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Contents

Foreword

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  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

shall indicates a mandatory requirement to do something

shall not indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

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should not indicates a recommendation not to do something

may indicates permission to do something

need not indicates permission not to do something

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can indicates that something is possible

cannot indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

will indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

will not indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

might indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document specifies the stage 3 Protocol and data model for the UAS Application Enabler (UAE) Server services, for enabling the support of Uncrewed Aerial System (UAS) applications over 3GPP networks. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the UAE Server.

The stage 2 application layer architecture for Uncrewed Aerial System (UAS), functional requirements, procedures and information flows necessary for enabling Uncrewed Aerial System (UAS) applications over 3GPP networks are specified in 3GPP TS 23.255 [6].

The common protocol and interface aspects for API definition are specified in clause 5.2 of 3GPP TS 29.122 [2].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document in the same Release as the present document.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 29.122: "T8 reference point for Northbound Application Programming Interfaces (APIs)".

[3] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[4] OpenAPI: "OpenAPI Specification Version 3.0.0", https://spec.openapis.org/oas/v3.0.0.

[5] 3GPP TR 21.900: "Technical Specification Group working methods".

[6] 3GPP TS 23.255: "Application layer support for Uncrewed Aerial System (UAS); Functional architecture and information flows".

[7] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[8] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

[9] 3GPP TS 23.222: "Common API Framework for 3GPP Northbound APIs; Stage 2".

[10] 3GPP TS 29.222: "Common API Framework for 3GPP Northbound APIs; Stage 3".

[11] 3GPP TS 33.122: "Security aspects of Common API Framework (CAPIF) for 3GPP northbound APIs".

[12] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[13] 3GPP TS 29.558: "Enabling Edge Applications; Application Programming Interface (API) specification; Stage 3".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

For the purpose of the present document, the terms and definitions given in clause 3 of 3GPP TS 23.255 [6] also apply, including the ones referencing other specifications.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

BVLOS	Beyond Visual Line Of Sight
C2	Command and Control
CAA	Civil Aviation Authorities
DAA	Detect And Avoid
RSRP	Reference Signal Received Power
UAE	UAS Application Enabler
UAS	Uncrewed Arial System
UASS	UAS Application Specific Server
UAV	Uncrewed Aerial Vehicle
UAV-C	Uncrewed Aerial Vehicle – Controller
USS	UAS Service Supplier
UTM	UAS Traffic Management
LUN	Local USS Network

4 Overview

The UAS Application Enabler (UAE) Server forms part of the UAS application enabler layer that aims to ensure the efficient use and deployment of UAS over 3GPP systems. The UAE Server supports for this purpose, among other functionalities defined in 3GPP TS 23.255 [6], the following functionalities:

- UAS application layer support functions to a UASS (e.g. USS/UTM) over the Us reference point, i.e.:
  - C2 operation mode configuration management for a UAS (i.e. pair of UAV and UAV-C);
  - C2 communication modes switching control and management for a UAS (i.e. pair of UAV and UAV-C);
  - Real-Time UAV Connection Status Monitoring and Location reporting;
  - USS change management;
  - DAA management; and
  - UAV dynamic information management;

  and

- interaction with other UAE Servers over the UAE-E reference point, in order to support distributed UAE Server deployments.

Figure 4-1 shows the reference model of the UAS Application Layer, with a focus on the UAE Server:

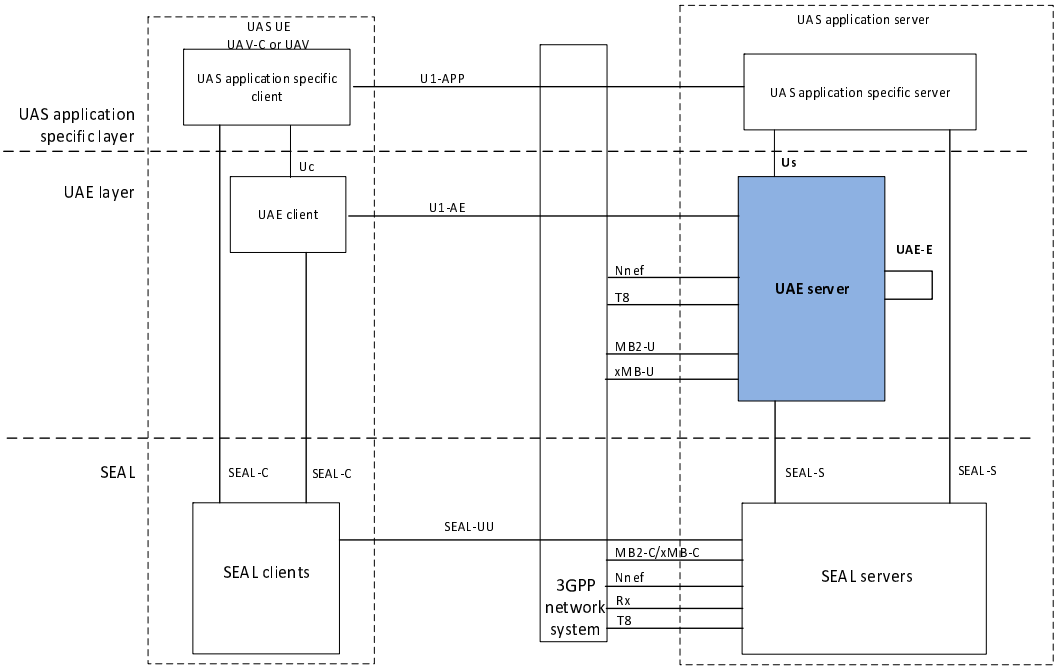

Figure 4-1: UAS Application Layer functional model

5 Services offered by the UAE Server

5.1 Introduction

The UAE Server provides the following services:

- UAE_C2OperationModeManagement
- UAE_RealtimeUAVStatus
- UAE_ChangeUSSManagement
- UAE_DAASupport
- UAE_UAVDynamicInfo

Table 5.1-1 summarizes the corresponding APIs defined in this specification.

Table 5.1-1: API Descriptions

Service Name	Clause	Description	OpenAPI Specification File	API Name	Annex
UAE_C2OperationModeManagement	5.2	UAE Server C2 Operation Mode Management Service	TS29257_UAE_C2OperationModeManagement.yaml	uae-c2opmode-mngt	A.2
UAE_RealtimeUAVStatus	5.3	UAE Server Real-time UAV Status Service	TS29257_UAE_RealtimeUAVStatus.yaml	uae-uav-status	A.3
UAE_ChangeUSSManagement	5.4	UAE Server USS Change Management Service	TS29257_UAE_ChangeUSSManagement.yaml	uae-ucm	A.4
UAE_DAASupport	5.5	UAE Server DAA Support Service	TS29257_UAE_DAASupport.yaml	uae-daa	A.5
UAE_UAVDynamicInfo	5.6	UAE Server UAV Dynamic Information Service	TS29257_UAE_UAVDynamicInfo.yaml	uae-udi	A.6

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 5, the UAE Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

5.2 UAE_C2OperationModeManagement Service

5.2.1 Service Description

The UAE_C2OperationModeManagement service exposed by the UAE Server enables a service consumer to:

- communicate C2 operation mode configuration information to the UAE Server for a UAS (i.e. pair of UAV and UAV-C);
- receive notifications from the UAE Server on the C2 operation mode management completion;
- receive notifications from the UAE Server on the C2 communication mode selected by a UAS (i.e. pair of UAV and UAV-C); and
- receive notifications from the UAE Server when C2 communication mode switching is carried out and decide whether to authorize it or not.

5.2.2 Service Operations

5.2.2.1 Introduction

The service operations defined for the UAE_C2OperationModeManagement service are shown in table 5.2.2.1-1.

Table 5.2.2.1-1: UAE_C2OperationModeManagement Service Operations

Service Operation Name	Description	Initiated by
UAE_C2OperationModeManagement_Initiate	This service operation enables a service consumer to initiate the configuration of C2 operation modes for a UAS (i.e. pair of UAV and UAV-C) by communicating the associated C2 operation mode configuration information to the UAE Server.	e.g. UASS
UAE_C2OperationModeManagement_Notify	This service operation enables a UAE Server to notify a previously subscribed service consumer either: - on C2 operation mode management completion; - on the C2 communication mode selected by a UAS (i.e. pair of UAV and UAV-C); or - when C2 communication mode switching is carried out. The service consumer may then confirm the targeted C2 communication mode switching or not.	UAE Server

5.2.2.2 UAE_C2OperationModeManagement_Initiate

5.2.2.2.1 General

This service operation is used by a service consumer to request the provisioning of C2 operation mode configuration information for a UAS (i.e. pair of UAV and UAV-C) to the UAE Server.

The following procedures are supported by the "UAE_C2OperationModeManagement_Initiate" service operation:

- C2 Operation Mode Initiation procedure.

5.2.2.2.2 C2 Operation Mode Initiation

Figure 5.2.2.2.2-1 depicts a scenario where a service consumer sends a request to the UAE Server to request the provisioning of C2 operation mode configuration information for a UAS (i.e. pair of UAV and UAV-C) (see also clause 7.4 of 3GPP°TS°23.255°[6]).

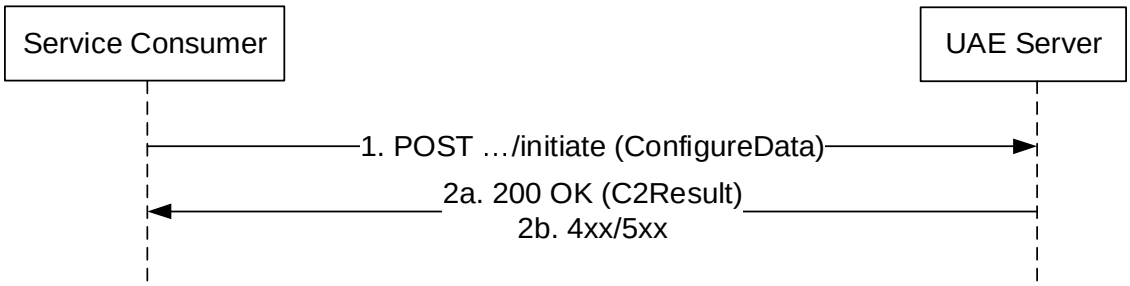

Figure 5.2.2.2.2-1: C2 Operation Mode Initiation procedure

1. The service consumer shall send for this purpose an HTTP POST request (custom operation: "Initiate") to the UAE Server, with the request URI set to "{apiRoot}/uae-c2opmode-mngt/<apiVersion>/initiate" and the request body including the ConfigureData data structure that shall contain:

   - the identifier of the service consumer that is sending the request, within the "uassId" attribute;
   - the identifier of the target UAS (i.e. pair of UAV and UAV-C) to which the C2 Operation Mode configuration information is destined, within the "uasId" attribute;
   - the allowed C2 communication modes for the UAS (i.e. pair of UAV and UAV-C) identified by the "uasId" attribute, within the "allowedC2CommModes" attribute;
   - the C2 Operation Mode switching types to be supported by the UAE Server, within the "c2CommModeSwitchTypes" attribute;
   - the notification URI via which the service consumer desires to receive notifications from the UAE Server, within the "notificationUri" attribute;
   - the primary C2 communication mode (i.e. either Direct C2 Communication mode or Network-Assisted C2 Communication mode) to be used by the UAS (i.e. pair of UAV and UAV-C) identified by the "uasId" attribute, within the "primaryC2CommMode" attribute; and
   - the C2 operation mode switching policies, within the "c2SwitchPolicies" attribute;

   and may also contain:

   - the secondary C2 communication mode (i.e. either Direct C2 Communication mode or Network-Assisted C2 Communication mode) to be used by the UAS (i.e. pair of UAV and UAV-C) identified by the "uasId" attribute, within the "secondaryC2CommMode" attribute;
   - the service area within which the C2 operation mode management request applies (i.e. a geographical area or a topological area), within the "c2ServiceArea" attribute; and
   - the list of features supported by the service consumer among the ones defined in clause 6.1.8, within the "suppFeat" attribute.

2a. Upon success, the UAE Server shall respond with an HTTP "200 OK" status code with the response body including the C2Result data structure which shall contain a feedback from the UAE Server on whether the request for C2 Operation Mode configuration information provisioning is confirmed (i.e. can be undertaken by the UAE Server) or not. The C2Result data structure may also contain the list of negotiated supported features.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body.

5.2.2.3 UAE_C2OperationModeManagement_Notify

5.2.2.3.1 General

This service operation is used by a UAE Server to notify a previously subscribed service consumer either on C2 operation mode management completion, on the C2 communication mode selected by a UAS (i.e. pair of UAV and UAV-C) or when C2 communication mode switching is carried out. For the latter, the service consumer may then confirm the targeted C2 communication mode switching or not. See also clause 7.4 of 3GPP°TS°23.255 [6].

The following procedures are supported by the "UAE_C2OperationModeManagement_Notify" service operation:

- C2 Operation Mode Management Completion Notification.
- Selected C2 Communication Mode Notification.
- C2 Communication Mode Switching Notification.

5.2.2.3.2 C2 Operation Mode Management Completion Notification

Figure 5.2.2.3.2-1 depicts a scenario where the UAE Server sends a request to notify a previously subscribed service consumer on the C2 operation mode management completion status for a UAS (i.e. pair of UAV and UAV-C). See also clause 7.4 of 3GPP°TS°23.255°[6].

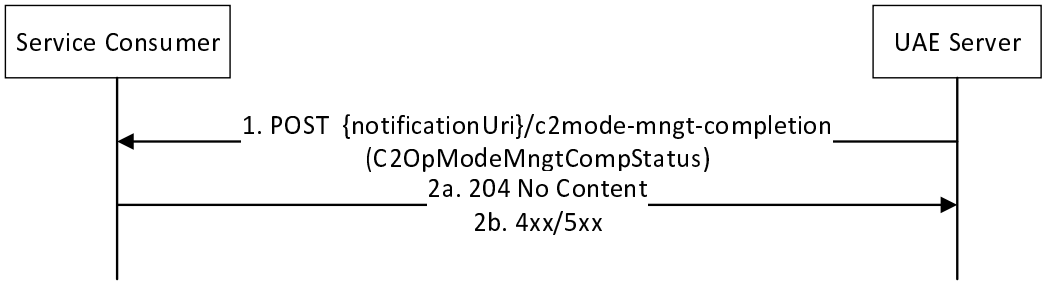

Figure 5.2.2.3.2-1: C2 Operation Mode Management Completion Notification procedure

1. The UAE Server shall send for this purpose an HTTP POST request to the service consumer with the request URI set to "{notificationUri}/c2mode-mngt-completion", where the "notificationUri" is set to the value received from the service consumer during the C2 Operation Mode Initiation procedure defined in clause 5.2.2.2, and the request body including the C2OpModeMngtCompStatus data structure that shall contain:

   - the identifier of the UAS (i.e. pair of UAV and UAV-C) to which the notification is related, within the "uasId" attribute; and

   - the C2 operation mode management completion status (i.e. either successful or not successful) for the concerned UAS (i.e. pair of UAV and UAV-C), within the "status" attribute.

2a. Upon success, the service consumer shall respond to the UAE Server with an HTTP "204 No Content" status code to acknowledge the reception of the notification.

   If the service consumer is not able to handle the notification request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent, as defined in clause 5.2.10 of 3GPP TS 29.122 [2].

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body.

5.2.2.3.3 Selected C2 Communication Mode Notification

Figure 5.2.2.3.3-1 depicts a scenario where the UAE Server sends a request to notify a previously subscribed service consumer on the C2 communication mode selected by a UAS (i.e. pair of UAV and UAV-C). See also clause 7.4 of 3GPP°TS°23.255°[6].

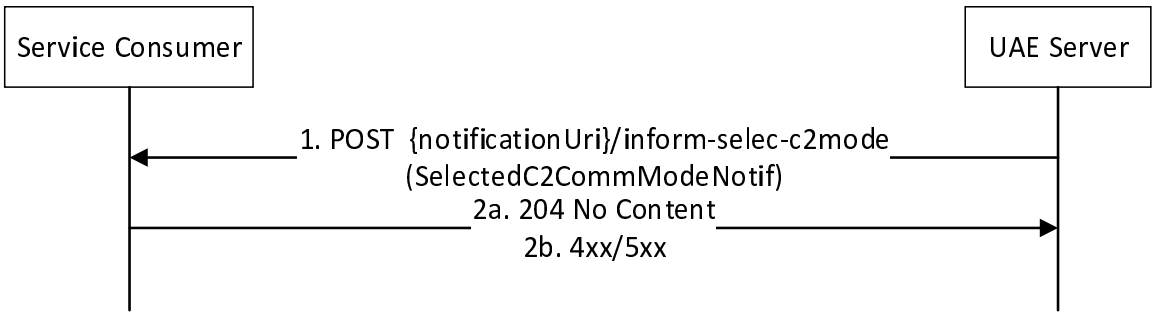

Figure 5.2.2.3.3-1: Selected C2 Communication Mode Notification procedure

1. The UAE Server shall send for this purpose an HTTP POST request to the service consumer with the request URI set to "{notificationUri}/inform-selec-c2mode", where the "notificationUri" is set to the value received from the service consumer during the C2 Operation Mode Initiation procedure defined in clause 5.2.2.2, and the request body including the SelectedC2CommModeNotif data structure that shall contain:

   - the identifier of the UAS (i.e. pair of UAV and UAV-C) to which the notification is related, within the "uasId" attribute; and

   - the primary C2 communication mode selected by the UAS (i.e. pair of UAV and UAV-C) identified by the "uasId" attribute, within the "selPrimaryC2CommMode" attribute;

   and may also contain:

   - the secondary C2 communication mode selected by the UAS (i.e. pair of UAV and UAV-C) identified by the "uasId" attribute, within the "selSecondaryC2CommMode" attribute.

2a. Upon success, the service consumer shall respond to the UAE Server with an HTTP "204 No Content" status code to acknowledge the reception of the notification.

   If the service consumer is not able to handle the notification request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent, as defined in clause 5.2.10 of 3GPP TS 29.122 [2].

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body.

5.2.2.3.4 C2 Communication Mode Switching Notification

Figure 5.2.2.3.4-1 depicts a scenario where the UAE Server sends a request to notify a previously subscribed service consumer on the targeted C2 communication mode switching for a UAS (i.e. pair of UAV and UAV-C) and may request confirmation from the service consumer. See also clause 7.4 of 3GPP°TS°23.255°[6].

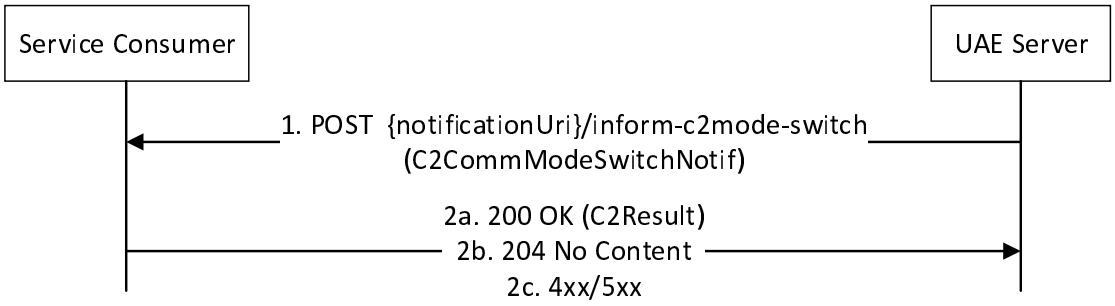

Figure 5.2.2.3.4-1: C2 Communication Mode Switching Notification procedure

1. The UAE Server shall send for this purpose an HTTP POST request to the service consumer with the request URI set to "{notificationUri}/inform-c2mode-switch", where the "notificationUri" is set to the value received from the service consumer during the C2 Operation Mode Initiation procedure defined in clause 5.2.2.2, and the request body including the C2CommModeSwitchNotif data structure that shall contain:

   - the identifier of the UAE Server that is sending the notification and possibly requesting C2 Communication Mode switching confirmation for a UAS (i.e. pair of UAV and UAV-C) from the service consumer, within the "uaeServerId" attribute;

   - the identifier of the UAS (i.e. pair of UAV and UAV-C) to which the provided C2 Communication Mode switching information is related, within the "uasId" attribute; and

   - the targeted C2 Communication Mode switching for the UAS (i.e. pair of UAV and UAV-C) identified by the "uasId" attribute, within the "c2CommModeSwitchType" attribute;

   And may contain:

   - the C2 Communication Mode switching cause, within the "switchingCause" attribute.

