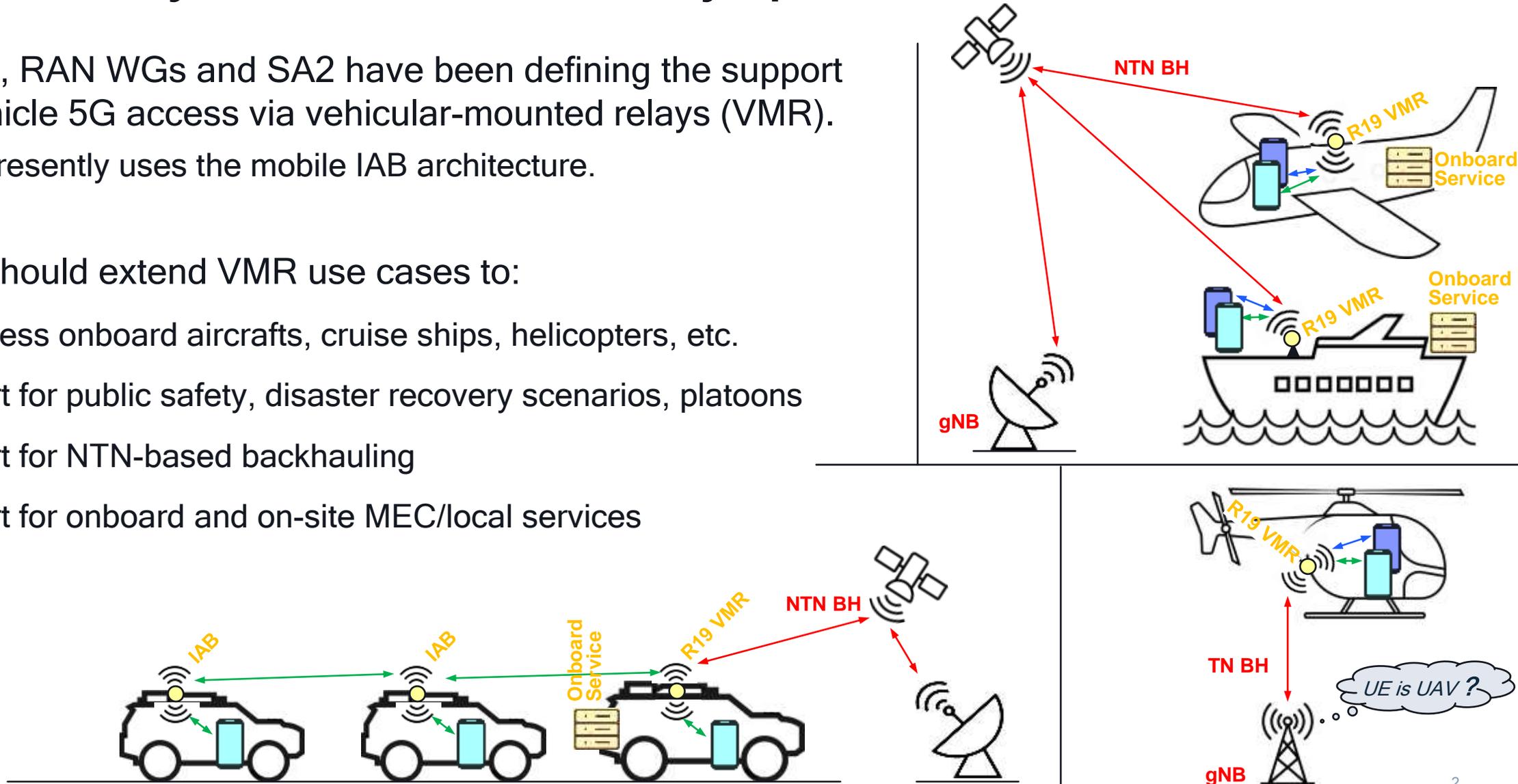
Agenda Item: 5

Wireless Access Backhaul

Qualcomm Incorporated

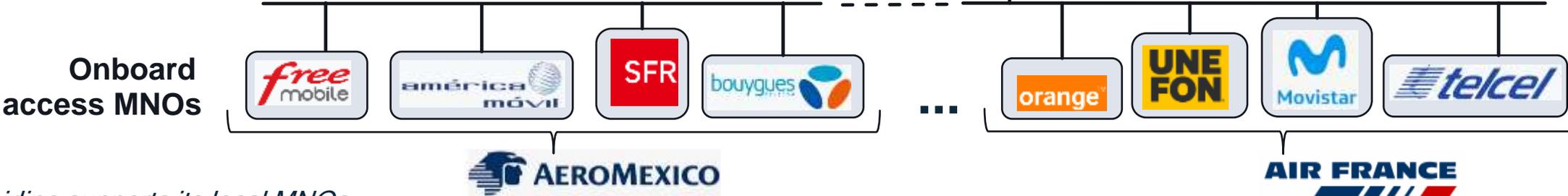
