

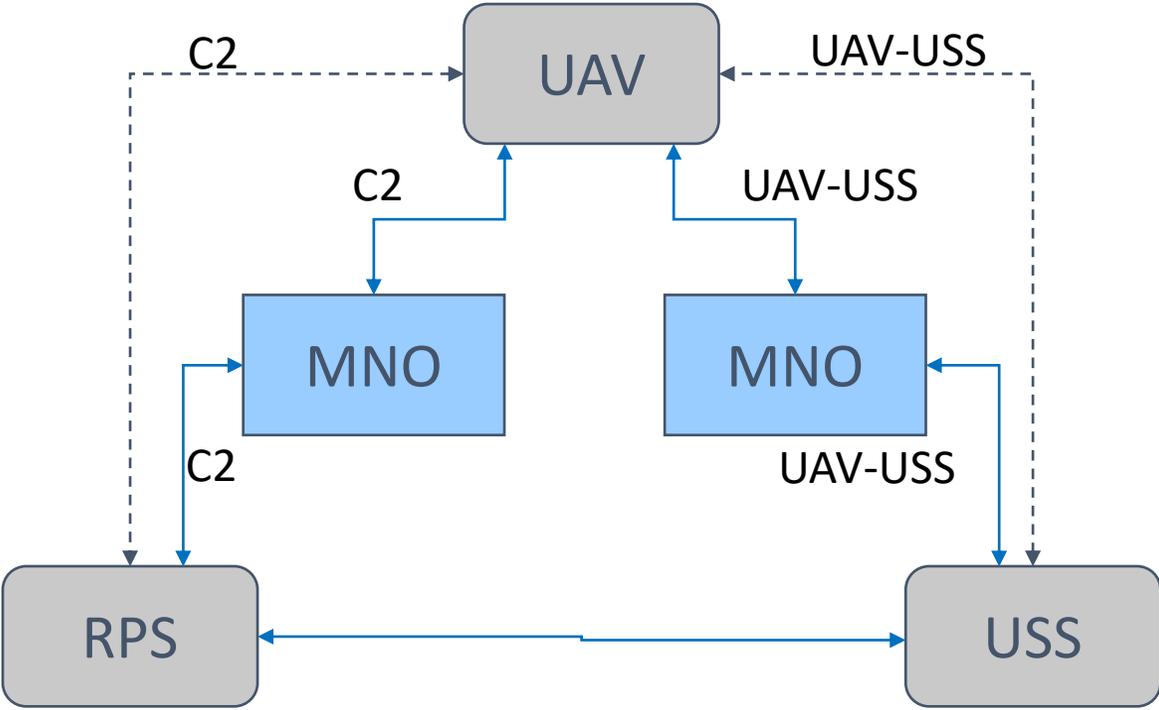
Multi-Network support for UAVs

AI 4: New proposals (for Rel-19)

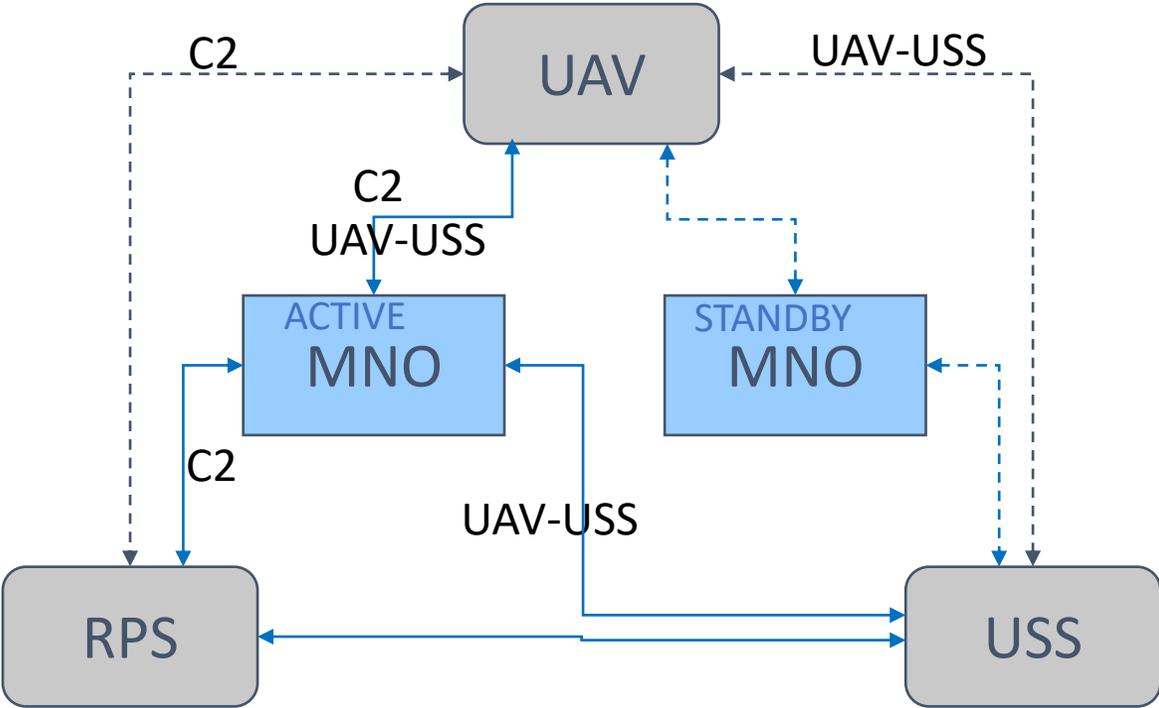
Multi-Network support for UAV : Scenarios