2a. Upon success, if the service consumer has to confirm (i.e. approve) the C2 Communication Mode switching operation to the UAE Server, the service consumer shall respond with an HTTP "200 OK" status code with the response body including the C2Result data structure which shall contain a feedback from the service consumer on whether this C2 Communication Mode switching is confirmed (i.e. approved) or not.

2b. Otherwise, upon success, if the service consumer does not have to confirm (i.e. approve) the C2 Communication Mode switching operation to the UAE Server, the service consumer shall respond to the UAE Server with an HTTP "204 No Content" status code to acknowledge the reception of the notification.

   If the service consumer is not able to handle the notification request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent, as defined in clause 5.2.10 of 3GPP TS 29.122 [2].

2c. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body.

5.3 UAE_RealtimeUAVStatus Service

5.3.1 Service Description

The UAE_RealtimeUAVStatus service exposed by the UAE Server enables a service consumer to:

- subscribe to real-time UAV status information reporting;
- update an existing real-time UAV status information reporting subscription;
- receive real-time UAV status notifications; and
- unsubscribe from real-time UAV status information reporting.

The UAV status information includes the UAV network connection status information and the UAV location information.

5.3.2 Service Operations

5.3.2.1 Introduction

The service operations defined for the UAE_RealtimeUAVStatus service are shown in table 5.3.2.1-1.

Table 5.3.2.1-1: UAE_RealtimeUAVStatus Service Operations

Service Operation Name	Description	Initiated by
UAE_RealtimeUAVStatus_Subscribe	This service operation enables a service consumer to subscribe to real-time UAV status information reporting or update an existing real-time UAV status information reporting subscription.	e.g. UASS
UAE_RealtimeUAVStatus_Unsubscribe	This service operation enables a service consumer to unsubscribe from real-time UAV status information reporting.	e.g. UASS
UAE_RealtimeUAVStatus_Notify	This service operation enables a UAE Server to notify a previously subscribed service consumer on real-time UAV status information.	UAE Server

5.3.2.2 UAE_RealtimeUAVStatus_Subscribe

5.3.2.2.1 General

This service operation is used by a service consumer to subscribe to real-time UAV status information reporting or update an existing real-time UAV status information reporting subscription.

The following procedures are supported by the "UAE_RealtimeUAVStatus_Subscribe" service operation:

- Subscribe to real-time UAV status information reporting.
- Update an existing real-time UAV status information reporting subscription.

5.3.2.2.2 Subscribe to real-time UAV status information reporting

Figure 5.3.2.2.2-1 depicts a scenario where a service consumer sends a request to the UAE Server to request the creation of a subscription to real-time UAV status information reporting (see also clause 7.5 of 3GPP°TS°23.255°[6]).

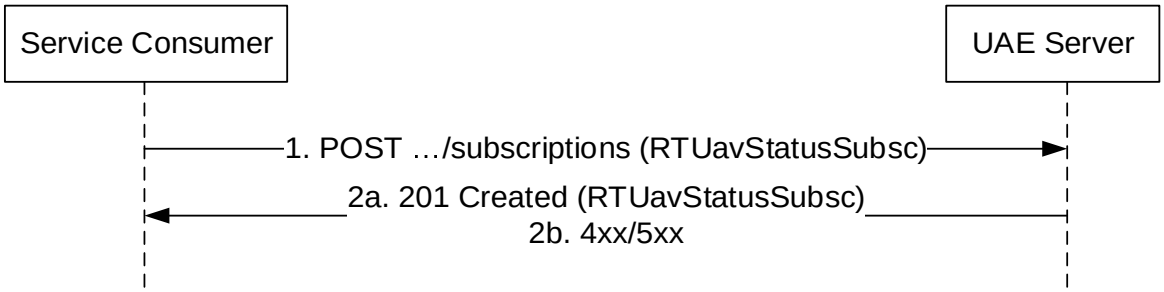

Figure 5.3.2.2.2-1: Procedure for subscribing to real-time UAV status information reporting

1. In order to subscribe to real-time UAV status reporting, the service consumer shall send an HTTP POST request to the UAE Server, with the request URI set to "{apiRoot}/uae-uav-status/<apiVersion>/subscriptions" and the request body including the RTUavStatusSubsc data structure that shall contain:

   - the identifier of the service consumer that is sending the request, within the "uassId" attribute;
   - the identifier(s) of the target UAV(s) to which the subscription is related, within the "uavIds" attribute;
   - the notification URI via which the service consumer desires to receive real-time UAV status notifications from the UAE Server, within the "notificationUri" attribute; and
   - the list of features supported by the service consumer among the ones defined in clause 6.2.8, within the "suppFeat" attribute.

2a. Upon success, the UAE Server shall respond with an HTTP "201 Created" status code with the response body containing a representation of the created Individual Real-time UAV Status Subscription resource within the RTUavStatusSubsc data structure.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body.

5.3.2.2.3 Update an existing real-time UAV status information reporting subscription

Figure 5.3.2.2.3-1 depicts a scenario where a service consumer sends a request to the UAE Server to request the update of an existing subscription to real-time UAV status information reporting.

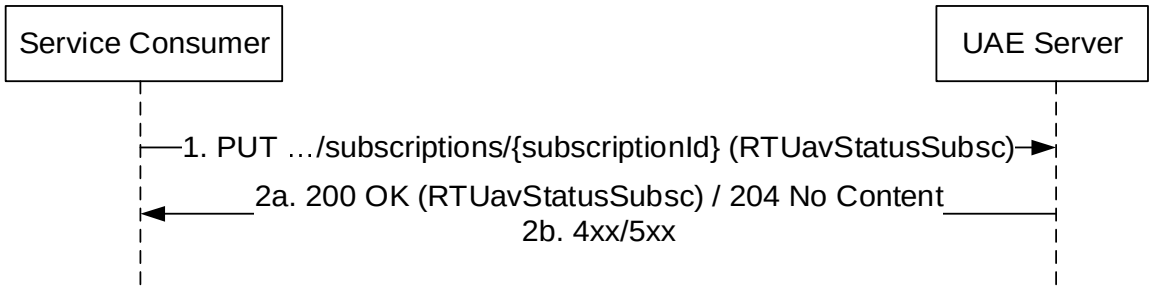

Figure 5.3.2.2.3-1: Procedure for updating a real-time UAV status information reporting subscription

1. In order to update an existing real-time UAV status reporting subscription, the service consumer shall send an HTTP PUT request to the UAE Server, with the request URI set to "{apiRoot}/uae-uav-status/<apiVersion>/subscriptions/{subscriptionId}", requesting to update the Individual Real-time UAV Status Subscription resource identified by the provided "subscriptionId" path segment. The request body shall include an updated representation of the resource within the RTUavStatusSubsc data structure that shall contain:

- the identifier of the service consumer that is sending the request, within the "uassId" attribute;

NOTE: An alternative service consumer than the one that requested the creation of the subscription resource can send this subscription update request.

- the same or an updated list of identifier(s) of the target UAV(s) to which the subscription is related, within the "uavIds" attribute; and

- the same or an updated notification URI via which the service consumer desires to receive real-time UAV status notifications from the UAE Server, within the "notificationUri" attribute.

2a. Upon success, the UAE Server shall update the concerned Individual Real-time UAV Status Subscription resource accordingly and respond with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated Individual Real-time UAV Status Subscription resource within the RTUavStatusSubsc data structure; or

- an HTTP "204 No Content" status code.

If the UAE Server is not able to handle the request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI of the resource located in an alternative UAE Server, as defined in clause 5.2.10 of 3GPP TS 29.122 [2].

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT response body.

5.3.2.3 UAE_RealtimeUAVStatus_Unsubscribe

5.3.2.3.1 General

This service operation is used by a service consumer to unsubscribe from real-time UAV status information reporting.

The following procedures are supported by the "UAE_RealtimeUAVStatus_Unsubscribe" service operation:

- Unsubscribe from real-time UAV status information reporting.

5.3.2.3.2 Unsubscribe from real-time UAV status information reporting

Figure 5.3.2.3.2-1 depicts a scenario where a service consumer sends a request to the UAE Server to request the deletion of an existing Individual Real-time UAV Status Subscription resource (see also clause 7.5 of 3GPP°TS°23.255°[6]).

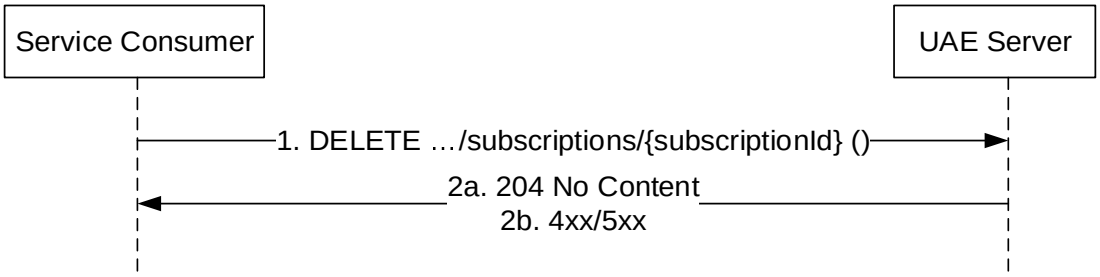

Figure 5.3.2.3.2-1: Procedure for unsubscribing from real-time UAV status information reporting

1. In order to unsubscribe from real-time UAV status reporting, the service consumer shall send an HTTP DELETE request to the UAE Server, with the request URI set to "{apiRoot}/uae-uav-status/<apiVersion>/subscriptions/{subscriptionId}", requesting to delete the Individual Real-time UAV Status Subscription resource identified by the provided "subscriptionId" path segment.

2a. Upon success, the UAE Server shall respond with an HTTP "204 No Content" status code.

If the UAE Server is not able to handle the request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI of the resource located in an alternative UAE Server, as defined in clause 5.2.10 of 3GPP TS 29.122 [2].

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body.

5.3.2.4 UAE_RealtimeUAVStatus_Notify

5.3.2.4.1 General

This service operation is used by a UAE Server to notify a previously subscribed service consumer on real-time UAV status information. See also clause 7.5 of 3GPP°TS°23.255 [6].

The following procedures are supported by the "UAE_RealtimeUAVStatus_Notify" service operation:

- Real-time UAV Status Notification.

5.3.2.4.2 Real-time UAV Status Notification

Figure 5.3.2.4.2-1 depicts a scenario where the UAE Server sends a request to notify a previously subscribed service consumer on real-time UAV status information. See also clause 7.5 of 3GPP°TS°23.255°[6].

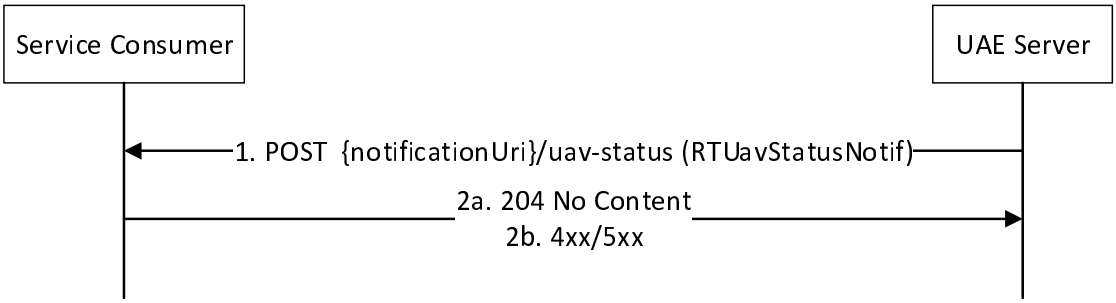

Figure 5.3.2.4.2-1: Real-time UAV Status Notification procedure

1. The UAE Server shall send for this purpose an HTTP POST request to the service consumer with the request URI set to "{notificationUri}/uav-status", where the "notificationUri" is set to the value received from the service consumer during the real-time UAV status reporting subscription creation/update procedures defined in clause 5.3.2.2, and the request body including the RTUavStatusNotif data structure that shall contain:

   - The identifier of the Individual Real-time UAV Status Subscription to which the notification is related, within the "subscriptionId" attribute; and

   - The real-time UAV status information for the concerned UAV(s), within the "rTUavStatus" attribute.

2a. Upon success, the service consumer shall respond with an HTTP "204 No Content" status code to acknowledge the reception of the notification to the UAE Server.

   If the service consumer is not able to handle the notification request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent, as defined in clause 5.2.10 of 3GPP TS 29.122 [2].

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body.

5.4 UAE_ChangeUSSManagement Service

5.4.1 Service Description

The UAE_ChangeUSSManagement service exposed by the UAE Server enables a service consumer to:

- create/update/delete USS Change Policy(ies);
- request USS change; and
- receive notifications on USS Change related event(s).

5.4.2 Service Operations

5.4.2.1 Introduction

The service operations defined for the UAE_ChangeUSSManagement service are shown in table 5.4.2.1-1.

Table 5.4.2.1-1: UAE_ChangeUSSManagement Service Operations

Service Operation Name	Description	Initiated by
UAE_ChangeUSSManagement_ManageUSS	This service operation enables a service consumer to create/update/delete a USS Change Policy.	e.g., UASS
UAE_ChangeUSSManagement_RequestUSSChange	This service operation enables a service consumer to trigger USS change.	e.g., UASS
UAE_ChangeUSSManagement_Notify	This service operation enables a UAE Server to notify a previously subscribed service consumer on USS Change related event(s).	UAE Server

5.4.2.2 UAE_ChangeUSSManagement_ManageUSS

5.4.2.2.1 General

This service operation is used by a service consumer to request the creation/update/deletion of a USS Change Policy at the UAE Server.

The following procedures are supported by the "UAE_ChangeUSSManagement_ManageUSS" service operation:

- USS Change Policy Creation.
- USS Change Policy Update.
- USS Change Policy Deletion.

5.4.2.2.2 USS Change Policy Creation

Figure 5.4.2.2.2-1 depicts a scenario where a service consumer sends a request to the UAE Server to create a USS Change Policy (see also clause 7.6 of 3GPP°TS°23.255°[6]).

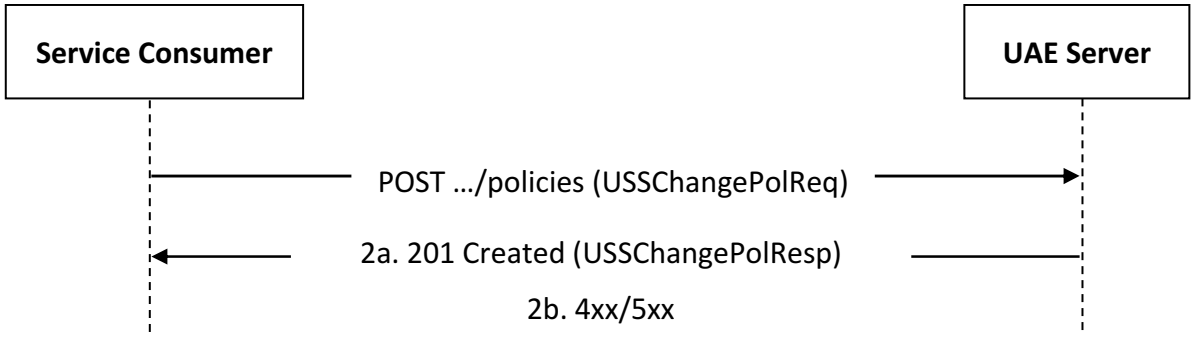

Figure 5.4.2.2.2-1: Procedure for USS Change Policy Creation

1. In order to request the creation of a USS Change Policy, the service consumer shall send an HTTP POST request to the UAE Server targeting the "USS Change Policies" resource, with the request body including the USSChangePolReq data structure.

2a. Upon success, the UAE Server shall respond with an HTTP "201 Created" status code with the response body containing a representation of the created "Individual USS Change Policy" resource and potentially additional information within the USSChangePolResp data structure.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.3.7.

5.4.2.2.3 USS Change Policy Update

Figure 5.4.2.2.3-1 depicts a scenario where a service consumer sends a request to the UAE Server to update an existing USS Change Policy (see also clause 7.6 of 3GPP°TS°23.255°[6]).

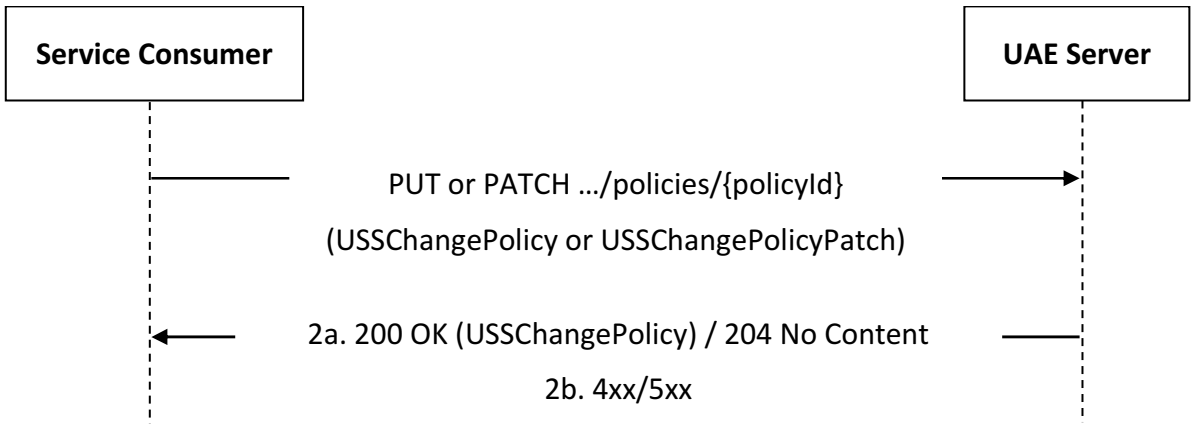

Figure 5.4.2.2.3-1: Procedure for USS Change Policy Update

1. In order to request the update/modification of an existing USS Change Policy, the service consumer shall send an HTTP PUT/PATCH request to the UAE Server targeting the corresponding "Individual USS Change Policy" resource, with the request body including either:

   - the updated representation of the resource within the USSChangePolicy data structure, in case the HTTP PUT method is used; or

   - the requested modifications to the resource within the USSChangePolicyPatch data structure, in case the HTTP PATCH method is used.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

If the UAE Server is not able to handle the request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing

an alternative URI of the resource located in an alternative UAE Server, as defined in clause 5.2.10 of 3GPP TS 29.122 [2].

2a. Upon success, the UAE Server shall respond with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated/modified "Individual USS Change Policy" resource within the USSChangePolicy data structure; or
- an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 6.3.7.

5.4.2.2.4 USS Change Policy Deletion

Figure 5.4.2.2.4-1 depicts a scenario where a service consumer sends a request to the UAE Server to delete an existing USS Change Policy (see also clause 7.6 of 3GPP°TS°23.255°[6]).

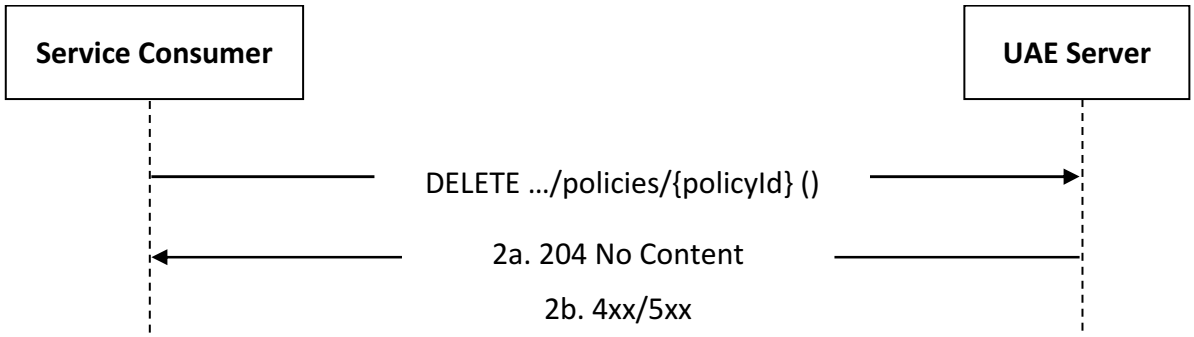

Figure 5.4.2.2.4-1: Procedure for USS Change Policy Deletion

1. In order to request the deletion of an existing USS Change Policy, the service consumer shall send an HTTP DELETE request to the UAE Server targeting the corresponding "Individual USS Change Policy" resource.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

2a. Upon success, the UAE Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 6.3.7.

5.4.2.3 UAE_ChangeUSSManagement_RequestUSSChange

5.4.2.3.1 General

This service operation is used by a service consumer to request USS change.

The following procedures are supported by the "UAE_ChangeUSSManagement_RequestUSSChange" service operation:

- USS Change Request.

