**3GPP TSG-CT WG1 Meeting #133-eC1-21XXXX**

**E-Meeting, 11th – 19th November 2021** *Revision of C1-216573*

**3GPP TSG-CT WG3 Meeting #119-eC3-216027\_r1**

**E-Meeting, 11th – 19th November 2021** *revision of C3-215170*

(revision of CP-211330)

**Source: Huawei, HiSilicon**

**Title: Revised WID on CT Aspects of Application Layer Support for Uncrewed Aerial Systems (UAS)**

**Document for: Approval**

**Agenda Item: 17.1.1**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

# Title: CT Aspects of Application Layer Support for Uncrewed Aerial Systems (UAS)

## Acronym: UASAPP

## Unique identifier: 920004

Potential target Release: Rel-17

## 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Affects:** | UICC apps | ME | AN | CN | Others (specify) |
| **Yes** |  | X |  | X |  |
| **No** |  |  | X |  |  |
| **Don't know** | X |  |  |  | X |

## 2 Classification of the Work Item and linked work items

### 2.1 Primary classification

|  |  |
| --- | --- |
|  | Feature |
| X | Building Block |
|  | *Work Task* |
|  | Study Item |

### 2.2 Parent Work Item

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| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| FS\_UASAPP | SA6 | 820026 | Study on application layer support for Uncrewed Aerial System (UAS) |
| UASAPP | SA6 | 900025 | Application layer support for Uncrewed Aerial System (UAS) |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work Items (if any) |
| Unique ID | Title | Nature of relationship |
| 810049 | Remote Identification of Uncrewed Aerial Systems | Stage 1 requirements |
| 900014 | Support of Uncrewed Aerial Systems Connectivity, Identification, and Tracking  | Stage 2 work for 3GPP CN enhancements for supporting UAS |
| 900024 | Enhanced Service Enabler Architecture Layer for Verticals  | Stage 2 work for SEAL enhancements for supporting UAS |

## 3 Justification

TSG SA approved a work item on Application layer support for Uncrewed Aerial System (UAS) (UASAPP) in Rel-17 in SP-200988. A number of impacts on UE, core network (5GC and EPC) and associated protocols for the support of UASAPP have been identified and specified in 3GPP TS 23.255.

As the above work impacts CT WGs, a new work item hence needs to be established to specify the stage 3 aspects of Application layer support for Uncrewed Aerial System (UAS) in Rel-17 in order to implement these stage 2 requirements.

## 4 Objective

The objective of the work is to specify the CT aspects and update the CT WGs specifications to support the stage 2 requirements on Application layer support for Uncrewed Aerial System (UAS) defined in 3GPP TS 23.255.

The following areas of work are expected to be covered. They may of course be adjusted according to the final conclusions of the stage 2 normative work and associated requirements. The stage 3 work shall be started only after the applicable normative stage-2 requirements are available.

**CT1:**

- Uc: Protocol definition of the interface between the UAE client and the UAS application specific client (e.g. C2 communication modes, negotiation of redundant C2 communication modes).

- U1-AE: Define the protocols to support communications between the UAE server and the UAE client (e.g. send UAV application, QoS management procedures, switching mode trigger, support QoS report, C2 communication link selection and switching policy).

- U2-AE: Define the protocols to support communications between UAE clients.

- Definition of new AT-commands to control MT supporting UAE layer for UAS applications.

- Potential impacts to SEAL LMS for adding supplementary location information and real-time location monitoring for any deviation.

- Potential impacts to SEAL NRMS for adding QoS coordination, UE connection monitoring and enhancements to SIP-based unicast resource management.

**CT3:**

- Define the services / APIs exposed by the UAE Server (i.e. new Us interface):

- Define the UAE\_C2OperationModeManagement API exposed by the UAE server to the UAS application specific server (e.g. USS/UTM) in order to support C2 communication mode configuration and management procedures, e.g. C2 communication mode selection / switching, etc.

- Define the UAE\_RealtimeUAVStatus API exposed by the UAE server to the UAS application specific server (e.g. USS/UTM) in order to support Real-Time UAV Connection Status Monitoring and Location reporting.

- Support CAPIF for the above mentioned services/APIs.

- Support of EES (Edge Enabler Server) and align the UAE layer with the Edge Enabler Layer.

- Support/Enhancements of SEAL for the above mentioned services/APIs.

NOTE: Services/features applicable to multiple verticals (define in TS 23.434) will be specified under the remit of the eSEAL WI. The usage of these services/features and the clarifications that are specific to UAS applications will however be specified in this WID.

## 5 Expected Output and Time scale

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| --- |
| **New specifications** |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
| TS | 24.257 | Uncrewed Aerial System (UAS) Application Enabler (UAE) layer;Protocol aspects; Stage 3 | TSG CT #94 (December 2021) | TSG CT #95 (March 2022) | CT1Rapporteur:Lin Shu, Huawei(shulin@huawei.com) |
| TS | 29.257 | Application layer support for Uncrewed Aerial System (UAS);UAS Application Enabler (UAE) Server Services; Stage 3 | TSG CT #94 (December 2021) | TSG CT #95 (March 2022) | CT3Rapporteur:Abdessamad El Moatamid, Huawei(abdessamad.el.moatamid@huawei.com) |

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| **Impacted existing TS/TR** |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| TS 27.007 | Enhancements to support new AT-commands to control MT supporting UAE layer for UAS applications | TSG CT #95 (March 2022) | CT1 |
| TS 24.545 | Potential enhancements to SEAL LMS. | TSG CT #95 (March 2022) | CT1 |
| TS 24.548 | Potential enhancements to SEAL NRMS. | TSG CT #95 (March 2022) | CT1 |
| TS 29.549 | Specify the UASAPP related usage and clarifications in SEAL APIs. | TSG CT #95 (March 2022) | CT3 |

## 6 Work item Rapporteur(s)

Lin Shu, Huawei, shulin@huawei.com

## 7 Work item leadership

CT1

## 8 Aspects that involve other WGs

N/A

## 9 Supporting Individual Members

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| Supporting IM name |
| Huawei |
| HiSilicon |
| China Mobile |
| China Unicom |
| CATT |
| InterDigital |
| Lenovo |
| Motorola Mobility |
| Samsung |
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