Two main models are being considered by the aviation industry (e.g. ACJA):

RPS: Remote Pilot Station
USS: UAS Serv. Supplier



Multiple PLMNs for differentiated traffic



Multiple PLMNs for reliability/fallback

Reliability of C2 is considered of the utmost importance, and considering network load conditions and network coverage, regulations are considering the simultaneous support of connectivity to multiple PLMNs

Multi-Network support for UAV : Assumptions

- UAV has dual subscription (dual SIM)
 - Note: may be from same MNO that has multiple PLMNs
- UAV is registered and connected on two PLMNs at the same time
 - Any UAV application may be transported over any of the active PLMNs at any time
- Reliability/fallback scenario
 - UAV traffic is active on one PLMN at a time
 - Which PLMN to use maybe based on specific conditions and policies
- Differentiated traffic scenario
 - UAV traffic is active on both PLMNs
 - Which PLMN to use, for which traffic, maybe based on specific conditions and policies

Gaps vs existing requirements

- There are no service requirements in 22.125 about UAS multi-NW/PLMN support.
- Other requirements (e.g. from 22.261) **do not** cover the proposed UAV-specific scenarios and functionalities



6.18 Multi-network connectivity and service delivery across operators

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6.18.2 Requirements

The 5G system shall enable users to obtain services from more than one network simultaneously on an on-demand basis.

For a user with a single operator subscription, the use of multiple serving networks operated by different operators shall be under the control of the home operator.

When a service is offered by multiple operators, the 5G system shall be able to maintain service continuity with minimum service interruption when the serving network is changed to a different serving network operated by a different operator.

NOTE 1: A business agreement is required between the network operators.

In the event of the same service being offered by multiple operators, unless directed by the home operator's network, the UE shall be prioritized to receive subscribed services from the home operator's network.

NOTE 2: If the service is unavailable (e.g. due to lack of network coverage) from the home operator's network, the UE may be able to receive the service from another operator's network.

NOTE 3: QoS provided by the partner operator's network for the same service will be based on the agreement between the two operators and could be different than that provided by the home operator's network.

There are only very few and basic reqs on simultaneous services over multiple PLMNs.

There are not reqs on specific UAV traffic differentiation or steering scenarios (prev. slides), and potential new 5GS functionalities, e.g.

- Selection / fallback (among PLMNs) considering UAV-traffic policies or other conditions
- 5GS mechanisms to configure, control and expose those policies

SA1 Proposal

It is proposed to study use cases and requirements on UAV multi-network scenarios, in particular by **including the following objective as part of the Rel-19 SID on UAS-ph3:**

- *Improve support for redundancy or reliability of UAV operation, e.g. using multi-network connectivity for critical (C2) traffic.*
 - *NOTE: this objective should include, and depend on, an initial analysis on whether existing service requirements (e.g. from 22.261 sec .6.18) can fulfil target UAV-specific use cases, or not.*