5.4.2.3.2 USS Change Request

Figure 5.4.2.3.2-1 depicts a scenario where a service consumer sends a request to the UAE Server to request USS change (see also clause 7.6 of 3GPP°TS°23.255°[6]).

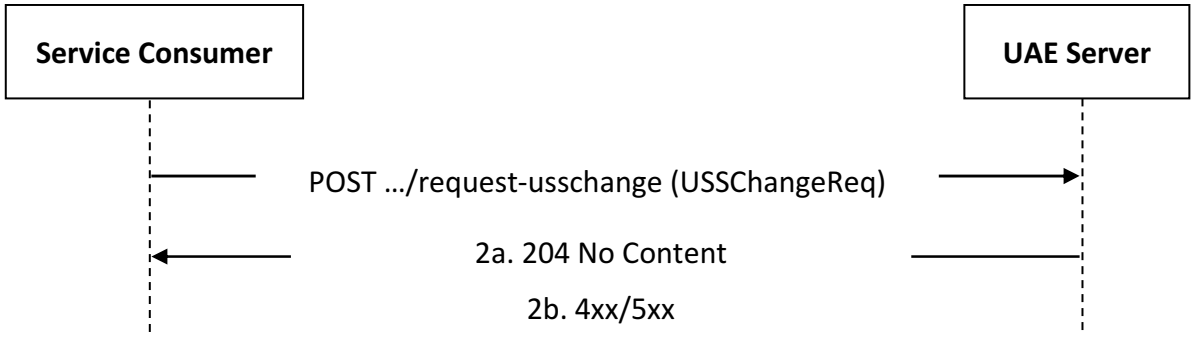

Figure 5.4.2.3.2-1: Procedure for USS Change Request

1. In order to request USS change, the service consumer shall send an HTTP POST request (custom operation: "RequestUssChange") to the UAE Server, with the request URI set to "{apiRoot}/uae-ucm/<apiVersion>/request-usschange", and the request body including the USSChangeReq data structure.

   If the UAE Server is not able to handle the request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI of the resource located in an alternative UAE Server, as defined in clause 5.2.10 of 3GPP TS 29.122 [2].

2a. Upon success, the UAE Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.3.7.

5.4.2.4 UAE_ChangeUSSManagement_Notify

5.4.2.4.1 General

This service operation is used by a UAE Server to notify a previously subscribed service consumer on USS Change event(s).

The following procedures are supported by the "UAE_ChangeUSSManagement_Notify" service operation:

- USS Change Notification.

5.4.2.4.2 USS Change Notification

Figure 5.4.2.4.2-1 depicts a scenario where the UAE Server sends a request to notify a previously subscribed service consumer on USS Change event(s) (see also clause 7.6 of 3GPP°TS°23.255°[6]).

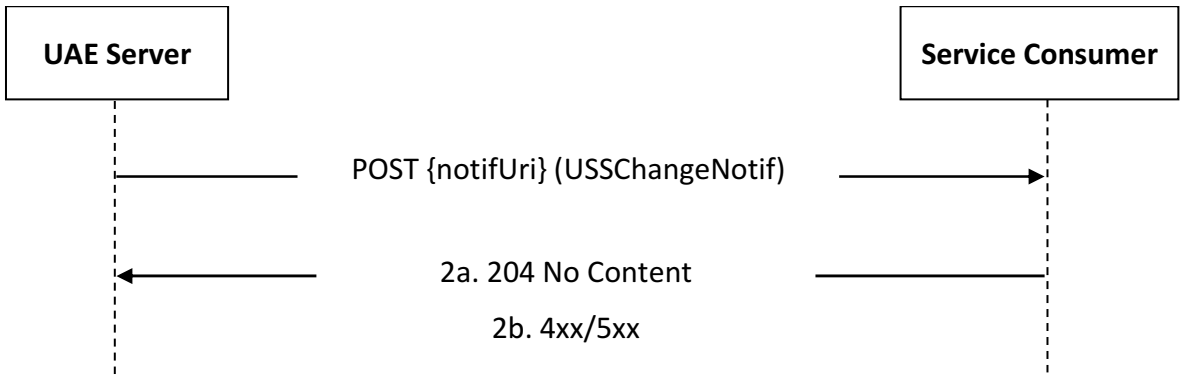

Figure 5.4.2.4.2-1: USS Change Notification procedure

1. In order to notify a service consumer on USS Change event(s), the UAE Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}", where the "notifUri" variable is set to

the value received from the service consumer during the corresponding USS Change Policy Creation/Update procedure defined in clause 5.4.2.2, and the request body including the USSChangeNotif data structure.

If the service consumer is not able to handle the notification request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent, as defined in clause 5.2.10 of 3GPP TS 29.122 [2].

2a. Upon success, the service consumer shall respond to the UAE Server with an HTTP "204 No Content" status code to acknowledge the reception of the notification.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.3.7.

5.5 UAE_DAASupport Service

5.5.1 Service Description

The UAE_DAASupport service exposed by the UAE Server enables a service consumer to:

- create/update/delete DAA Policies;
- receive DAA Policy Configuration Completion Status notifications;
- receive DAA Events notifications; and
- inform about and request the management of the detected DAA related events.

5.5.2 Service Operations

5.5.2.1 Introduction

The service operations defined for the UAE_DAASupport service are shown in table 5.5.2.1-1.

Table 5.5.2.1-1: UAE_DAASupport Service Operations

Service Operation Name	Description	Initiated by
UAE_DAASupport_Manage	This service operation enables a service consumer to create/update/delete a DAA Application Policy.	e.g. UASS
UAE_DAASupport_InformDAAEvents	This service operation enables a service consumer to send the detected DAA related events.	e.g. UASS
UAE_DAASupport_Notify	This service operation enables a UAE Server to notify a previously subscribed service consumer either: - on DAA Policy Configuration Completion Status; or - on detected DAA related events.	UAE Server

5.5.2.2 UAE_DAASupport_Manage

5.5.2.2.1 General

This service operation is used by a service consumer to request the creation/update/deletion of a DAA Policy at the UAE Server.

The following procedures are supported by the "UAE_DAASupport_Manage" service operation:

- DAA Policy Creation.
- DAA Policy Update.
- DAA Policy Deletion.

5.5.2.2.2 DAA Policy Creation

Figure 5.5.2.2.2-1 depicts a scenario where a service consumer sends a request to the UAE Server to create a DAA Policy (see also clause 7.7 of 3GPP°TS°23.255°[6]).

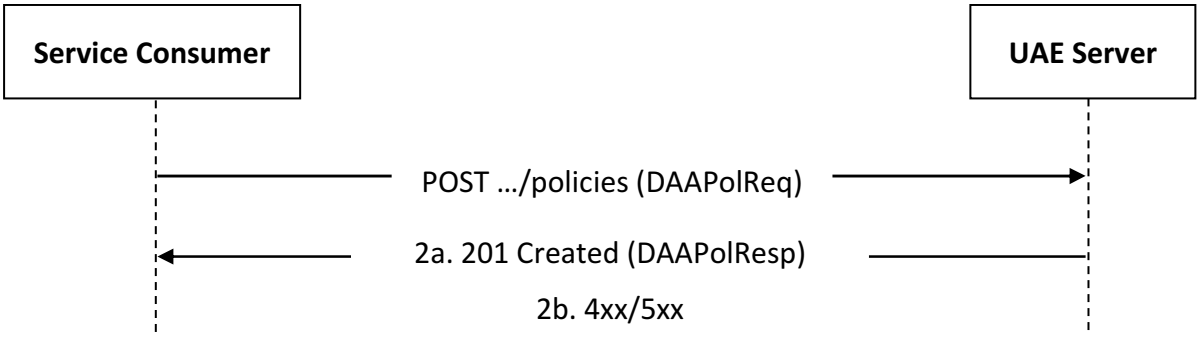

Figure 5.5.2.2.2-1: Procedure for DAA Policy Creation

1. In order to request the creation of a DAA Policy, the service consumer shall send an HTTP POST request to the UAE Server targeting the "DAA Policies" collection resource, with the request body including the DAAPolReq data structure.

2a. Upon success, the UAE Server shall respond with an HTTP "201 Created" status code with the response body containing a representation of the created "Individual DAA Policy" resource and potentially additional information within the DAAPolResp data structure.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.4.7.

5.5.2.2.3 DAA Policy Update

Figure 5.5.2.2.3-1 depicts a scenario where a service consumer sends a request to the UAE Server to update an existing DAA Policy (see also clause 7.7 of 3GPP°TS°23.255°[6]).

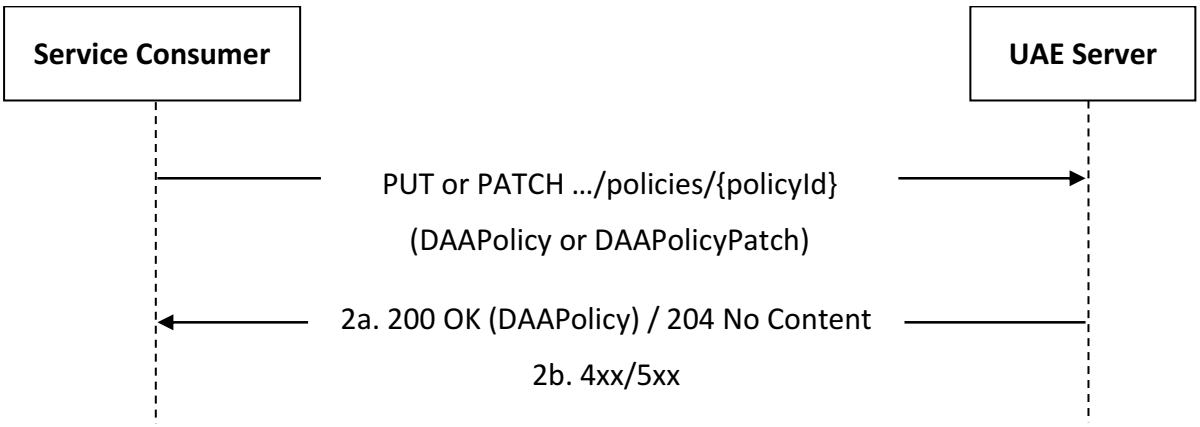

Figure 5.5.2.2.3-1: Procedure for DAA Policy Update

1. In order to request the update/modification of an existing DAA Policy, the service consumer shall send an HTTP PUT/PATCH request to the UAE Server targeting the corresponding "Individual DAA Policy" resource, with the request body including either:

   - the updated representation of the resource within the DAAPolicy data structure, in case the HTTP PUT method is used; or

   - the requested modifications to the resource within the DAAPolicyPatch data structure, in case the HTTP PATCH method is used.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

If the UAE Server is not able to handle the request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing

an alternative URI of the resource located in an alternative UAE Server, as defined in clause 5.2.10 of 3GPP TS 29.122 [2].

2a. Upon success, the UAE Server shall respond with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated/modified "Individual DAA Policy" resource within the DAAPolicy data structure; or
- an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 6.4.7.

5.5.2.2.4 DAA Policy Deletion

Figure 5.5.2.2.4-1 depicts a scenario where a service consumer sends a request to the UAE Server to delete an existing DAA Policy (see also clause 7.7 of 3GPP°TS°23.255°[6]).

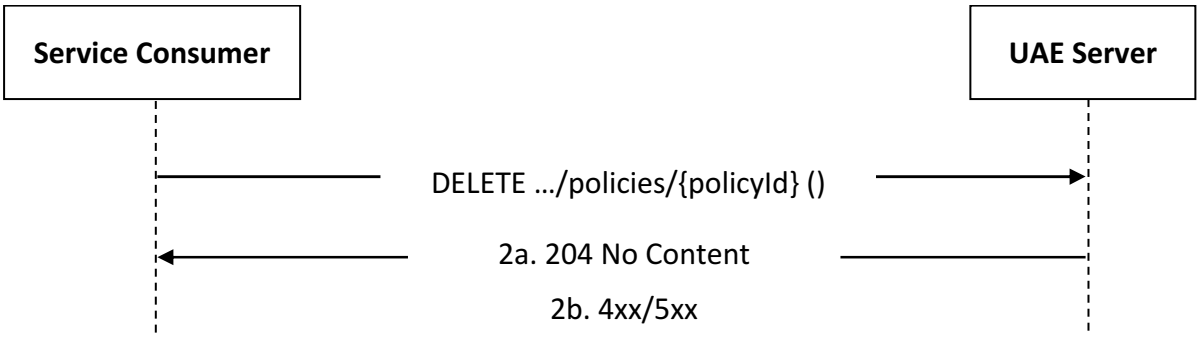

Figure 5.5.2.2.4-1: Procedure for DAA Policy Deletion

1. In order to request the deletion of an existing DAA Policy, the service consumer shall send an HTTP DELETE request to the UAE Server targeting the corresponding "Individual DAA Policy" resource.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

2a. Upon success, the UAE Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 6.4.7.

5.5.2.3 UAE_DAASupport_InformDAAEvents

5.5.2.3.1 General

This service operation is used by a service consumer to inform about and request the management of the detected DAA related event(s).

The following procedures are supported by the "UAE_DAASupport_InformDAAEvents" service operation:

- DAA Events Information Request.

5.5.2.3.2 DAA Events Information Request

Figure 5.5.2.3.2-1 depicts a scenario where a service consumer sends a request to the UAE Server to inform about and request the management of the detected DAA related event(s) (see also clause 7.7 of 3GPP°TS°23.255°[6]).

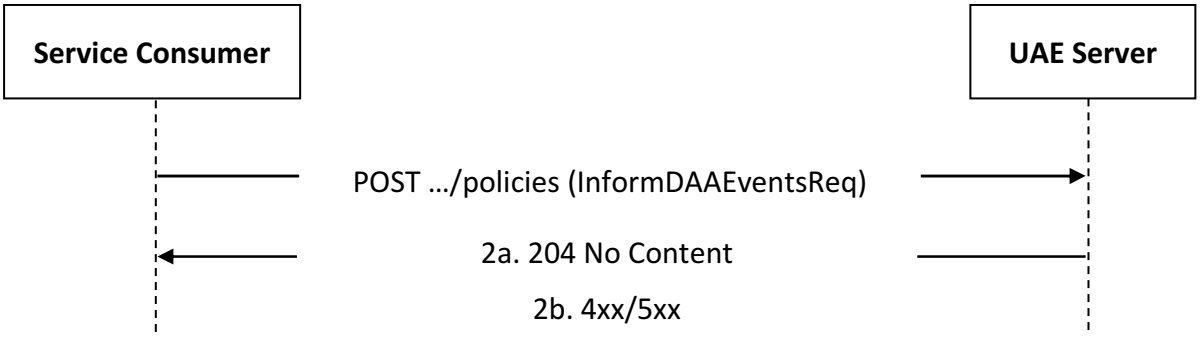

Figure 5.5.2.3.2-1: Procedure for DAA Events Information Request

1. In order to send DAA related event(s) information, the service consumer shall send an HTTP POST request (custom operation: "InformDAAEvents") to the UAE Server, with the request URI set to "{apiRoot}/uae-daa/<apiVersion>/inform-events" and the request body including the InformDAAEventsReq data structure.

   If the UAE Server is not able to handle the request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI of the resource located in an alternative UAE Server, as defined in clause 5.2.10 of 3GPP TS 29.122 [2].

2a. Upon success, the UAE Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.4.7.

5.5.2.4 UAE_DAASupport_Notify

5.5.2.4.1 General

This service operation is used by a UAE Server to notify a previously subscribed service consumer either:

- on DAA Policy Configuration Completion Status; or
- on DAA related event(s).

The following procedures are supported by the "UAE_DAASupport_Notify" service operation:

- DAA Policy Configuration Completion Status Notification.
- DAA Events Notification.

5.5.2.4.2 DAA Policy Configuration Completion Status Notification

Figure 5.5.2.4.2-1 depicts a scenario where the UAE Server sends a request to notify a previously subscribed service consumer on the status of DAA Policy Configuration (see also clause 7.7 of 3GPP°TS°23.255°[6]).

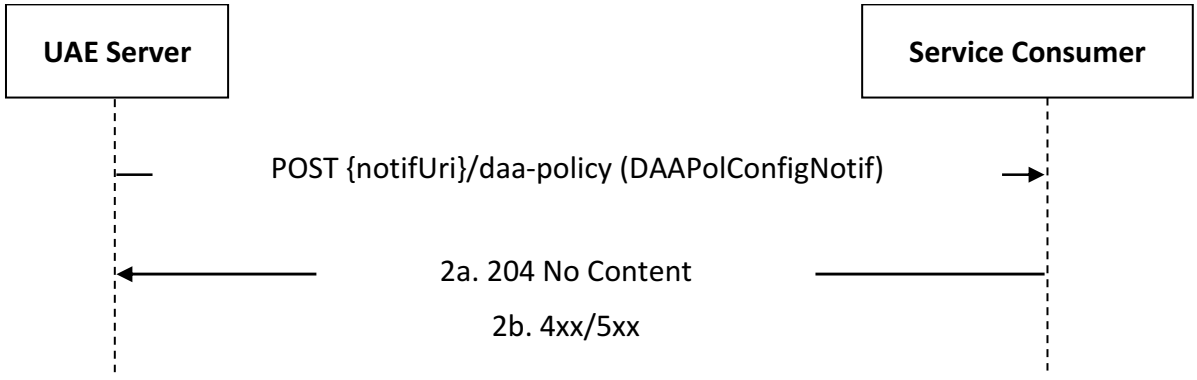

Figure 5.5.2.4.2-1: DAA Policy Configuration Completion Status Notification procedure

1. In order to notify a service consumer on the status of DAA Policy Configuration, the UAE Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}/daa-policy", where the "notifUri" variable is set to the value received from the service consumer during the DAA Policy Creation/Update procedure defined in clause 5.5.2.2, and the request body including the DAAPolConfigNotif data structure.

   If the service consumer is not able to handle the notification request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent, as defined in clause 5.2.10 of 3GPP TS 29.122 [2].

2a. Upon success, the service consumer shall respond to the UAE Server with an HTTP "204 No Content" status code to acknowledge the reception of the notification.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.4.7.

5.5.2.4.3 DAA Events Notification

Figure 5.5.2.4.3-1 depicts a scenario where the UAE Server sends a request to notify a previously subscribed service consumer on DAA related event(s) (see also clause 7.7 of 3GPP°TS°23.255°[6]).

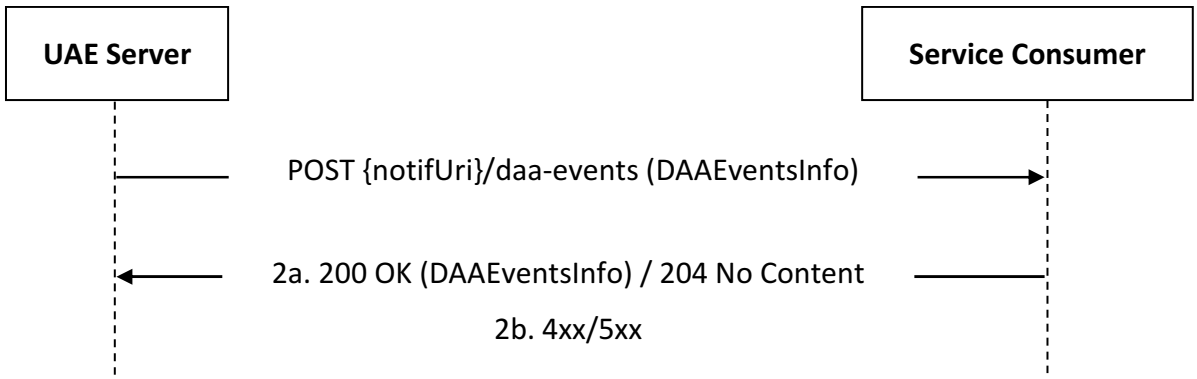

Figure 5.5.2.4.3-1: DAA Events Notification procedure

1. In order to notify a service consumer on the detected DAA event(s), the UAE Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}/daa-events", where the "notifUri" variable is set to the value received from the service consumer during the DAA Policy Creation/Update procedure defined in clause 5.5.2.2, and the request body including the DAAEventsInfo data structure.

   If the service consumer is not able to handle the notification request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent, as defined in clause 5.2.10 of 3GPP TS 29.122 [2].

2a. Upon success, the service consumer shall respond to the UAE Server with either:

   - an HTTP "200 OK" status code with the response body containing updated/additional DAA event(s) related information within the DAAEventsInfo data structure, if the service consumer needs to provide information about additional DAA event(s) or updated DAA event(s) related information; or

   - an HTTP "204 No Content" status code, if the service consumer does not need to provide any updated/additional DAA event(s) related information.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.4.7.

