**3GPP TSG-SA WG6 Meeting #48-e S6-220516r2**

**e-meeting, 5th – 14th April 2022 (revision of S6-21xxxx)**

**Source: InterDigital**

**Title: Evaluation of Solution #1**

**Document for: Approval**

**Agenda Item: 9.9**

This is an evaluation of Solution #1 for Key Issue #2, Change of USS during flight.

Solution #1, with the additions in S6-220509, is in our view now complete. Note that change of DN/EDN to avoid disruption while in flight due to change of USS is not covered by this solution.

The Key issue #2 “Support for multi-USS deployments” states:

*In the current version of 3GPP TS 23.255 [3], it is assumed that the UE communicate with a single USS/UTM during a flight. However, it is not unlikely that a single flight can span the service area of more than one USS/UTM.*

*In some scenarios, a UAS can be served by more than one USS, or by more USSs in a USS network. A USS network can be considered a set of connected USSs for exchanging information and sharing relevant details to ensure shared situational awareness for UTM participants. USSs could have several geographic areas and times for which they are providing services.*

*It must be secured that change of USS/UTM during an ongoing session (flight) is supported by the UAE layer. In multi-USS scenarios, each USS can also be located in different clouds and potentially deployed at the edge.*

*Solutions for UAE layer support for UAS operation in multi-USS deployments must be coordinated with the work outlined by 3GPP TR 23.700-58 [6].*

*The key issue will investigate:*

*a) Whether and how the UAE layer can be enhanced to support change of USS/UTM during flight.*

*b) Whether and how the UAE layer needs to be enhanced to assist the traffic steering of UAS application traffic to different DN/EDN to avoid application service disruption while in-flight.*

*NOTE: Liability/legal responsibility for UAV operation stays with UTM/UAS operator.*

As this solution on change of USS is on the UAE-layer only, and aspects on change of PLMN and/or change of DN/EDN are not covered, we do not consider that this solution need to be communicated to and coordinated with SA2.

The below text is proposed incorporated into TR 23.700-55 v 0.3.0.n.

\* \* \* \* Start of changes \* \* \* \*

### 7.3.3 Solution evaluation

Key Issue #2 outlines the following to be investigated further with respect to the impact on the application layer functional model for UAS:

a) Whether and how the UAE layer can be enhanced to support change of USS/UTM during flight.

b) Whether and how the UAE layer needs to be enhanced to assist the traffic steering of UAS application traffic to different DN/EDN to avoid application service disruption while in-flight.

This solution fully addresses the bullet a) in Key Issue #2:

A summary of the UAE layer capabilities are:

1) UAE server and UAE client provide support for application specific layer message exchanges related to change of USS/UTM during flight.

2) UAE client change USS/UTM during flight as per Multi-USS configuration parameters.

NOTE: Change of DN/EDN to avoid disruption while in flight due to change of USS is not covered by this solution.

The solution enables the USS/UTM to take or give back control of the change of USS/UTM from/to the UAE server and/or the UAE client at any time.

\* \* \* \* Next change \* \* \* \*

### 9.2.1 General

All the key issues, solutions and architecture enhancements specified in this technical report are listed in Table 9.2.1-1.

Table 9.2.1-1 provides a mapping of the key issues to the related solutions. It also indicates whether the solution requires enhancement to the Release-17 architecture and lists the dependencies on other working groups.

Table 9.2.1-1 Key issue and solutions

| Key issues (evaluation clause reference) | Solution | Architectural enhancement  (clause reference) | Enhancements required | Dependency on other working groups | |
| --- | --- | --- | --- | --- | --- |
| KI #1 Direct communication between UAVs |  |  |  | SA2 | |
| KI #2: Support for multi-USS deployments | Solution #1: Change of USS during flight NOTE 1 | 7.3 | None |  | |
| KI 3: Coordination between Uu and PC5 for direct UAV-to-UAV or UAV-to-UAV-C communication |  |  |  | SA2 | |
| *KI#1: <title>* | *Solution #x: <title>* | *6.x* | *Architecture / None* | *<WG>* | |
| *Solution #y: <title>* | *6.y* | *Architecture / None* | *<WG>* | |
| NOTE 1: Change of DN/EDN to avoid disruption while in flight due to change of USS is not covered by this solution. | | | | |

\* \* \* \* End of changes \* \* \* \*