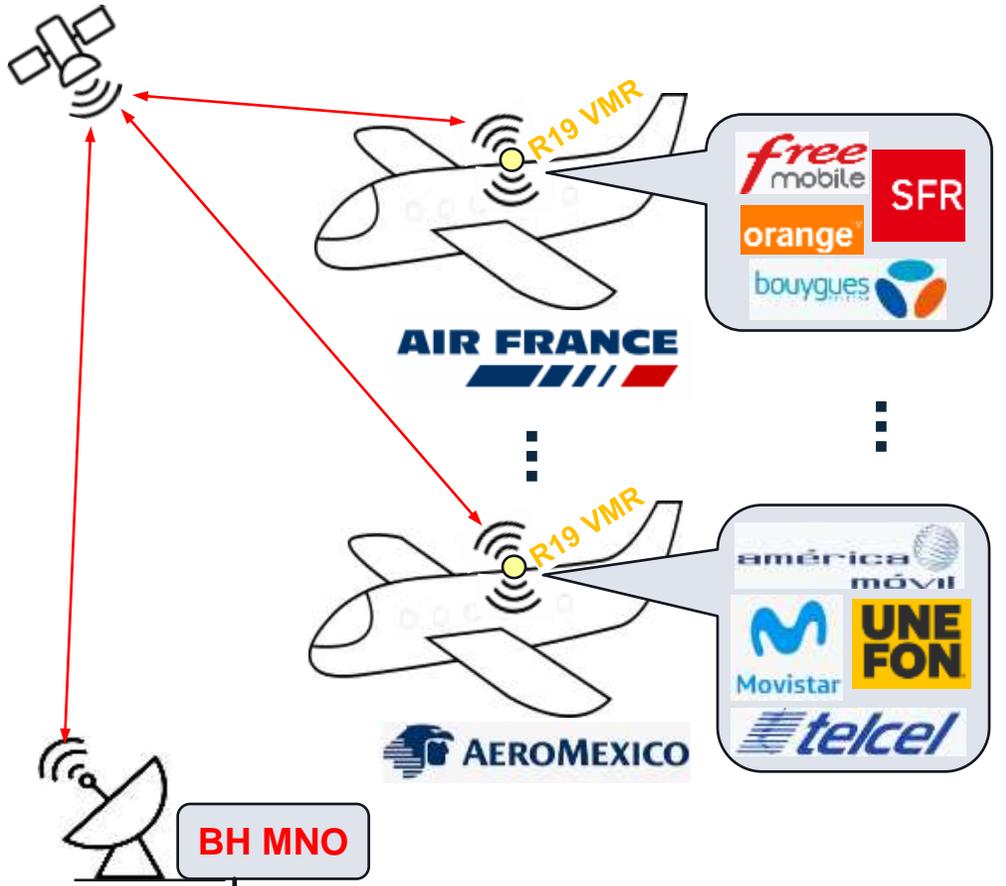
VMR extension to aircrafts, cruise ships, helicopters, public safety, disaster recovery, platoons, etc.