5.6 UAE_UAVDynamicInfo

5.6.1 Service Description

The UAE_UAVDynamicInfo service exposed by the UAE Server enables a service consumer to:

- create/update/delete a UAV dynamic information subscription; and
- receive UAV dynamic information event(s) related notifications.

5.6.2 Service Operations

5.6.2.1 Introduction

The service operations defined for the UAE_UAVDynamicInfo service are shown in table 5.6.2.1-1.

Table 5.6.2.1-1: UAE_UAVDynamicInfo Service Operations

Service Operation Name	Description	Initiated by
UAE_UAVDynamicInfo_Subscribe	This service operation enables a service consumer to request the creation/update/deletion of a UAV Dynamic Information Subscription at the UAE Server.	e.g., UASS
UAE_UAVDynamicInfo_Notify	This service operation enables a service consumer to receive UAV dynamic information event(s) related notifications from the UAE Server.	UAE Server

5.6.2.2 UAE_UAVDynamicInfo_Subscribe

5.6.2.2.1 General

This service operation is used by a service consumer to request the creation/update/deletion of a UAV dynamic information subscription at the UAE Server.

The following procedures are supported by the "UAE_UAVDynamicInfo_Subscribe" service operation:

- UAV Dynamic Information Subscription Creation.
- UAV Dynamic Information Subscription Update.
- UAV Dynamic Information Subscription Deletion.

5.6.2.2.2 UAV Dynamic Information Subscription Creation

Figure 5.6.2.2.2-1 depicts a scenario where a a service consumer sends a request to the UAE Server to request the creation of a UAV Dynamic Information Subscription (see also clause 7.8 of 3GPP°TS°23.255°[6]).

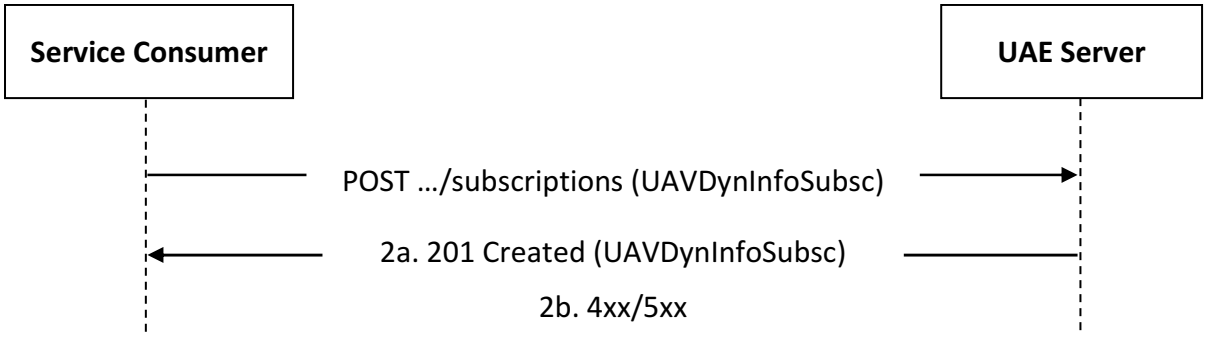

Figure 5.6.2.2.2-1: Procedure for UAV Dynamic Information Subscription Creation

1. In order to create a UAV Dynamic Information Subscription, the service consumer shall send an HTTP POST request to the UAE Server targeting the URI of the "UAV Dynamic Information Subscriptions" collection resource, with the request body including the UAVDynInfoSubsc data structure.

2a. Upon success, the UAE Server shall respond with an HTTP "201 Created" status code, with the response body containing a representation of the created "Individual UAV Dynamic Information Subscription" resource within the UAVDynInfoSubsc data structure, and an HTTP "Location" header field containing the URI of the created resource.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.5.7.

5.6.2.2.3 UAV Dynamic Information Subscription Update

Figure 5.6.2.2.3-1 depicts a scenario where a service consumer sends a request to the UAE Server to request the update of an existing UAV Dynamic Information Subscription (see also clause 7.8 of 3GPP°TS°23.255°[6]).

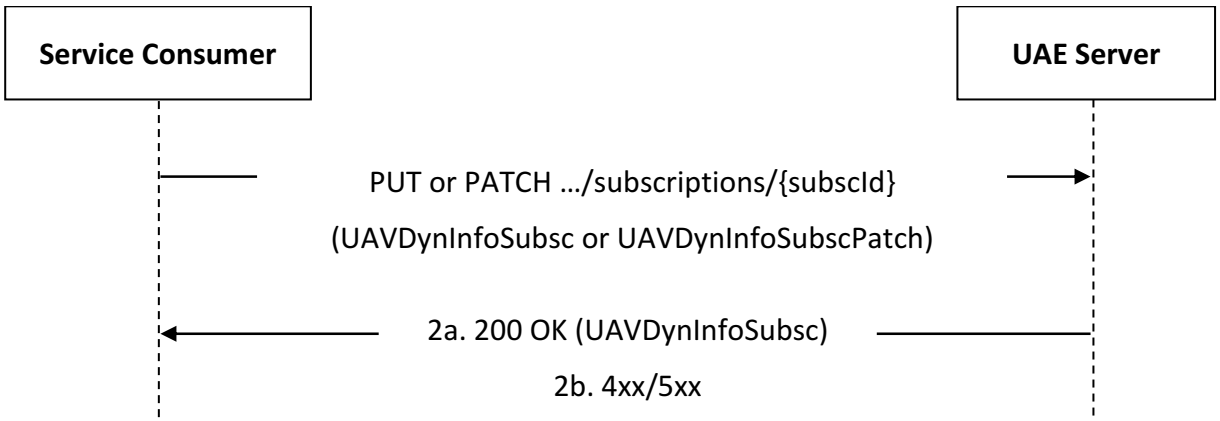

Figure 5.6.2.2.3-1: Procedure for UAV Dynamic Information Subscription Update

1. In order to request the update of an existing UAV Dynamic Information Subscription, the service consumer shall send an HTTP PUT/PATCH request to the UAE Server, targeting the URI of the corresponding "Individual UAV Dynamic Information Subscription" resource, with the request body including either:

   - the updated representation of the resource within the UAVDynInfoSubsc data structure, in case the HTTP PUT method is used; or

   - the requested modifications to the resource within the UAVDynInfoSubscPatch data structure, in case the HTTP PATCH method is used.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

2a. Upon success, the UAE Server shall update the targeted "Individual UAV Dynamic Information Subscription" resource accordingly and respond with either:

   - an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual UAV Dynamic Information Subscription" resource within the UAVDynInfoSubsc data structure; or

   - an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 6.5.7.

5.6.2.2.4 UAV Dynamic Information Subscription Deletion

Figure 5.6.2.2.4-1 depicts a scenario where a service consumer sends a request to the UAE Server to request the deletion of an existing UAV Dynamic Information Subscription (see also clause 7.8 of 3GPP°TS°23.255°[6]).

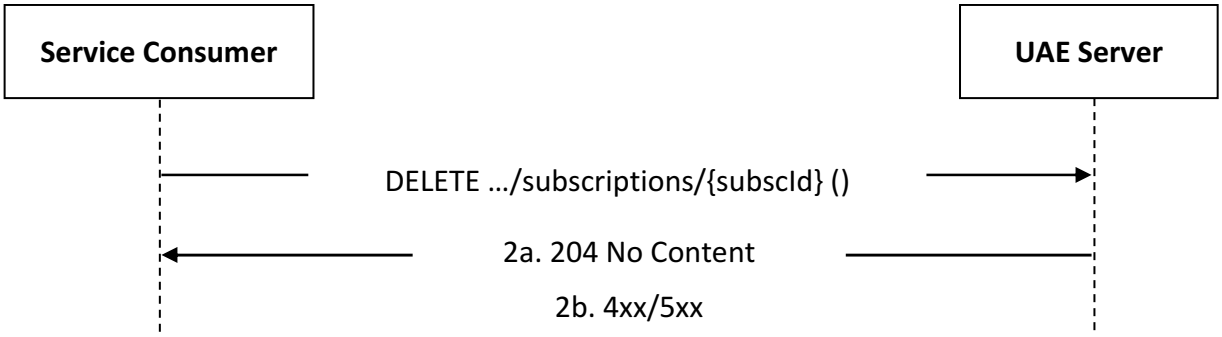

Figure 5.6.2.2.4-1: Procedure for UAV Dynamic Information Subscription Deletion

1. In order to request the deletion of an existing UAV Dynamic Information Subscription, the service consumer shall send an HTTP DELETE request to the UAE Server targeting the corresponding "Individual UAV Dynamic Information Subscription" resource.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation/update of the targeted resource) can initiate this request.

2a. Upon success, the UAE Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 6.5.7.

5.6.2.3 UAE_UAVDynamicInfo_Notify

5.6.2.3.1 General

This service operation is used by a UAE Server to notify a previously subscribed service consumer on:

- UAV dynamic information event(s).

The following procedures are supported by the "UAE_UAVDynamicInfo_Notify" service operation:

- UAV Dynamic Information Notification.

5.6.2.3.2 UAV Dynamic Information Notification

Figure 5.6.2.3.2-1 depicts a scenario where the UAE Server sends a request to notify a previously subscribed service consumer on UAV dynamic information event(s) (see also clause 7.8 of 3GPP°TS°23.255°[6]).

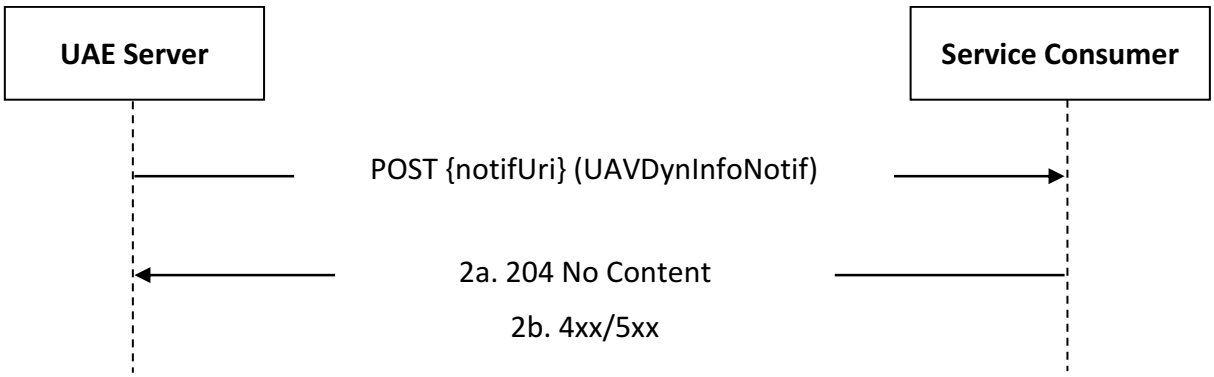

Figure 5.6.2.3.2-1: Procedure for UAV Dynamic Information Notification

1. In order to notify a previously subscribed service consumer on UAV dynamic information event(s), the UAE Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}", where the "notifUri" variable is set to the value received from the service consumer during the creation/update of the corresponding UAV Dynamic Information Subscription using the procedures defined in clause 5.6.2.2, and the request body including the UAVDynInfoNotif data structure.

2a. Upon success, the service consumer shall respond to the UAE Server with an HTTP "204 No Content" status code to acknowledge the successful reception and processing of the notification.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.5.7.

6 API Definitions

6.1 UAE_C2OperationModeManagement Service API

6.1.1 Introduction

The UAE_C2OperationModeManagement service shall use the UAE_C2OperationModeManagement API.

The API URI of the UAE_C2OperationModeManagement API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [2], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [2].
- The <apiName> shall be "uae-c2opmode-mngt".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [2].

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.1, the UAE Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

6.1.2 Usage of HTTP

The provisions of clause 5.2.2 of 3GPP TS 29.122 [2] shall apply for the UAE_C2OperationModeManagement API.

6.1.3 Resources

There are no resources defined for this API in this release of the specification.

6.1.4 Custom Operations without associated resources

6.1.4.1 Overview

The structure of the custom operation URIs of the UAE_C2OperationModeManagement API is shown in Figure 6.1.4.1-1.

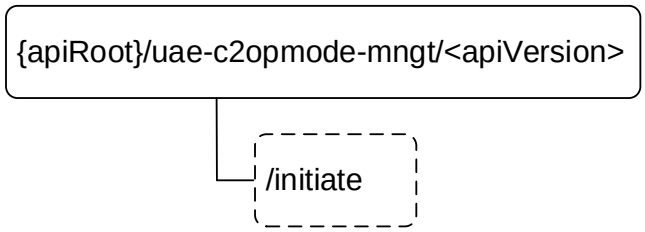

Figure 6.1.4.1-1: Custom operation URI structure of the UAE_C2OperationModeManagement API

Table 6.1.4.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the UAE_C2OperationModeManagement API.

Table 6.1.4.1-1: Custom operations without associated resources

Operation name	Custom operation URI	Mapped HTTP method	Description
Initiate	/initiate	POST	Enables a service consumer to request to provision C2 Operation Mode configuration information for a UAS (i.e. pair of UAV and UAV-C) to the UAE Server.

6.1.4.2 Operation: Initiate

6.1.4.2.1 Description

The custom operation enables a service consumer to initiate the configuration of C2 operation modes for a UAS (i.e. pair of UAV and UAV-C) by communicating the associated C2 Operation Mode configuration information to the UAE Server.

6.1.4.2.2 Operation Definition

This operation shall support the request data structures and the response data structures and response codes specified in tables 6.1.4.2.2-1 and 6.1.4.2.2-2.

Table 6.1.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ConfigureData	M	1	Contains the parameters to request to provision C2 Operation Mode configuration information for a UAS (i.e. pair of UAV and UAV-C).

Table 6.1.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
C2Result	M	1	200 OK	The communicated C2 Operation Mode configuration information was successfully received. The response body shall contain the feedback of the UAE Server on whether this C2 Operation Mode configuration request is confirmed (i.e. can be undertaken by the UAE Server) or not.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2]
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.1.4.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative UAE Server.

Table 6.1.4.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative UAE Server.

6.1.5 Notifications

6.1.5.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [2].

Table 6.1.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
C2 Operation Mode Management Completion Notification	{notificationUri}/c2mode-mngt-completion	c2mode-mngt-completion (POST)	This service operation enables a UAE Server to notify a previously subscribed service consumer on the C2 operation mode management completion status for the concerned UAS (i.e. pair of UAV and UAV-C).
Selected C2 Communication Mode Notification	{notificationUri}/inform-selec-c2mode	inform-selec-c2mode (POST)	This service operation enables a UAE Server to notify a previously subscribed service consumer on the C2 communication mode selected by the concerned UAS (i.e. pair of UAV and UAV-C).
C2 Communication Mode Switching Notification	{notificationUri}/inform-c2mode-switch	inform-c2mode-switch (POST)	This service operation enables a UAE Server to notify a previously subscribed service consumer when C2 communication mode switching is carried out for the concerned UAS (i.e. pair of UAV and UAV-C) and possibly request confirmation from the service consumer.

6.1.5.2 C2 Operation Mode Management Completion Notification

6.1.5.2.1 Description

The C2 Operation Mode Management Completion Notification is used by a UAE Server to notify a previously subscribed service consumer on the C2 operation mode management completion status for a UAS (i.e. pair of UAV and UAV-C).

6.1.5.2.2 Target URI

The Callback URI **"{notificationUri}/c2mode-mngt-completion"** shall be used with the callback URI variables defined in table 6.1.5.2.2-1.

Table 6.1.5.2.2-1: Callback URI variables

Name	Data type	Definition
notificationUri	Uri	String formatted as a URI containing the Callback URI.

6.1.5.2.3 Standard Methods

6.1.5.2.3.1 POST

This method shall support the request data structures specified in table 6.1.5.2.3.1-1 and the response data structures and response codes specified in table 6.1.5.2.3.1-2.

Table 6.1.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
C2OpModeMngtCompStatus	M	1	Contains the C2 operation mode management completion status for the concerned UAS (i.e. pair of UAV and UAV-C).

Table 6.1.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The C2 operation mode management completion status for the concerned UAS (i.e. pair of UAV and UAV-C) is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.1.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.1.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.1.5.3 Selected C2 Communication Mode Notification

6.1.5.3.1 Description

The Selected C2 Communication Mode Notification is used by a UAE Server to notify a previously subscribed service consumer on the C2 communication mode selected by a UAS (i.e. pair of UAV and UAV-C).

6.1.5.3.2 Target URI

The Callback URI **"{notificationUri}/inform-selec-c2mode"** shall be used with the callback URI variables defined in table 6.1.5.3.2-1.

Table 6.1.5.3.2-1: Callback URI variables

Name	Data type	Definition
notificationUri	Uri	String formatted as a URI containing the Callback URI.

6.1.5.3.3 Standard Methods

6.1.5.3.3.1 POST

This method shall support the request data structures specified in table 6.1.5.3.3.1-1 and the response data structures and response codes specified in table 6.1.5.3.3.1-2.

Table 6.1.5.3.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
SelectedC2CommModeNotif	M	1	Contains information on the C2 Communication Mode selected by the concerned UAS (i.e. pair of UAV and UAV-C).

Table 6.1.5.3.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The C2 Communication Mode selected by the concerned UAS (i.e. pair of UAV and UAV-C) is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.1.5.3.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.1.5.3.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.1.5.4 C2 Communication Mode Switching Notification

6.1.5.4.1 Description

The C2 Communication Mode Switching Notification is used by a UAE Server to notify a previously subscribed service consumer on the targeted C2 Communication Mode switching for a UAS (i.e. pair of UAV and UAV-C).

6.1.5.4.2 Target URI

The Callback URI **"{notificationUri}/inform-c2mode-switch"** shall be used with the callback URI variables defined in table 6.1.5.4.2-1.

Table 6.1.5.4.2-1: Callback URI variables

Name	Data type	Definition
notificationUri	Uri	String formatted as a URI containing the Callback URI.

6.1.5.4.3 Standard Methods

6.1.5.4.3.1 POST

This method shall support the request data structures specified in table 6.1.5.4.3.1-1 and the response data structures and response codes specified in table 6.1.5.4.3.1-2.

Table 6.1.5.4.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
C2CommModeSwitchNotif	M	1	Contains information on the targeted C2 Communication Mode switching for the concerned UAS (i.e. pair of UAV and UAV-C).

Table 6.1.5.4.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
C2Result	M	1	200 OK	The targeted C2 Communication Mode switching for the concerned UAS (i.e. pair of UAV and UAV-C) is successfully received. The response body shall contain the feedback of the service consumer on whether this C2 Communication Mode switching is confirmed (i.e. validated) or not.
n/a			204 No Content	The targeted C2 Communication Mode switching for the concerned UAS (i.e. pair of UAV and UAV-C) is successfully received and acknowledged, and the service consumer does not need to confirm (i.e. validate) it.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.1.5.4.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.1.5.4.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.1.6 Data Model

6.1.6.1 General

This clause specifies the application data model supported by the API.

Table 6.1.6.1-1 specifies the data types defined for the UAE_C2OperationModeManagement API.

Table 6.1.6.1-1: UAE_C2OperationModeManagement API specific Data Types

Data type	Clause defined	Description	Applicability
ConfigureData	6.1.6.2.2	Represents the parameters to request to provision C2 Operation Mode configuration information for a UAS (i.e. pair of UAV and UAV-C).	
SelectedC2CommModeNotif	6.1.6.2.3	Represents information on the C2 Communication Mode slected by a UAS (i.e. pair of UAV and UAV-C).	
C2CommModeSwitchNotif	6.1.6.2.4	Represents information on the targeted C2 Communication Mode switching for a UAS (i.e. pair of UAV and UAV-C).	
C2LinkQualityThrlds	6.1.6.2.11	Represents the C2 link quality thresholds.	
C2OpModeMngtCompStatus	6.1.6.2.9	Represents the C2 operation mode management completion status for a UAS (i.e. pair of UAV and UAV-C).	
C2OpModeStatus	6.1.6.3.6	Represents the C2 operation mode management completion status.	
C2Result	6.1.6.2.5	Represents the result of an action related to C2 of a UAS.	
C2ServiceArea	6.1.6.2.8	Represents a C2 service area.	
C2SwitchPolicies	6.1.6.2.10	Represents the C2 operation mode switching policies.	
UasId	6.1.6.2.6	Represents the identifier of a UAS (i.e. pair of UAV and UAV-C).	
UavId	6.1.6.2.7	Represents the identifier of a UAV (e.g. UAV, UAV-C).	
C2CommMode	6.1.6.3.3	Represents the C2 Communication Modes.	
C2CommModeSwitching	6.1.6.3.4	Represents the C2 Communication Mode Switching types.	
C2SwitchingCause	6.1.6.3.5	Represents the C2 Communication Mode switching cause.	

Table 6.1.6.1-2 specifies data types re-used by the UAE_C2OperationModeManagement API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the UAE_C2OperationModeManagement API.

Table 6.1.6.1-2: UAE_C2OperationModeManagement API re-used Data Types

Data type	Reference	Comments	Applicability
ExternalGroupId	3GPP TS 29.122 [2]	Represents an external group identifier.	
GeographicArea	3GPP TS 29.572 [8]	Represents a geographical area.	
Gpsi	3GPP TS 29.571 [7]	Represents a GPSI.	
Ncgi	3GPP TS 29.571 [7]	Represents an NCGI.	
PacketLossRate	3GPP TS 29.571 [7]	Represents the packet loss rate.	
SupportedFeatures	3GPP TS 29.571 [7]	Used to negotiate the applicability of the optional features.	
Tai	3GPP TS 29.571 [7]	Represents a tracking area identifier.	
Uri	3GPP TS 29.122 [2]	Represents a URI.	

6.1.6.2 Structured data types

6.1.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

6.1.6.2.2 Type: ConfigureData

Table 6.1.6.2.2-1: Definition of type ConfigureData

Attribute name	Data type	P	Cardinality	Description	Applicability
uassId	Uri	M	1	Contains the identity of the service consumer communicating the C2 Operation Mode configuration information for a UAS (i.e. pair of UAV and UAV-C). It takes the form of a URI.	
uasId	UasId	M	1	Contains the identity of the UAS (i.e. pair of UAV and UAV-C) to which the provided C2 Operation Mode configuration information is destined. This shall be either in the form of a UAS identifier (e.g. group ID) or a collection of individual identifiers (e.g. CAA level UAV ID, GPSI) of the UAV and UAV-C composing the UAS.	
allowedC2CommModes	array(C2CommMode)	M	1..N	Contains the allowed C2 communication modes for the UAS (i.e. pair of UAV and UAV-C) identified by the "uasId" attribute.	
c2CommModeSwitchTypes	array(C2CommModeSwitching)	M	1..N	Contains the C2 Communication Mode switching types to be supported by the UAE Server for the UAS (i.e. pair of UAV and UAV-C) identified by the "uasId" attribute. The possible switching types are: - from "Direct C2 Communication" to "Network-Assisted C2 Communication"; - from "Network-Assisted C2 Communication" to "Direct C2 Communication"; - from "Direct C2 Communication" to "UTM-Navigated C2 Communication"; and/or - from "Network-Assisted C2 Communication" to "UTM-Navigated C2 Communication".	
notificationUri	Uri	M	1	Contains the notification URI via which the notifications shall be delivered.	
primaryC2CommMode	C2CommMode	M	1	Contains the primary C2 communication mode to be used by the UAS (i.e. pair of UAV and UAV-C) identified by the "uasId" attribute. It shall be set to either "DIRECT_C2_COMMUNICATION" or "NETWORK_ASSISTED_C2_COMMUNICATION".	
secondaryC2CommMode	C2CommMode	O	0..1	Contains the secondary C2 communication mode to be used by the UAS (i.e. pair of UAV and UAV-C) identified by the "uasId" attribute. When provided, it shall be set to either "DIRECT_C2_COMMUNICATION" or "NETWORK_ASSISTED_C2_COMMUNICATION".	
c2SwitchPolicies	C2SwitchPolicies	M	1	Contains the C2 operation mode switching policies.	
c2ServiceArea	C2ServiceArea	O	0..1	Contains the service area within which the C2 operation mode management request applies. This shall be either a geographical area or a topological area.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.1.8. This attribute shall be provided if at least one feature is supported by the service consumer.	

6.1.6.2.3 Type: SelectedC2CommModeNotif

Table 6.1.6.2.3-1: Definition of type SelectedC2CommModeNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
uasId	UasId	M	1	Contains the identity of the UAS (i.e. pair of UAV and UAV-C) to which the notification is related. This shall be either in form of a UAS identifier (e.g. group ID) or a collection of individual identifiers (e.g. CAA level UAV ID, GPSI) of the UAV and UAV-C composing the UAS.	
selPrimaryC2CommMode	C2CommMode	M	1	Contains the primary C2 communication mode selected by the UAS (i.e. pair of UAV and UAV-C) identified by the "uasId" attribute. It shall be set to either "DIRECT_C2_COMMUNICATION" or "NETWORK_ASSISTED_C2_COMMUNICATION".	
selSecondaryC2CommMode	C2CommMode	O	0..1	Contains the secondary C2 communication mode to be used by the UAS (i.e. pair of UAV and UAV-C) identified by the "uasId" attribute. When provided, it shall be set to either "DIRECT_C2_COMMUNICATION" or "NETWORK_ASSISTED_C2_COMMUNICATION".	

6.1.6.2.4 Type: C2CommModeSwitchNotif

Table 6.1.6.2.4-1: Definition of type C2CommModeSwitchNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
uaeServerId	Uri	M	1	Contains the identifier of the UAE Server that is sending the notification and requesting C2 Communication Mode switching confirmation for a UAS (i.e. pair of UAV and UAV-C) from the service consumer.	
uasId	UasId	M	1	Contains the identifier of the UAS (i.e. pair of UAV and UAV-C) to which the provided C2 Communication Mode switching information is related. This shall be either in form of a UAS identifier (e.g. group ID) or a collection of individual identifiers (e.g. CAA level UAV ID, GPSI) of the UAV and UAV-C composing the UAS.	
c2CommModeSwitchType	C2CommModeSwitching	M	1	Contains the targeted C2 Communication Mode switching for the UAS (i.e. pair of UAV and UAV-C) identified by the "uasId" attribute.	
switchingCause	C2SwitchingCause	O	0..1	Contains the cause that triggers the C2 Communication Mode switching.	

6.1.6.2.5 Type: C2Result

Table 6.1.6.2.5-1: Definition of type C2Result

Attribute name	Data type	P	Cardinality	Description	Applicability
c2OpConfirmed	Boolean	M	1	This attribute indicates whether the requested action (e.g. targeted C2 Communication Mode switching, C2 Operation Mode configuration information provisioning) is confirmed or not. - "true" means that the requested action is confirmed or approved. - "false" means that the requested action is not confirmed or not approved.	
suppFeat	SupportedFeatures	C	0..1	Indicates the list of negotiated supported features. This attribute shall be provided by the UAE Server in the response to a request in which the service consumer provided the list of features that it supports.	

6.1.6.2.6 Type: UasId

Table 6.1.6.2.6-1: Definition of type UasId

Attribute name	Data type	P	Cardinality	Description	Applicability
groupId	ExternalGroupId	C	0..1	Contains the identity of a UAS (i.e. a pair of UAV and UAV-C) in the form of a group identifier. (NOTE)	
individualUasId	array(UavId)	C	0..N	Contains the identity of a UAS (i.e. a pair of UAV and UAV-C) in the form of a collection of individual identifiers of the UAV and UAV-C composing the UAS. (NOTE)	
NOTE: The "groupId" attribute and the "individualUasId" attribute are mutually exclusive.					

6.1.6.2.7 Type: UavId

Table 6.1.6.2.7-1: Definition of type UavId

Attribute name	Data type	P	Cardinality	Description	Applicability
gpsi	Gpsi	C	0..1	Contains the identity of a UAV or UAV-C in the form of a GPSI. (NOTE)	
caaId	string	C	0..1	Contains the identity of a UAV or UAV-C in the form of a CAA level UAV ID. (NOTE)	
NOTE: At least one of the "groupId" attribute or the "caaId" attribute shall be provided within the UavId data type.					

6.1.6.2.8 Type: C2ServiceArea

Table 6.1.6.2.8-1: Definition of type C2ServiceArea

Attribute name	Data type	P	Cardinality	Description	Applicability
ncgiList	array(Ncgi)	C	0..N	Contains a list of NR cell identifier(s) that constitutes the C2 service area.	
taiList	array(Tai)	C	0..N	Contains a list of tracking area identifier(s) that constitutes the C2 service area.	
geographicAreaList	array(GeographicArea)	C	0..N	Contains a list of geographic area(s) that constitutes the C2 service area.	
NOTE: Either the "geographicAreaList" attribute or the "ncgiList" attribute and/or the "taiList" attribute shall be provided.					

6.1.6.2.9 Type: C2OpModeMngtCompStatus

Table 6.1.6.2.9-1: Definition of type C2OpModeMngtCompStatus

Attribute name	Data type	P	Cardinality	Description	Applicability
uasId	UasId	M	1	Contains the identifier of the UAS (i.e. pair of UAV and UAV-C) to which the provided C2 operation mode management completion status information is related.	
status	C2OpModeStatus	M	1	Contains the C2 operation mode management completion status.	

6.1.6.2.10 Type: C2SwitchPolicies

Table 6.1.6.2.10-1: Definition of type C2SwitchPolicies

Attribute name	Data type	P	Cardinality	Description	Applicability
directC2LinkQualityThrlds	C2LinkQualityThrlds	O	0..1	Contains the threshold(s) used to evaluate the quality of the direct C2 link.	
uuC2LinkQualityThrlds	C2LinkQualityThrlds	O	0..1	Contains the threshold(s) used to evaluate the quality of the Network-Assisted (i.e. Uu based) C2 link.	
NOTE: Either the "directC2LinkQualityThrlds" attribute, the "uuC2LinkQualityThrlds" attribute or both shall be provided.					

6.1.6.2.11 Type: C2LinkQualityThrlds

Table 6.1.6.2.11-1: Definition of type C2LinkQualityThrlds

Attribute name	Data type	P	Cardinality	Description	Applicability
nrRsrpThrldLow	integer	O	0..1	Represents the lower RSRP value threshold for the direct C2 link. Value range: 0-127. (NOTE 1)	
nrRsrpThrldHigh	integer	O	0..1	Represents the upper RSRP value threshold for the direct C2 link. Value range: 0-127. (NOTE 2)	
nrRsrqThrldLow	integer	O	0..1	Represents the lower RSRQ value threshold for the direct C2 link. Value range: 0-127. (NOTE 1)	
nrRsrqThrldHigh	integer	O	0..1	Represents the upper RSRQ value threshold for the direct C2 link. Value range: 0-127. (NOTE 2)	
packetLossThrldLow	PacketLossRate	O	0..1	Represents the lower packet loss rate value threshold for the direct C2 link. (NOTE 1)	
packetLossThrldHigh	PacketLossRate	O	0..1	Represents the upper packet loss rate value threshold for the direct C2 link. (NOTE 2)	
NOTE 1: At least one of the "nrRsrpThrldLow", "nrRsrqThrldLow" or "packetLossThrldLow" attributes shall be provided. NOTE 2: At least one of the "nrRsrpThrldHigh", "nrRsrqThrldHigh" or "packetLossThrldHigh" attributes shall be provided.					

6.1.6.3 Simple data types and enumerations

6.1.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.1.6.3.2 Simple data types

The simple data types defined in table 6.1.6.3.2-1 shall be supported.

Table 6.1.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.1.6.3.3 Enumeration: C2CommMode

The enumeration C2CommMode represents C2 Communication Modes. It shall comply with the provisions of table 6.1.6.3.3-1.

Table 6.1.6.3.3-1: Enumeration C2CommMode

Enumeration value	Description	Applicability
DIRECT_C2_COMMUNICATION	Represents Direct C2 Communication mode.	
NETWORK_ASSISTED_C2_COMMUNICATION	Represents Network-Assisted C2 Communication mode.	
UTM_NAVIGATED_C2_COMMUNICATION	Represents UTM-Navigated C2 communication mode.	

6.1.6.3.4 Enumeration: C2CommModeSwitching

The enumeration C2CommModeSwitching represents C2 Communication Mode Switching types. It shall comply with the provisions of table 6.1.6.3.4-1.

Table 6.1.6.3.4-1: Enumeration C2CommModeSwitching

Enumeration value	Description	Applicability
DIRECT_TO_NETWORK_ASSISTED_C2	Represents the C2 Communication Mode switching from Direct C2 Communication mode to Network-Assisted C2 Communication mode.	
NETWORK_ASSISTED_TO_DIRECT_C2	Represents the C2 Communication Mode switching from Network-Assisted C2 Communication mode to Direct C2 Communication mode.	
DIRECT_TO_UTM_NAVIGATED_C2	Represents the C2 Communication Mode switching from Direct C2 Communication mode to UTM-Navigated C2 communication mode.	
NETWORK_ASSISTED_TO_UTM_NAVIGATED_C2	Represents the C2 Communication Mode switching from Network-Assisted C2 Communication mode to UTM-Navigated C2 communication mode.	

6.1.6.3.5 Enumeration: C2SwitchingCause

The enumeration C2SwitchingCause represents the C2 Communication Mode switching cause. It shall comply with the provisions of table 6.1.6.3.5-1.

Table 6.1.6.3.5-1: Enumeration C2SwitchingCause

Enumeration value	Description	Applicability
DIRECT_LINK_QUALITY_DEGRADATION	Indicates that the C2 Communication Mode switching was triggered due to a degradation in the direct radio link quality.	
DIRECT_LINK_AVAILABLE	Indicates that the C2 Communication Mode switching was triggered due to the availability of a direct link, i.e. direct radio link quality enables its usage.	
MOVING_BVLOS	Indicates that the C2 Communication Mode switching was triggered due to the UAV moving BVLOS.	
LOCATION_CHANGE	Indicates that the C2 Communication Mode switching was triggered due to an actual or expected location/mobility of the UAV (e.g. which impacts the UAV-to-UAV-C location).	
TRAFFIC_CONTROL_NEEDED	Indicates that the C2 Communication Mode switching was triggered due to the necessity to have air traffic control.	
SECURITY_REASONS	Indicates that the C2 Communication Mode switching was triggered due to security reasons.	
OTHER_REASONS	Indicates that the C2 Communication Mode switching was triggered due to other reasons (e.g. unpredictable event, unknown reason, weather conditions, topography, etc.).	

6.1.6.3.6 Enumeration: C2OpModeStatus

The enumeration C2OpModeStatus represents C2 Operation Mode Management Completion status. It shall comply with the provisions of table 6.1.6.3.6-1.

Table 6.1.6.3.6-1: Enumeration C2CommMode

Enumeration value	Description	Applicability
SUCCESSFUL	Indicates that the C2 operation mode configuration was successful.	
NOT_SUCCESSFUL	Indicates that the C2 operation mode configuration was not successful.	

6.1.6.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

6.1.6.5 Binary data

6.1.6.5.1 Binary Data Types

Table 6.1.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

6.1.7 Error Handling

6.1.7.1 General

For the UAE_C2OperationModeManagement API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [2]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [2] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [2].

In addition, the requirements in the following clauses are applicable for the UAE_C2OperationModeManagement API.

6.1.7.2 Protocol Errors

No specific protocol errors for the UAE_C2OperationModeManagement API are specified.

6.1.7.3 Application Errors

The application errors defined for the UAE_C2OperationModeManagement API are listed in Table 6.1.7.3-1.

Table 6.1.7.3-1: Application errors

Application Error	HTTP status code	Description

6.1.8 Feature negotiation

The optional features listed in table 6.1.8-1 are defined for the UAE_C2OperationModeManagement API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [2].

Table 6.1.8-1: Supported Features

Feature number	Feature Name	Description

6.1.9 Security

The provisions of clause 6 of 3GPP TS 29.122 [2] shall apply for the UAE_C2OperationModeManagement API.

6.2 UAE_RealtimeUAVStatus Service API

6.2.1 Introduction

The UAE_RealtimeUAVStatus service shall use the UAE_RealtimeUAVStatus API.

The API URI of the UAE_RealtimeUAVStatus API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [2], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [2].
- The <apiName> shall be "uae-uav-status".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [2].

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.2, the UAE Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

6.2.2 Usage of HTTP

The provisions of clause 5.2.2 of 3GPP TS 29.122 [2] shall apply for the UAE_RealtimeUAVStatus API.

6.2.3 Resources

6.2.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.2.3.1-1 depicts the resource URIs structure for the UAE_RealtimeUAVStatus API.

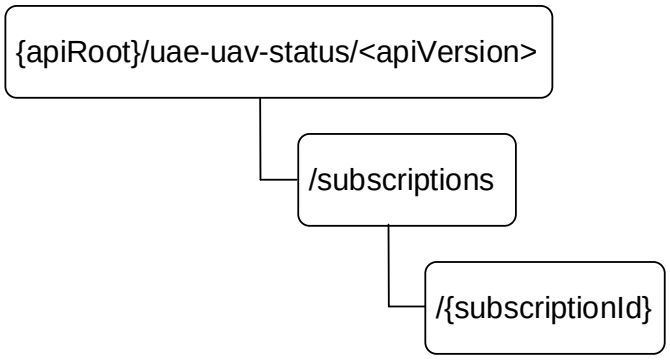

Figure 6.2.3.1-1: Resource URIs structure of the UAE_RealtimeUAVStatus API

Table 6.2.3.1-1 provides an overview of the resources and applicable HTTP methods for the UAE_RealtimeUAVStatus API.

Table 6.2.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Real-time UAV Status Subscriptions	/subscriptions	GET	Retrieve all the active real-time UAV status subscriptions managed by the UAE Server.
		POST	Request the creation of a subscription to real-time UAV status reporting.
Individual Real-time UAV Status Subscription	/subscriptions/{subscriptionId}	GET	Retrieve a real-time UAV status subscription resource identified by the provided subscription identifier.
		PUT	Update an existing real-time UAV status subscription resource identified by the provided subscription identifier.
		DELETE	Request the deletion of a real-time UAV status subscription resource identified by the provided subscription identifier.

6.2.3.2 Resource: Real-time UAV Status Subscriptions

6.2.3.2.1 Description

This resource represents the collection of real-time UAV status subscriptions managed by the UAE Server.

6.2.3.2.2 Resource Definition

Resource URI: **{apiRoot}/uae-uav-status/<apiVersion>/subscriptions**

This resource shall support the resource URI variables defined in table 6.2.3.2.2-1.

Table 6.2.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 5.2.4 of 3GPP TS 29.122 [2].

6.2.3.2.3 Resource Standard Methods

6.2.3.2.3.1 GET

The GET method allows a service consumer to retrieve all the active real-time UAV status subscriptions managed by the UAE Server.

This method shall support the URI query parameters specified in table 6.2.3.2.3.1-1.

Table 6.2.3.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.2.3.1-2 and the response data structures and response codes specified in table 6.2.3.2.3.1-3.

Table 6.2.3.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.2.3.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
array(RTUavStatusSubsc)	M	1..N	200 OK	Successful case. All the active real-time UAV status subscriptions managed by the UAE Server shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.2.3.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.2.3.2.3.2 POST

The POST method allows a service consumer to request the creation of a subscription to real-time UAV status reporting at the UAE Server.

This method shall support the URI query parameters specified in table 6.2.3.2.3.2-1.

Table 6.2.3.2.3.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.2.3.2-2 and the response data structures and response codes specified in table 6.2.3.2.3.2-3.

Table 6.2.3.2.3.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
RTUavStatusSubsc	M	1	Represents the parameters to request the creation of a subscription to real-time UAV status reporting.

Table 6.2.3.2.3.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
RTUavStatusSubsc	M	1	201 Created	Successful case. The subscription is successfully created and a representation of the created Individual Real-time UAV Status Subscription resource shall be returned. An HTTP "Location" header that contains the resource URI of the created Individual Real-time UAV Status Subscription resource shall also be included.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.2.3.2-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/uae-uav-status/<apiVersion>/subscriptions/{subscriptionId}

6.2.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.2.3.3 Resource: Individual Real-time UAV Status Subscription

6.2.3.3.1 Description

This resource represents an individual real-time UAV status subscription managed by the UAE Server.

6.2.3.3.2 Resource Definition

Resource URI: **{apiRoot}/uae-uav-status/<apiVersion>/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 6.2.3.3.2-1.

Table 6.2.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 5.2.4 of 3GPP TS 29.122 [2].
subscriptionId	string	Represents the subscription identifier.

6.2.3.3.3 Resource Standard Methods

6.2.3.3.3.1 GET

The GET method allows a service consumer to retrieve a real-time UAV status subscription identified by the subscription identifier included in the request URI (i.e. within the "/{subscriptionId}" path segment).

This method shall support the URI query parameters specified in table 6.2.3.3.3.1-1.

Table 6.2.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.3.3.1-2 and the response data structures and response codes specified in table 6.2.3.3.3.1-3.

Table 6.2.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.2.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
RTUavStatusSubsc	M	1	200 OK	Successful case. The requested Individual Real-time UAV Status Subscription resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.2.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.2.3.3.3.2 PUT

The PUT method allows a service consumer to request the update of an existing real-time UAV status subscription identified by the subscription identifier included in the request URI (i.e. within the "/{subscriptionId}" path segment).