- In Rel18, RAN WGs and SA2 have been defining the support of in-vehicle 5G access via vehicular-mounted relays (VMR).
 - VMR presently uses the mobile IAB architecture.
- Rel-19 should extend VMR use cases to:
 - 5G access onboard aircrafts, cruise ships, helicopters, etc.
 - Support for public safety, disaster recovery scenarios, platoons
 - Support for NTN-based backhauling
 - Support for onboard and on-site MEC/local services



Rel-19 VMR: Gap analysis over Rel-18 mobile IAB

- MEC and onboard services require onboard gNB + UPF
 - Not compliant with present mobile IAB architecture.
 - Mobile IAB cannot support the necessary IP address continuity for backhauling of N2, N3, and N4.
- Backhaul MNO needs to be able to support multiple and potentially different access MNOs for each transport association
 - Mobile IAB would require explicit RAN-sharing between the BH MNO and all onboard MNOs.
 - Does not scale for commercial transport scenarios, e.g., airlines.
- UE onboard of helicopter needs to be recognized as UAV
 - Presently, not supported by mobile IAB



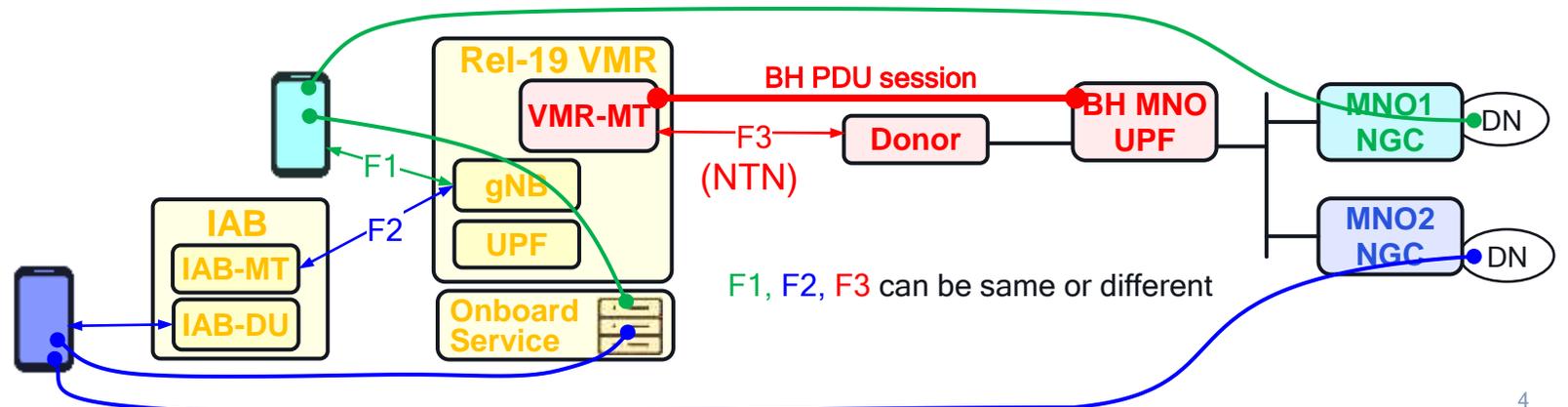
*Example: Each airline supports its local MNOs.
 For mobile IAB, explicit RAN sharing would be needed between all of these access MNOs and each BH MNO.*

Rel-19 VMR: Enhancements mostly on Stage 2

- Support of full gNB/UPF functionality on Rel-19 VMR node for MEC and local services. } *Can be supported by implementation*
- Backhauling enhancements:
 - IP address continuity for backhauling of N2, N3, N4.
 - Backhauling of access MNO traffic without need for RAN sharing with BH MNO(s).
 } *Can leverage PDU session for backhauling*
- NTN-backhauling and NTN-to-TN migration for backhaul } *Can leverage existing NTN functionality defined for access*
- Recognition of onboard UEs as UAVs (helicopter use case) } *Based on implementation if UE's gNB itself is onboard*
- Enhancements due to mobility of access node
 - TAC change, PCI collision avoidance, etc.
 - In-band operation of access and backhaul
 } *Can leverage functionality developed for mobile IAB*

Example: Rel-19 VMR including gNB/UPF for onboard service, backhauling over PDU session, and NTN backhauling

In this example, the gNB also has IAB-donor functionality to support for hops



Rel-19 VMR: Enhancements potentially on Stage 2 & 3

- Authorization of Rel-19 VMR node by CN
- Enhancements to RAN to support moving gNB
 - Support for dynamic neighbor relations between RAN nodes for support of Xn functionality and SON.
 - Support for dynamic associations between LMF and moving RAN nodes.
- Consideration of Femto-GW function for VMR nodes to allow a large number of VMR nodes to connect to the same AMF.
- Effort can be addressed via WI, mostly confined to RAN3, and requires collaboration with SA2.



Thank you

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