This method shall support the URI query parameters specified in table 6.2.3.3.3.2-1.

Table 6.2.3.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.3.3.2-2 and the response data structures and response codes specified in table 6.2.3.3.3.2-3.

Table 6.2.3.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
RTUavStatusSubsc	M	1	Represents the parameters to request the update of an existing subscription to real-time UAV status reporting.

Table 6.2.3.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
RTUavStatusSubsc	M	1	200 OK	Successful case. The real-time UAV status subscription is successfully updated and a representation of the updated Individual Real-time UAV Status Subscription resource shall be returned.
n/a			204 No Content	Successful case. The real-time UAV status subscription is successfully updated.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.2.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.2.3.3.3.3 DELETE

The DELETE method allows a service consumer to request the deletion of an existing real-time UAV status subscription identified by the subscription identifier included in the request URI (i.e. within the "/{subscriptionId}" path segment).

This method shall support the URI query parameters specified in table 6.2.3.3.3.3-1.

Table 6.2.3.3.3.3-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.3.3.3-2 and the response data structures and response codes specified in table 6.2.3.3.3.3-3.

Table 6.2.3.3.3.3-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.2.3.3.3.3-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The real-time UAV status subscription is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.2.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.2.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.2.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

6.2.5 Notifications

6.2.5.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [2].

Table 6.2.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Real-time UAV Status Notification	{notificationUri}/uav-status	uav-status (POST)	This service operation enables a UAE Server to notify a previously subscribed service consumer on the real-time UAV status information.

6.2.5.2 Real-time UAV Status Notification

6.2.5.2.1 Description

The Real-time UAV Status Notification is used by a UAE Server to notify a previously subscribed service consumer on the real-time UAV status information.

6.2.5.2.2 Target URI

The Callback URI **"{notificationUri}/uav-status"** shall be used with the callback URI variables defined in table 6.2.5.2.2-1.

Table 6.2.5.2.2-1: Callback URI variables

Name	Data type	Definition
notificationUri	Uri	String formatted as a URI containing the Callback URI.

6.2.5.2.3 Standard Methods

6.2.5.2.3.1 POST

This method shall support the request data structures specified in table 6.2.5.2.3.1-1 and the response data structures and response codes specified in table 6.2.5.2.3.1-2.

Table 6.2.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
RTUavStatusNotif	M	1	Represents a real-time UAV status notification.

Table 6.2.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The real-time UAV status notification is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.2.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.2.6 Data Model

6.2.6.1 General

This clause specifies the application data model supported by the API.

Table 6.2.6.1-1 specifies the data types defined for the UAE_RealtimeUAVStatus API.

Table 6.2.6.1-1: UAE_RealtimeUAVStatus API specific Data Types

Data type	Clause defined	Description	Applicability
RTUavStatusSubsc	6.2.6.2.2	Represents the parameters to request the creation of a subscription to real-time UAV status reporting.	
RTUavStatusNotif	6.2.6.2.3	Represents a real-time UAV status notification.	
RTUavStatus	6.2.6.2.4	Represents real-time UAV status information.	
UavNetConnStatus	6.2.6.2.5	Represents the UAV network connection status information.	

Table 6.2.6.1-2 specifies data types re-used by the UAE_RealtimeUAVStatus API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the UAE_RealtimeUAVStatus API.

Table 6.2.6.1-2: UAE_RealtimeUAVStatus API re-used Data Types

Data type	Reference	Comments	Applicability
DateTime	3GPP TS 29.122 [2]	Represents a date and a time.	
MonitoringType	3GPP TS 29.122 [2]	Represents a monitoring event type.	
LocationInfo	3GPP TS 29.122 [2]	Represents user location information.	
SupportedFeatures	3GPP TS 29.571 [7]	Used to negotiate the applicability of the optional features.	
UavId	Clause 6.1.6.2.7	Represents a UAV identifier.	
Uri	3GPP TS 29.122 [2]	Represents a URI.	

6.2.6.2 Structured data types

6.2.6.2.1 Introduction

This clause defines the data structures to be used in resource representations.

6.2.6.2.2 Type: RTUavStatusSubsc

Table 6.2.6.2.2-1: Definition of type RTUavStatusSubsc

Attribute name	Data type	P	Cardinality	Description	Applicability
uassId	Uri	M	1	Contains the identity of the service consumer that is sending the request. It takes the form of a URI.	
uavIds	array(UavId)	M	1..N	Contains the identity of the UAV(s) to which the real-time UAV status subscription is related.	
notificationUri	Uri	M	1	Contains the notification URI via which the real-time UAV status notifications shall be delivered.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.2.8. This attribute shall be provided in the HTTP POST request for subscription resource creation and in the associated successful response.	

6.2.6.2.3 Type: RTUavStatusNotif

Table 6.2.6.2.3-1: Definition of type RTUavStatusNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
subscriptionId	string	M	1	Contains the identifier of the Individual Real-time UAV Status Subscription to which the notification is related.	
rTUavStatus	array(RTUavStatus)	M	1..N	Contains the real-time UAV status information for a UAV.	

6.2.6.2.4 Type: RTUavStatus

Table 6.2.6.2.4-1: Definition of type RTUavStatus

Attribute name	Data type	P	Cardinality	Description	Applicability
uavId	UavId	M	1	Contains the identity of the UAV to which the real-time UAV status information is related.	
uavNetConnStatus	UavNetConnStatus	C	0..1	Contains the network connection status information for the UAV. (NOTE)	
uavLocInfo	LocationInfo	M	0..1	Contains the location information for the UAV. (NOTE)	
NOTE: Either only the "uavLocInfo" attribute or both the "uavNetConnStatus" attribute and the "uavLocInfo" attribute shall be present.					

6.2.6.2.5 Type: UavNetConnStatus

Table 6.2.6.2.5-1: Definition of type UavNetConnStatus

Attribute name	Data type	P	Cardinality	Description	Applicability
statusInfo	MonitoringType	M	1	Contains the network connection status monitoring event that occurred. Only the "LOSS_OF_CONNECTIVITY", "UE_REACHABILITY", "COMMUNICATION_FAILURE" and "PDN_CONNECTIVITY_STATUS" values are applicable.	
timestamp	DateTime	M	1	Contains the timestamp of the provided network connection status information.	

6.2.6.3 Simple data types and enumerations

6.2.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.2.6.3.2 Simple data types

The simple data types defined in table 6.2.6.3.2-1 shall be supported.

Table 6.2.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.2.6.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

6.2.6.5 Binary data

6.2.6.5.1 Binary Data Types

Table 6.2.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

6.2.7 Error Handling

6.2.7.1 General

For the UAE_RealtimeUAVStatus API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [2]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [2] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [2].

In addition, the requirements in the following clauses are applicable for the UAE_RealtimeUAVStatus API.

6.2.7.2 Protocol Errors

No specific protocol errors for the UAE_RealtimeUAVStatus API are specified.

6.2.7.3 Application Errors

The application errors defined for the UAE_RealtimeUAVStatus API are listed in Table 6.2.7.3-1.

Table 6.2.7.3-1: Application errors

Application Error	HTTP status code	Description

6.2.8 Feature negotiation

The optional features listed in table 6.2.8-1 are defined for the UAE_RealtimeUAVStatus API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [2].

Table 6.2.8-1: Supported Features

Feature number	Feature Name	Description

6.2.9 Security

The provisions of clause 6 of 3GPP TS 29.122 [2] shall apply for the UAE_RealtimeUAVStatus API.

6.3 UAE_ChangeUSSManagement Service API

6.3.1 Introduction

The UAE_ChangeUSSManagement service shall use the UAE_ChangeUSSManagement API.

The API URI of the UAE_ChangeUSSManagement API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [2], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [2].
- The <apiName> shall be "uae-ucm".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [2].

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.3, the UAE Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

6.3.2 Usage of HTTP

The provisions of clause 5.2.2 of 3GPP TS 29.122 [2] shall apply for the UAE_ChangeUSSManagement API.

6.3.3 Resources

6.3.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.3.3.1-1 depicts the resource URIs structure for the UAE_ChangeUSSManagement API.

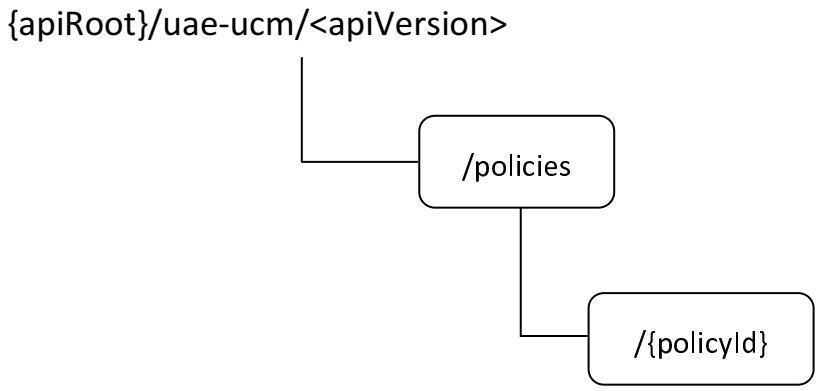

Figure 6.3.3.1-1: Resource URIs structure of the UAE_ChangeUSSManagement API

Table 6.3.3.1-1 provides an overview of the resources and applicable HTTP methods for the UAE_ChangeUSSManagement API.

Table 6.3.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
USS Change Policies	/policies	GET	Retrieve all the active USS Change Policies managed by the UAE Server.
		POST	Request the creation of a USS Change Policy.
Individual USS Change Policy	/policies/{policyId}	GET	Retrieve an existing "Individual USS Change Policy" resource.
		PUT	Request the update of an existing "Individual USS Change Policy" resource.
		PATCH	Request the modification of an existing "Individual USS Change Policy" resource.
		DELETE	Request the deletion of an existing "Individual USS Change Policy" resource.

6.3.3.2 Resource: USS Change Policies

6.3.3.2.1 Description

This resource represents the collection of USS Change Policies managed by the UAE Server.

6.3.3.2.2 Resource Definition

Resource URI: **{apiRoot}/uae-ucm/<apiVersion>/policies**

This resource shall support the resource URI variables defined in table 6.3.3.2.2-1.

Table 6.3.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.3.1.

6.3.3.2.3 Resource Standard Methods

6.3.3.2.3.1 GET

The HTTP GET method allows a service consumer to retrieve all the active USS Change Policies managed by the UAE Server.

This method shall support the URI query parameters specified in table 6.3.3.2.3.1-1.

Table 6.3.3.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.3.3.2.3.1-2 and the response data structures and response codes specified in table 6.3.3.2.3.1-3.

Table 6.3.3.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.3.3.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
array(USSChangePolicy)	M	0..N	200 OK	Successful case. All the active USS Change Policies managed by the UAE Server shall be returned. When there are no active USS Change Policies at the UAE Server, an empty array shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.3.3.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.3.3.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.3.3.2.3.2 POST

The HTTP POST method allows a service consumer to request the creation of a USS Change Policy at the UAE Server.

This method shall support the URI query parameters specified in table 6.3.3.2.3.2-1.

Table 6.3.3.2.3.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.3.3.2.3.2-2 and the response data structures and response codes specified in table 6.3.3.2.3.2-3.

Table 6.3.3.2.3.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
USSChangePolReq	M	1	Represents the parameters to request the creation of a USS Change Policy.

Table 6.3.3.2.3.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
USSChangePolResp	M	1	201 Created	Successful case. The USS Change Policy is successfully created and a representation of the created "Individual USS Change Policy" resource shall be returned. An HTTP "Location" header that contains the URI of the created resource shall also be included.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.3.3.2.3.2-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/uae-ucm/<apiVersion>/policies/{policyId}

6.3.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.3.3.3 Resource: Individual USS Change Policy

6.3.3.3.1 Description

This resource represents a USS Change Policy managed by the UAE Server.

6.3.3.3.2 Resource Definition

Resource URI: **{apiRoot}/uae-ucm/<apiVersion>/policies/{policyId}**

This resource shall support the resource URI variables defined in table 6.3.3.3.2-1.

Table 6.3.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.3.1.
policyId	string	Represents the identifier of the "Individual USS Change Policy".

6.3.3.3.3 Resource Standard Methods

6.3.3.3.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual USS Change Policy" resource at the UAE Server.

This method shall support the URI query parameters specified in table 6.3.3.3.3.1-1.

Table 6.3.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.3.3.3.3.1-2 and the response data structures and response codes specified in table 6.3.3.3.3.1-3.

Table 6.3.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.3.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
USSChangePolicy	M	1	200 OK	Successful case. The requested "Individual USS Change Policy" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.3.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.3.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.3.3.3.3.2 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual USS Change Policy" resource at the UAE Server.

This method shall support the URI query parameters specified in table 6.3.3.3.3.2-1.

Table 6.3.3.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.3.3.3.3.2-2 and the response data structures and response codes specified in table 6.3.3.3.3.2-3.

Table 6.3.3.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
USSChangePolicy	M	1	Represents the updated representation of the "Individual USS Change Policy" resource.

Table 6.3.3.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
USSChangePolicy	M	1	200 OK	Successful case. The "Individual USS Change Policy" resource is successfully updated and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual USS Change Policy" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.3.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.3.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.3.3.3.3.3 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual USS Change Policy" resource at the UAE Server.

This method shall support the URI query parameters specified in table 6.3.3.3.3.3-1.

Table 6.3.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.3.3.3.3.3-2 and the response data structures and response codes specified in table 6.3.3.3.3.3-3.

Table 6.3.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
USSChangePolicyPatch	M	1	Represents the parameters to request the modification of the "Individual USS Change Policy" resource.

Table 6.3.3.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
USSChangePolicy	M	1	200 OK	Successful case. The "Individual USS Change Policy" resource is successfully modified and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual USS Change Policy" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.3.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.3.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.3.3.3.3.4 DELETE

The HTTP DELETE method allows a service consumer to request the deletion of an existing "Individual USS Change Policy" resource at the UAE Server.

This method shall support the URI query parameters specified in table 6.3.3.3.3.4-1.

Table 6.3.3.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.3.3.3.3.4-2 and the response data structures and response codes specified in table 6.3.3.3.3.4-3.

Table 6.3.3.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.3.3.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual USS Change Policy" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.3.3.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.3.3.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.3.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.3.4 Custom Operations without associated resources

6.3.4.1 Overview

The structure of the custom operation URIs of the UAE_ChangeUSSManagement API is shown in Figure 6.3.4.1-1.

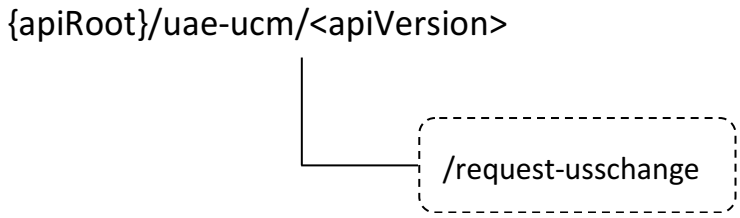

Figure 6.3.4.1-1: Custom operation URI structure of the UAE_ChangeUSSManagement API

Table 6.3.4.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the UAE_ChangeUSSManagement API.

Table 6.3.4.1-1: Custom operations without associated resources

Operation name	Custom operation URI	Mapped HTTP method	Description
RequestUSSChange	/request-usschange	POST	Enables a service consumer to request USS change to the UAE Server.

6.3.4.2 Operation: RequestUssChange

6.3.4.2.1 Description

The custom operation enables a service consumer to request USS change to the UAE Server.

6.3.4.2.2 Operation Definition

This operation shall support the request data structures and the response data structures and response codes specified in tables 6.3.4.2.2-1 and 6.3.4.2.2-2.

Table 6.3.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
USSChangeReq	M	1	Contains the parameters to request USS change.

Table 6.3.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The USS change request is successfully received and processed.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2]
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.3.4.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative UAE Server.

Table 6.3.4.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative UAE Server.

6.3.5 Notifications

6.3.5.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [2].

Table 6.3.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
USS Change Notification	{notifUri}	POST	This service operation enables a UAE Server to notify a previously subscribed service consumer on USS change related event(s).

6.3.5.2 USS Change Notification

6.3.5.2.1 Description

The USS Change Notification is used by a UAE Server to notify a previously subscribed service consumer on USS Change related event(s).

6.3.5.2.2 Target URI

The Callback URI **"{notifUri}"** shall be used with the callback URI variables defined in table 6.3.5.2.2-1.

Table 6.3.5.2.2-1: Callback URI variables

Name	Data type	Definition
notifUri	Uri	Represents the callback URI encoded as a string formatted as a URI.

6.3.5.2.3 Standard Methods

6.3.5.2.3.1 POST

This method shall support the request data structures specified in table 6.3.5.2.3.1-1 and the response data structures and response codes specified in table 6.3.5.2.3.1-2.

Table 6.3.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
USSChangeNotif	M	1	Represents the USS Change Notification.

Table 6.3.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The USS Change Notification is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.3.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.3.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.3.6 Data Model

6.3.6.1 General

This clause specifies the application data model supported by the API.

Table 6.3.6.1-1 specifies the data types defined for the UAE_ChangeUSSManagement API.

Table 6.3.6.1-1: UAE_ChangeUSSManagement API specific Data Types

Data type	Clause defined	Description	Applicability
UssChangeEvent	6.3.6.3.4	Represents a mobility event.	
MultiUssPol	6.3.6.2.6	Represents a Multi-USS policy.	
ServArea	6.3.6.2.7	Represents a service area.	
ServReq	6.3.6.2.10	Represents a service requirement.	
UasRoute	6.3.6.2.8	Represents the UAS route.	
UssChangeEvent	6.3.6.3.3	Represents a USS Change Event.	
USSChangeNotif	6.3.6.2.13	Represents a USS Change Notification.	
USSChangePolReq	6.3.6.2.2	Represents the parameters to request the creation of a USS Change Policy.	
USSChangePolResp	6.3.6.2.3	Represents the response to a USS Change Policy create request.	
USSChangePolicy	6.3.6.2.4	Represents a USS Change Policy.	
USSChangePolicyPatch	6.3.6.2.5	Represents the parameters to request the modification of a USS Change Policy.	
USSChangeReq	6.3.6.2.11	Represents the parameters to request for USS change.	
UssChgInfo	6.3.6.2.14	Represents the USS change trigger information.	
UssId	6.3.6.3.2	Represents the identifier of a USS.	
UssInfo	6.3.6.2.9	Represents USS information.	
TgtUssInfo	6.3.6.2.12	Represents the target USS related information.	

Table 6.3.6.1-2 specifies data types re-used by the UAE_ChangeUSSManagement API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the UAE_ChangeUSSManagement API.

Table 6.3.6.1-2: UAE_ChangeUSSManagement API re-used Data Types

Data type	Reference	Comments	Applicability
Bytes	3GPP TS 29.122 [2]	Represents a sequence of bytes.	
Dnai	3GPP TS 29.571 [7]	Identifies a DNAI.	
EndPoint	3GPP TS 29.558 [13]	Represents endpoint information.	
GeographicArea	3GPP TS 29.572 [8]	Represents a geographical area.	
Ncgi	3GPP TS 29.571 [7]	Represents an NCGI.	
SupportedFeatures	3GPP TS 29.571 [7]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
Tai	3GPP TS 29.571 [7]	Represents a tracking area identifier.	
UasId	Clause 6.1.6.2.6	Represents a UAV identifier.	
Uri	3GPP TS 29.122 [2]	Represents a URI.	

6.3.6.2 Structured data types

6.3.6.2.1 Introduction

This clause defines the data structures to be used in resource representations.

6.3.6.2.2 Type: USSChangePolReq

Table 6.3.6.2.2-1: Definition of type USSChangePolReq

Attribute name	Data type	P	Cardinality	Description	Applicability
requestorId	Uri	M	1	Contains the identity of the service consumer that is sending the request.	
ussChangePol	USSChangePolicy	M	1	Contains the USS Change Policy that shall be created.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.3.8. This attribute shall be present only when feature negotiation needs to take place.	

6.3.6.2.3 Type: USSChangePolResp

Table 6.3.6.2.3-1: Definition of type USSChangePolResp

Attribute name	Data type	P	Cardinality	Description	Applicability
ussChangePol	USSChangePolicy	M	1	Contains the created USS Change Policy.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.3.8. This attribute shall be present only when feature negotiation needs to take place and this attribute was present in the corresponding request.	

6.3.6.2.4 Type: USSChangePolicy

Table 6.3.6.2.4-1: Definition of type USSChangePolicy

Attribute name	Data type	P	Cardinality	Description	Applicability
uasId	UasId	M	1	Contains the identifier of the UAS (i.e. pair of UAV and UAV-C) to which the provided USS Change Policy is related. This shall be either in form of a UAS identifier (e.g. group ID) or a collection of individual identifiers (e.g. CAA level UAV ID, GPSI) of the UAV and UAV-C composing the UAS.	
notifUri	Uri	M	1	Contains the notification URI via which the USS Change management related notifications shall be delivered.	
uasRegArea	ServArea	O	0..1	Contains the registration area within which the UAS is allowed to fly.	
uasAllowedRoute	array(UasRoute)	O	1..N	Contains the allowed route(s) for the UAS within the UAS registration area provided by the "uasRegArea" attribute. This attribute shall be present only if the "uasRegArea" attribute is present.	
multiUssPol	MultiUssPol	O	0..1	Contains the multi-USS policy management container consisting of the requirements and policies for multi-USS management.	

6.3.6.2.5 Type: USSChangePolicyPatch

Table 6.3.6.2.5-1: Definition of type USSChangePolicyPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
notifUri	Uri	O	0..1	Contains the updated notification URI via which the USS Change management related notifications shall be delivered.	
uasRegArea	ServArea	O	0..1	Contains the updated registration area within which the UAS is allowed to fly.	
uasAllowedRoute	array(UasRoute)	O	1..N	Contains the updated allowed route for the UAS within the UAS registration area provided by the "uasRegArea" attribute. This attribute may be present only if the "uasRegArea" attribute is present.	
multiUssPol	MultiUssPol	O	0..1	Contains the updated multi-USS policy management container.	

6.3.6.2.6 Type: MultiUssPol

Table 6.3.6.2.6-1: Definition of type MultiUssPol

Attribute name	Data type	P	Cardinality	Description	Applicability
servingUssId	UssId	M	1	Contains the identifier of the serving USS.	
servingUssInfo	string	M	1	Contains additional serving USS related information (e.g., related to switching to target USSs).	
ussChangeArea	ServArea	M	1	Contains the area within which the where the Multi-USS management policy applies	
allowedTgtUsss	array(UssInfo)	O	1..N	Contains the allowed target USS(s) related information.	

6.3.6.2.7 Type: ServArea

Table 6.3.6.2.7-1: Definition of type ServArea

Attribute name	Data type	P	Cardinality	Description	Applicability
ncgiList	array(Ncgi)	C	1..N	Contains a list of NR cell identifier(s) that constitutes the service area.	
taiList	array(Tai)	C	1..N	Contains a list of tracking area identifier(s) that constitutes the service area.	
geographicAreaList	array(GeographicArea)	C	1..N	Contains a list of geographic area(s) that constitute the service area.	
NOTE: Either the "geographicAreaList" attribute, or the "ncgiList" attribute and/or the "taiList" attribute shall be provided.					

6.3.6.2.8 Type: UasRoute

Table 6.3.6.2.8-1: Definition of type UasRoute

Attribute name	Data type	P	Cardinality	Description	Applicability
routeInfo	map(GeographicArea)	M	2..N1	Contains a list of two or more ordered geographic area(s) that constitute the UAS route. The key of the map shall be an unsigned integer (with the minimum value being 1) indicating the order of the geographic area, provided within the corresponding map entry, in the derivation of the route, with the first map entry being the start of the route and the last entry of the map being the end of the route.	

6.3.6.2.9 Type: UssInfo

Table 6.3.6.2.9-1: Definition of type UssInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
ussId	UssId	M	1	Contains the identifier of the USS.	
ussServArea	ServArea	M	1	Contains service area of the USS.	
ussServReqs	array(ServReq)	M	1..N	Contains the USS related service requirements.	
dnais	array(Dnai)	M	1..N	Contains the list of DNAI(s) associated with the USS.	
lunId	string	M	1	Contains the identifier of the LUN to which the USS belongs.	

6.3.6.2.10 Type: ServReq

Table 6.3.6.2.10-1: Definition of type ServReq

Attribute name	Data type	P	Cardinality	Description	Applicability
reqName	string	M	1	Contains the USS service requirement name.	
reqValue	Bytes	M	1	Contains the USS service requirement value.	

6.3.6.2.11 Type: USSChangeReq

Table 6.3.6.2.11-1: Definition of type USSChangeReq

Attribute name	Data type	P	Cardinality	Description	Applicability
requestorId	Uri	M	1	Contains the identity of the service consumer that is sending the request.	
uasId	UasId	M	1	Contains the identifier of the UAS (i.e. pair of UAV and UAV-C) to which the USS change request is related. This shall be either in form of a UAS identifier (e.g. group ID) or a collection of individual identifiers (e.g. CAA level UAV ID, GPSI) of the UAV and UAV-C composing the UAS.	
targetUssId	UssId	M	1	Contains the identifier of the target USS.	
targetUssInfo	TgtUssInfo	O	0..1	Contains the the target USS related information.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.3.8. This attribute shall be present only when feature negotiation needs to take place.	

6.3.6.2.12 Type: TgtUssInfo

Table 6.3.6.2.12-1: Definition of type TgtUssInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
ussEdpt	EndPoint	M	1	Contains the target USS endpoint information.	
ussServReqs	array(ServReq)	O	1..N	Contains the target USS related service requirements.	
lunId	string	O	0..1	Contains the identifier of the LUN.	
dnais	array(Dnai)	O	1..N	Contains the allowed target USS(s) related information.	

6.3.6.2.13 Type: USSChangeNotif

Table 6.3.6.2.13-1: Definition of type USSChangePolConfigNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
event	UssChangeEvent	M	1	Contains the reported USS change event.	
polConfigStatus	boolean	C	0..1	Indicates the status of the USS change policy configuration. - "true" indicates that the USS change policy configuration was successful. - "false" indicates that the USS change policy configuration failed. This attribute shall be present only when the reported event within the "event" attribute is "USS_CHG_POL_CONFIG_STATUS".	
tgtUssId	UssId	C	0..1	Contains the identifier of the target USS towards which the UAE Client assisted USS change was performed. This attribute shall be present only when the reported event within the "event" attribute is "UAE_CLIENT_ASSIST_USS_CHG".	
ussChgInfo	UssChgInfo	C	0..1	Contains the identifier target USS towards which the UAE Client assisted USS change was performed. This attribute shall be present only when the reported event within the "event" attribute is "UAE_SERVER_TRIGG_USS_CHG".	

6.3.6.2.14 Type: UssChgInfo

Table 6.3.6.2.14-1: Definition of type UssChgInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
servingUssId	UssId	M	1	Contains the identifier of the serving USS.	
targetUssId	UssId	O	0..1	Contains the identifier of the target USS.	
lunId	string	O	0..1	Contains the identifier of the LUN.	
mobilityEvent	MobilityEvent	O	0..1	Contains the reported mobility event.	

6.3.6.3 Simple data types and enumerations

6.3.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.3.6.3.2 Simple data types

The simple data types defined in table 6.3.6.3.2-1 shall be supported.

Table 6.3.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability
UssId	string	Represents the identifier of a USS, encoded in the form of e.g., an FQDN, a URI, etc.	

6.3.6.3.3 Enumeration: UssChangeEvent

The enumeration UssChangeEvent represents a USS Change Event. It shall comply with the provisions defined in table 6.3.6.3.3-1.

Table 6.3.6.3.3-1: Enumeration UssChangeEvent

Enumeration value	Description	Applicability
USS_CHG_POL_CONFIG_STATUS	Indicates that the USS Change Event is USS Change Policy Configuration Status. This event is implicitly subscribed by the service consumer.	
UAE_CLIENT_ASSIST_USS_CHG	Indicates that the USS Change Event is UAE Client Assisted USS Change. This event is implicitly subscribed by the service consumer.	
UAE_SERVER_TRIGG_USS_CHG	Indicates that the USS Change Event is UAE Server initiated USS Change Trigger. This event is implicitly subscribed by the service consumer.	

6.3.6.3.4 Enumeration: MobilityEvent

The enumeration MobilityEvent represents a mobility event. It shall comply with the provisions defined in table 6.3.6.3.4-1.

Table 6.3.6.3.4-1: Enumeration MobilityEvent

Enumeration value	Description	Applicability
OUT_OF_USS_SERV_AREA	Indicates that the mobility event is the expected UAV mobility to a service area that is outside the current serving USS's service area.	

6.3.6.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

6.3.6.5 Binary data

6.3.6.5.1 Binary Data Types

Table 6.3.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

6.3.7 Error Handling

6.3.7.1 General

For the UAE_ChangeUSSManagement API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [2]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [2] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [2].

In addition, the requirements in the following clauses are applicable for the UAE_ChangeUSSManagement API.

6.3.7.2 Protocol Errors

No specific protocol errors for the UAE_ChangeUSSManagement API are specified.

6.3.7.3 Application Errors

The application errors defined for the UAE_ChangeUSSManagement API are listed in Table 6.3.7.3-1.

Table 6.3.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

6.3.8 Feature negotiation

The optional features listed in table 6.3.8-1 are defined for the UAE_ChangeUSSManagement API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [2].

Table 6.3.8-1: Supported Features

Feature number	Feature Name	Description

6.3.9 Security

The provisions of clause 6 of 3GPP TS 29.122 [2] shall apply for the UAE_ChangeUSSManagement API.

6.4 UAE_DAASupport Service API

6.4.1 Introduction

The UAE_DAASupport service shall use the UAE_DAASupport API.

The API URI of the UAE_DAASupport Service API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [2], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [2].
- The <apiName> shall be "uae-daa".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [2].

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.4, the UAE Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

6.4.2 Usage of HTTP

The provisions of clause 5.2.2 of 3GPP TS 29.122 [2] shall apply for the UAE_DAASupport API.

6.4.3 Resources

6.4.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.4.3.1-1 depicts the resource URIs structure for the UAE_DAASupport API.

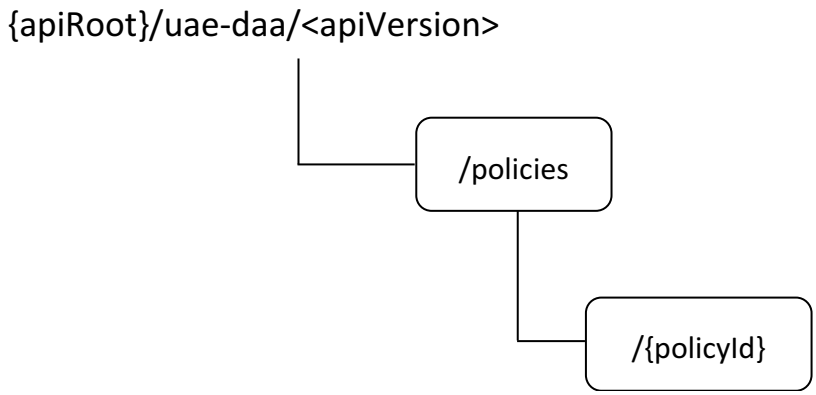

Figure 6.4.3.1-1: Resource URIs structure of the UAE_DAASupport API

Table 6.4.3.1-1 provides an overview of the resources and applicable HTTP methods for the UAE_DAASupport API.

Table 6.4.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
DAA Policies	/policies	GET	Retrieve all the active DAA Policies managed by the UAE Server.
		POST	Request the creation of a DAA Policy.
Individual DAA Policy	/policies/{policyId}	GET	Retrieve an existing "Individual DAA Policy" resource.
		PUT	Request the update of an existing "Individual DAA Policy" resource.
		PATCH	Request the modification of an existing "Individual DAA Policy" resource.
		DELETE	Request the deletion of an existing "Individual DAA Policy".

6.4.3.2 Resource: DAA Policies

6.4.3.2.1 Description

This resource represents the collection of DAA Policies managed by the UAE Server.

6.4.3.2.2 Resource Definition

Resource URI: **{apiRoot}/uae-daa/<apiVersion>/policies**

This resource shall support the resource URI variables defined in table 6.4.3.2.2-1.

Table 6.4.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.4.1.

6.4.3.2.3 Resource Standard Methods

6.4.3.2.3.1 GET

The HTTP GET method allows a service consumer to retrieve all the active DAA Policies managed by the UAE Server.

This method shall support the URI query parameters specified in table 6.4.3.2.3.1-1.

Table 6.4.3.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.2.3.1-2 and the response data structures and response codes specified in table 6.4.3.2.3.1-3.

Table 6.4.3.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.4.3.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
array(DAAPolicy)	M	1..N	200 OK	Successful case. All the active DAA Policies managed by the UAE Server shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.4.3.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.4.3.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.4.3.2.3.2 POST

The HTTP POST method allows a service consumer to request the creation of a DAA Policy at the UAE Server.

This method shall support the URI query parameters specified in table 6.4.3.2.3.2-1.

Table 6.4.3.2.3.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.2.3.2-2 and the response data structures and response codes specified in table 6.4.3.2.3.2-3.

Table 6.4.3.2.3.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
DAAPolReq	M	1	Represents the parameters to request the creation of a DAA Policy.

Table 6.4.3.2.3.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DAAPolResp	M	1	201 Created	Successful case. The DAA Policy is successfully created and a representation of the created "Individual DAA Policy" resource shall be returned. An HTTP "Location" header that contains the URI of the created resource shall also be included.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.4.3.2.3.2-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/uae-daa/<apiVersion>/policies/{policyId}

6.4.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.4.3.3 Resource: Individual DAA Policy

6.4.3.3.1 Description

This resource represents a DAA Policy managed by the UAE Server.

6.4.3.3.2 Resource Definition

Resource URI: **{apiRoot}/uae-daa/<apiVersion>/policies/{policyId}**

This resource shall support the resource URI variables defined in table 6.4.3.3.2-1.

Table 6.4.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.4.1.
policyId	string	Represents the identifier of the "Individual DAA Policy" resource.

6.4.3.3.3 Resource Standard Methods

6.4.3.3.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual DAA Policy" resource at the UAE Server.

This method shall support the URI query parameters specified in table 6.4.3.3.3.1-1.

Table 6.4.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.3.3.1-2 and the response data structures and response codes specified in table 6.4.3.3.3.1-3.

Table 6.4.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.4.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DAAPolicy	M	1	200 OK	Successful case. The requested "Individual DAA Policy" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.4.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.4.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.4.3.3.3.2 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual DAA Policy" resource at the UAE Server.

This method shall support the URI query parameters specified in table 6.4.3.3.3.2-1.

Table 6.4.3.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.3.3.2-2 and the response data structures and response codes specified in table 6.4.3.3.3.2-3.

Table 6.4.3.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
DAAPolicy	M	1	Represents the updated representation of the "Individual DAA Policy" resource.

Table 6.4.3.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DAAPolicy	M	1	200 OK	Successful case. The "Individual DAA Policy" resource is successfully updated and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual DAA Policy" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.4.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.4.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.4.3.3.3.3 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual DAA Policy" resource at the UAE Server.

This method shall support the URI query parameters specified in table 6.4.3.3.3.3-1.

Table 6.4.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.3.3.3-2 and the response data structures and response codes specified in table 6.4.3.3.3.3-3.

Table 6.4.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
DAAPolicyPatch	M	1	Represents the parameters to request the modification of the "Individual DAA Policy" resource.

Table 6.4.3.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DAAPolicy	M	1	200 OK	Successful case. The "Individual DAA Policy" resource is successfully modified and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual DAA Policy" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.4.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.4.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.4.3.3.3.4 DELETE

The HTTP DELETE method allows a service consumer to request the deletion of an existing "Individual DAA Policy" resource at the UAE Server.

This method shall support the URI query parameters specified in table 6.4.3.3.3.4-1.

Table 6.4.3.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.3.3.4-2 and the response data structures and response codes specified in table 6.4.3.3.3.4-3.

Table 6.4.3.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.4.3.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual DAA Policy" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.4.3.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.4.3.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.4.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.4.4 Custom Operations without associated resources

6.4.4.1 Overview

The structure of the custom operation URIs of the UAE_DAASupport API is shown in Figure 6.4.4.1-1.

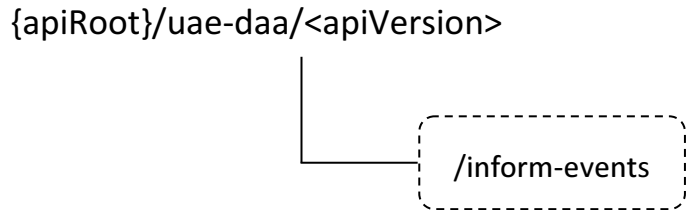

Figure 6.4.4.1-1: Custom operation URI structure of the UAE_DAASupport API

Table 6.4.4.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the UAE_DAASupport API.

Table 6.4.4.1-1: Custom operations without associated resources

Operation name	Custom operation URI	Mapped HTTP method	Description
InformDAAEvents	/inform-events	POST	Enables a service consumer to inform about and manage possible DAA related event(s).

6.4.4.2 Operation: InformDAAEvents

6.4.4.2.1 Description

The custom operation enables a service consumer to inform about and request the management of possible DAA related event(s) to the UAE Server.

6.4.4.2.2 Operation Definition

This operation shall support the request data structures and the response data structures and response codes specified in tables 6.4.4.2.2-1 and 6.4.4.2.2-2.

Table 6.4.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
InformDAAEvents Req	M	1	Contains the parameters to inform about and request the management of possible DAA related event(s).

Table 6.4.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The Inform DAA Events request is successfully received and processed.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2]
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.4.4.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative UAE Server.

Table 6.4.4.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative UAE Server.

6.4.5 Notifications

6.4.5.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [2].

Table 6.4.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
DAA Policy Configuration Completion Status Notification	{notifUri}/daa-policy	daa-policy (POST)	This service operation enables a UAE Server to notify a previously subscribed service consumer on the status of DAA Policy configuration.
DAA Events Notification	{notifUri}/daa-events	daa-events (POST)	This service operation enables a UAE Server to notify a previously subscribed service consumer of DAA related event(s).

6.4.5.2 DAA Policy Configuration Completion Status Notification

6.4.5.2.1 Description

The DAA Policy Configuration Completion Status Notification is used by a UAE Server to notify a previously subscribed service consumer on the status of DAA Policy configuration.

6.4.5.2.2 Target URI

The Callback URI **"{notifUri}/daa-policy"** shall be used with the callback URI variables defined in table 6.4.5.2.2-1.

Table 6.4.5.2.2-1: Callback URI variables

Name	Data type	Definition
notifUri	Uri	Represents the callback URI encoded as a string formatted as a URI.

6.4.5.2.3 Standard Methods

6.4.5.2.3.1 POST

This method shall support the request data structures specified in table 6.4.5.2.3.1-1 and the response data structures and response codes specified in table 6.4.5.2.3.1-2.

Table 6.4.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
DAAPolConfigNotif	M	1	Represents the DAA Policy Configuration Status Notification.

Table 6.4.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The DAA Policy Configuration Status notification is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.4.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.4.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.4.5.3 DAA Events Notification

6.4.5.3.1 Description

The DAA Events Notification is used by a UAE Server to notify a previously subscribed service consumer of DAA related event(s).

6.4.5.3.2 Target URI

The Callback URI **"{notifUri}/daa-events"** shall be used with the callback URI variables defined in table 6.4.5.3.2-1.

Table 6.4.5.3.2-1: Callback URI variables

Name	Data type	Definition
notifUri	Uri	Represents the callback URI encoded as a string formatted as a URI.

6.4.5.3.3 Standard Methods

6.4.5.3.3.1 POST

This method shall support the request data structures specified in table 6.4.5.3.3.1-1 and the response data structures and response codes specified in table 6.4.5.3.3.1-2.

Table 6.4.5.3.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
DAAEventsInfo	M	1	Represents the DAA Events Notification.

Table 6.4.5.3.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
DAAEventsInfo	M	1	200 OK	Successful case. The DAA Events Notification is successfully received and acknowledged, and updated/additional DAA related event information is returned in the response body.
n/a			204 No Content	Successful case. The DAA Events Notification is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.4.5.3.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.4.5.3.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.4.6 Data Model

6.4.6.1 General

This clause specifies the application data model supported by the API.

Table 6.4.6.1-1 specifies the data types defined for the UAE_DAASupport API.

Table 6.4.6.1-1: UAE_DAASupport API specific Data Types

Data type	Clause defined	Description	Applicability
DAAAppPolicy	6.4.6.2.6	Represents a DAA Application policy.	
DAAEvent	6.4.6.2.10	Represents a DAA event related information.	
DAAEventsInfo	6.4.6.2.9	Represents a DAA Events Notification.	
DAAPolConfigNotif	6.4.6.2.8	Represents a DAA Policy Configuration Status Notification.	
DAAPolReq	6.4.6.2.2	Represents the parameters to request the creation of a DAA Policy.	
DAAPolResp	6.4.6.2.3	Represents the response to a DAA Policy creation request.	
DAAPolicy	6.4.6.2.4	Represents the content of a DAA Policy.	
DAAPolicyPatch	6.4.6.2.5	Represents the parameters to request the modification of a DAA Policy.	
InformDAAEventsReq	6.4.6.2.7	Represents the parameters to report DAA related event(s).	

Table 6.4.6.1-2 specifies data types re-used by the UAE_DAASupport API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the UAE_DAASupport API.

Table 6.4.6.1-2: UAE_DAASupport API re-used Data Types

Data type	Reference	Comments	Applicability
Bytes	3GPP TS 29.122 [2]	Represents a sequence of bytes.	
LocationInfo	3GPP TS 29.122 [2]	Represents user location information.	
SupportedFeatures	3GPP TS 29.571 [7]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
UasId	Clause 6.1.6.2.6	Represents a UAV identifier.	
Uri	3GPP TS 29.122 [2]	Represents a URI.	

6.4.6.2 Structured data types

6.4.6.2.1 Introduction

This clause defines the data structures to be used in resource representations.

6.4.6.2.2 Type: DAAPolReq

Table 6.4.6.2.2-1: Definition of type DAAPolReq

Attribute name	Data type	P	Cardinality	Description	Applicability
requestorId	Uri	M	1	Contains the identity of the service consumer that is sending the request.	
daaPol	DAAPolicy	M	1	Contains the DAA Policy that is to be created.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.4.8. This attribute shall be present only when feature negotiation needs to take place.	

6.4.6.2.3 Type: DAAPolResp

Table 6.4.6.2.3-1: Definition of type DAAPolResp

Attribute name	Data type	P	Cardinality	Description	Applicability
daaPol	DAAPolicy	M	1	Contains the created DAA Policy.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.4.8. This attribute shall be present only when feature negotiation needs to take place and this attribute was present in the corresponding request.	

6.4.6.2.4 Type: DAAPolicy

Table 6.4.6.2.4-1: Definition of type DAAPolicy

Attribute name	Data type	P	Cardinality	Description	Applicability
uasId	UasId	M	1	Contains the identifier of the UAS (i.e., pair of UAV and UAV-C) to which the provided DAA Policy is related. This shall be either in form of a UAS identifier (e.g., group ID) or a collection of individual identifiers (e.g., CAA level UAV ID, GPSI) of the UAV and UAV-C composing the UAS.	
notifUri	Uri	M	1	Contains the notification URI via which DAA related notifications shall be delivered.	
daaAppPol	DAAAppPolicy	M	1	Contains the DAA Application policy consisting of the requirements and policies for DAA management.	

6.4.6.2.5 Type: DAAPolicyPatch

Table 6.4.6.2.5-1: Definition of type DAAPolicyPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
notifUri	Uri	O	0..1	Contains the updated notification URI via which DAA related notifications shall be delivered.	
daaAppPol	DAAAppPolicy	O	0..1	Contains the updated DAA Application policy.	

6.4.6.2.6 Type: DAAAppPolicy

Table 6.4.6.2.6-1: Definition of type DAAAppPolicy

Attribute name	Data type	P	Cardinality	Description	Applicability
polContainer	Bytes	C	0..1	Represents the content of the DAA Application Policy. (NOTE)	
NOTE: At least one of these attributes shall be present.					

6.4.6.2.7 Type: InformDAAEventsReq

Table 6.4.6.2.7-1: Definition of type InformDAAEventsReq

Attribute name	Data type	P	Cardinality	Description	Applicability
requestorId	Uri	M	1	Contains the identity of the service consumer that is sending the request.	
uasId	UasId	M	1	Contains the identifier of the UAS (i.e., pair of UAV and UAV-C) to which the DAA event information management request is related. This shall be either in form of a UAS identifier (e.g., group ID) or a collection of individual identifiers (e.g., CAA level UAV ID, GPSI) of the UAV and UAV-C composing the UAS.	
daaEventsInfo	array(DAAEvent)	M	1..N	Contains the detected DAA event information.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.4.8. This attribute shall be present only when feature negotiation needs to take place.	

6.4.6.2.8 Type: DAAPolConfigNotif

Table 6.4.6.2.8-1: Definition of type DAAPolConfigNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
status	DAAPolConfigStatus	M	1	Contains the DAA Policy configuration completion status.	

6.4.6.2.9 Type: DAAEventsInfo

Table 6.4.6.2.9-1: Definition of type DAAEventsInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
uasId	UasId	M	1	Contains the identifier of the UAS (i.e., pair of UAV and UAV-C) to which the DAA event information management request is related. This shall be either in form of a UAS identifier (e.g., group ID) or a collection of individual identifiers (e.g., CAA level UAV ID, GPSI) of the UAV and UAV-C composing the UAS.	
daaEventsInfo	array(DAAEvent)	M	1..N	Contains the detected DAA event information.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.4.8. This attribute shall be present only when feature negotiation needs to take place.	

6.4.6.2.10 Type: DAAEvent

Table 6.4.6.2.10-1: Definition of type DAAEvent

Attribute name	Data type	P	Cardinality	Description	Applicability
uasId	UasId	M	1	Contains the identifier of the UAS (i.e., pair of UAV and UAV-C) for which a potential flight path conflict is detected. This shall be either in form of a UAS identifier (e.g., group ID) or a collection of individual identifiers (e.g., CAA level UAV ID, GPSI) of the UAV and UAV-C composing the UAS.	
uasLocInfo	LocationInfo	M	1	Contains the location information of the UAS with which a potential flight path conflict is detected.	

6.4.6.3 Simple data types and enumerations

6.4.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.4.6.3.2 Simple data types

The simple data types defined in table 6.4.6.3.2-1 shall be supported.

Table 6.4.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.4.6.3.3 Enumeration: DAAPolConfigStatus

The enumeration DAAPolConfigStatus represents the DAA Policy configuration completion status. It shall comply with the provisions of table 6.4.6.3.3-1.

Table 6.4.6.3.3-1: Enumeration DAAPolConfigStatus

Enumeration value	Description	Applicability
SUCCESSFUL	Indicates that the DAA Policy configuration was successful.	
NOT_SUCCESSFUL	Indicates that the DAA Policy configuration was not successful.	

6.4.6.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

6.4.6.5 Binary data

6.4.6.5.1 Binary Data Types

Table 6.4.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

6.4.7 Error Handling

6.4.7.1 General

For the UAE_DAASupport API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [2]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [2] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [2].

In addition, the requirements in the following clauses are applicable for the UAE_DAASupport API.

6.4.7.2 Protocol Errors

No specific protocol errors for the UAE_DAASupport API are specified.

6.4.7.3 Application Errors

The application errors defined for the UAE_DAASupport API are listed in Table 6.4.7.3-1.

Table 6.4.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

6.4.8 Feature negotiation

The optional features listed in table 6.4.8-1 are defined for the UAE_DAASupport API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [2].

Table 6.4.8-1: Supported Features

Feature number	Feature Name	Description

6.4.9 Security

The provisions of clause 6 of 3GPP TS 29.122 [2] shall apply for the UAE_DAASupport API.

6.5 UAE_UAVDynamicInfo API

6.5.1 Introduction

The UAE_UAVDynamicInfo service shall use the UAE_UAVDynamicInfo API.

The API URI of the UAE_UAVDynamicInfo Service API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [2], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [2].
- The <apiName> shall be "uae-udi".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [2].

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.5, the UAE Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

6.5.2 Usage of HTTP

The provisions of clause 5.2.2 of 3GPP TS 29.122 [2] shall apply for the UAE_UAVDynamicInfo API.

6.5.3 Resources

6.5.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.5.3.1-1 depicts the resource URIs structure for the UAE_UAVDynamicInfo API.

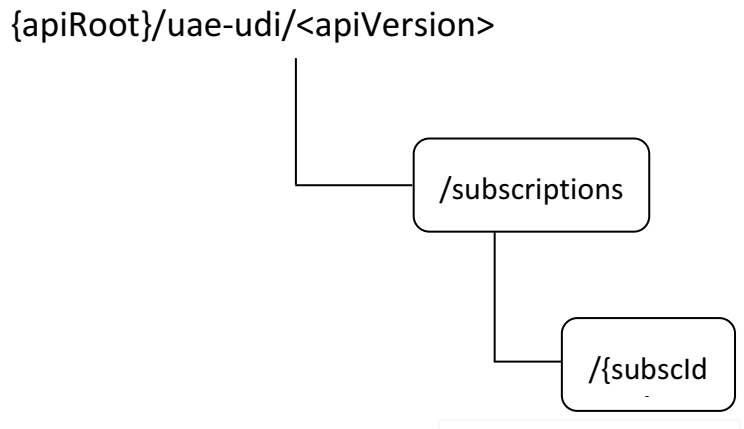

Figure 6.5.3.1-1: Resource URIs structure of the UAE_UAVDynamicInfo API

Table 6.5.3.1-1 provides an overview of the resources and applicable HTTP methods for the UAE_UAVDynamicInfo API.

Table 6.5.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
UAV Dynamic Information Subscriptions	/subscriptions	POST	Request the creation of a UAV Dynamic Information Subscription.
Individual UAV Dynamic Information Subscription	/sbscriptions/{subscId}	GET	Retrieve an existing "Individual UAV Dynamic Information Subscription" resource.
		PUT	Request the update of an existing "Individual UAV Dynamic Information Subscription" resource.
		PATCH	Request the modification of an existing "Individual UAV Dynamic Information Subscription" resource.
		DELETE	Request the deletion of an existing "Individual UAV Dynamic Information Subscription" resource.

6.5.3.2 Resource: UAV Dynamic Information Subscriptions

6.5.3.2.1 Description

This resource represents the collection of UAV Dynamic Information Subscriptions managed by the UAE Server.

6.5.3.2.2 Resource Definition

Resource URI: **{apiRoot}/uae-udi/<apiVersion>/subscriptions**

This resource shall support the resource URI variables defined in table 6.5.3.2.2-1.

Table 6.5.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.5.1.

6.5.3.2.3 Resource Standard Methods

6.5.3.2.3.2 POST

The HTTP POST method allows a service consumer to request the creation of a UAV Dynamic Information Subscription at the UAE Server.

This method shall support the URI query parameters specified in table 6.5.3.2.3.2-1.

Table 6.5.3.2.3.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.5.3.2.3.2-2 and the response data structures and response codes specified in table 6.5.3.2.3.2-3.

Table 6.5.3.2.3.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
UAVDynInfoSubsc	M	1	Represents the parameters to request the creation of a UAV Dynamic Information Subscription.

Table 6.5.3.2.3.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UAVDynInfoSubsc	M	1	201 Created	Successful case. The UAV Dynamic Information Subscription is successfully created and a representation of the created "Individual UAV Dynamic Information Subscription" resource shall be returned. An HTTP "Location" header that contains the resource URI of the created resource shall also be included.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.5.3.2.3.2-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/uae-udi/<apiVersion>/subscriptions/{subscId}

6.5.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.5.3.3 Resource: Individual UAV Dynamic Information Subscription

6.5.3.3.1 Description

This resource represents a UAV Dynamic Information Subscription managed by the UAE Server.

6.5.3.3.2 Resource Definition

Resource URI: **{apiRoot}/uae-udi/<apiVersion>/subscriptions/{subscId}**

This resource shall support the resource URI variables defined in table 6.5.3.3.2-1.

Table 6.5.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.5.1.
subscId	string	Represents the identifier of the "Individual UAV Dynamic Information Subscription" resource.

6.5.3.3.3 Resource Standard Methods

6.5.3.3.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual UAV Dynamic Information Subscription" resource at the UAE Server.

This method shall support the URI query parameters specified in table 6.5.3.3.3.1-1.

Table 6.5.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.5.3.3.3.1-2 and the response data structures and response codes specified in table 6.5.3.3.3.1-3.

Table 6.5.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.5.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UAVDynInfoSubsc	M	1	200 OK	Successful case. The requested "Individual UAV Dynamic Information Subscription" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.5.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.5.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.5.3.3.3.2 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual UAV Dynamic Information Subscription" resource at the UAE Server.

This method shall support the URI query parameters specified in table 6.5.3.3.3.2-1.

Table 6.5.3.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.5.3.3.3.2-2 and the response data structures and response codes specified in table 6.5.3.3.3.2-3.

Table 6.5.3.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
UAVDynInfoSubsc	M	1	Represents the updated representation of the "Individual UAV Dynamic Information Subscription" resource.

Table 6.5.3.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UAVDynInfoSubsc	M	1	200 OK	Successful case. The "Individual UAV Dynamic Information Subscription" resource is successfully updated and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual UAV Dynamic Information Subscription" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.5.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.5.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.5.3.3.3.3 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual UAV Dynamic Information Subscription" resource at the UAE Server.

This method shall support the URI query parameters specified in table 6.5.3.3.3.3-1.

Table 6.5.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.5.3.3.3.3-2 and the response data structures and response codes specified in table 6.5.3.3.3.3-3.

Table 6.5.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
UAVDynInfoSubscPatch	M	1	Represents the parameters to request the modification of the "Individual UAV Dynamic Information Subscription" resource.

Table 6.5.3.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UAVDynInfoSubsc	M	1	200 OK	Successful case. The "Individual UAV Dynamic Information Subscription" resource is successfully modified and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual UAV Dynamic Information Subscription" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.5.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.5.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.5.3.3.3.4 DELETE

The HTTP DELETE method allows a service consumer to request the deletion of an existing "Individual UAV Dynamic Information Subscription" resource at the UAE Server.

This method shall support the URI query parameters specified in table 6.5.3.3.3.4-1.

Table 6.5.3.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.5.3.3.3.4-2 and the response data structures and response codes specified in table 6.5.3.3.3.4-3.

Table 6.5.3.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.5.3.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual UAV Dynamic Information Subscription" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative UAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.5.3.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

Table 6.5.3.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative UAE Server.

6.5.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.5.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for this resource in this release of the specification.

6.5.5 Notifications

6.5.5.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [2].

Table 6.5.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
UAV Dynamic Information Notification	{notifUri}	POST	This service operation enables a UAE Server to notify a previously subscribed service consumer on UAV dynamic information event(s).

6.5.5.2 UAV Dynamic Information Notification

6.5.5.2.1 Description

The UAV Dynamic Information Notification is used by the UAE Server to notify a previously subscribed service consumer on UAV dynamic information event(s).

6.5.5.2.2 Target URI

The Callback URI **"{notifUri}"** shall be used with the callback URI variables defined in table 6.5.5.2.2-1.

Table 6.5.5.2.2-1: Callback URI variables

Name	Definition
notifUri	Represents the callback URI encoded as a string formatted as a URI.

6.5.5.2.3 Standard Methods

6.5.5.2.3.1 POST

This method shall support the request data structures specified in table 6.5.5.2.3.1-1 and the response data structures and response codes specified in table 6.5.5.2.3.1-2.

Table 6.5.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
UAVDynInfoNotif	M	1	Represents the UAV Dynamic Information Notification.

Table 6.5.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The UAV Dynamic Information Notification is successfully received and processed.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.5.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.5.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.5.6 Data Model

6.5.6.1 General

This clause specifies the application data model supported by the API.

Table 6.5.6.1-1 specifies the data types defined for the UAE_UAVDynamicInfo API.

Table 6.5.6.1-1: UAE_UAVDynamicInfo API specific Data Types

Data type	Clause defined	Description	Applicability
ProxRangInfo	6.5.6.2.5	Represents the proximity range information.	
UavDistance	6.5.6.3.2	Represents the linear distance between two UAVs.	
UAVDynInfoNotif	6.5.6.2.4	Represents a UAV Dynamic Information Notification.	
UAVDynInfoSubsc	6.5.6.2.2	Represents a UAV Dynamic Information Subscription.	
UAVDynInfoSubscPatch	6.5.6.2.3	Represents the requested modifications to a UAV Dynamic Information Subscription.	
UavInfo	6.5.6.2.6	Represents the UAV information related to the UAV detection in an application defined proximity range.	

Table 6.5.6.1-2 specifies data types re-used by the UAE_UAVDynamicInfo API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the UAE_UAVDynamicInfo API.

Table 6.5.6.1-2: UAE_UAVDynamicInfo API re-used Data Types

Data type	Reference	Comments	Applicability
LocationInfo	3GPP TS 29.122 [2]	Represents user location information.	
SupportedFeatures	3GPP TS 29.571 [18]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
UavId	Clause 6.1.6.2.7	Represents a UAV identifier.	
Uri	3GPP TS 29.122 [2]	Represents a Uri.	

6.5.6.2 Structured data types

6.5.6.2.1 Introduction

This clause defines the data structures to be used in resource representations.

6.5.6.2.2 Type: UAVDynInfoSubsc

Table 6.5.6.2.2-1: Definition of type UAVDynInfoSubsc

Attribute name	Data type	P	Cardinality	Description	Applicability
uavId	UavId	M	1	Contains the identity of the host UAV to which the UAV dynamic information subscription is related.	
proxRangInfo	ProxRangInfo	M	1	Contains the application defined proximity range information indicating the range information over which the requested host UAV's dynamic information is required.	
notifUri	Uri	M	1	Contains the URI via which the UAV dynamic information event(s) related notifications shall be delivered.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.5.8. This attribute shall be present only when feature negotiation needs to take place.	

6.5.6.2.3 Type: UAVDynInfoSubscPatch

Table 6.5.6.2.3-1: Definition of type UAVDynInfoSubscPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
proxRangInfo	ProxRangInfo	O	0..1	Contains the updated application defined proximity range information indicating the range information over which the requested host UAV's dynamic information is required.	
notifUri	Uri	O	0..1	Contains the updated URI via which the UAV dynamic information event(s) related notifications shall be delivered.	

6.5.6.2.4 Type: UAVDynInfoNotif

Table 6.5.6.2.4-1: Definition of type UAVDynInfoNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
subscId	string	M	1	Contains the identifier of the UAV Dynamic Information Subscription to which the notification is related.	
hostUavLoc	LocationInfo	M	1	Contains the location information for the host UAV.	
uavsInfo	array(UavInfo)	M	1..N	Contains a list of the UAV(s) detected in the application defined proximity range and the related information.	

6.5.6.2.5 Type: ProxRangInfo

Table 6.5.6.2.5-1: Definition of type ProxRangInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
range	number	O	0..1	Contains the application defined proximity range over which the requested host UAV's dynamic information is required. (NOTE)	
rangeInfo	string	O	0..1	Contains detailed and/or additional information on the application defined proximity range over which the requested host UAV's dynamic information is required. (NOTE)	
NOTE: At least one of these attributes shall be present.					

6.5.6.2.6 Type: UavInfo

Table 6.5.6.2.6-1: Definition of type UavInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
nearbyUavId	UavId	M	1	Contains the identity of the nearby UAV to which the provided in formation is related.	
nearbyUavLoc	LocationInfo	M	1	Contains the location information for the nearby UAV within the application defined proximity range.	
nearbyUavDist	UavDistance	M	1	Contains the distance between the nearby UAV and the host UAV.	

6.5.6.3 Simple data types and enumerations

6.5.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.5.6.3.2 Simple data types

The simple data types defined in table 6.5.6.3.2-1 shall be supported.

Table 6.5.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability
UavDistance	number	Represents the linear distance between two UAVs, expressed in meters.	

6.5.6.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

6.5.6.5 Binary data

6.5.6.5.1 Binary Data Types

Table 6.5.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

6.5.7 Error Handling

6.5.7.1 General

For the UAE_UAVDynamicInfo API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [2]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [2] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [2].

In addition, the requirements in the following clauses are applicable for the UAE_UAVDynamicInfo API.

6.5.7.2 Protocol Errors

No specific protocol errors for the UAE_UAVDynamicInfo API are specified.

6.5.7.3 Application Errors

The application errors defined for the UAE_UAVDynamicInfo API are listed in Table 6.5.7.3-1.

Table 6.5.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

6.5.8 Feature negotiation

The optional features listed in table 6.5.8-1 are defined for the UAE_UAVDynamicInfo API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [2].

Table 6.5.8-1: Supported Features

Feature number	Feature Name	Description

6.5.9 Security

The provisions of clause 6 of 3GPP TS 29.122 [2] shall apply for the UAE_UAVDynamicInfo API.

7 Using Common API Framework

7.1 General

When CAPIF is used with a UAE Server service, the UAE Server shall support the following functionalities as defined in 3GPP TS 29.222 [10]:

- the API exposing function and the related APIs over CAPIF-2/2e and CAPIF-3/3e reference points;
- the API publishing function and the related APIs over CAPIF-4/4e reference point;
- the API management function and the related APIs over CAPIF-5/5e reference point; and
- at least one of the security methods for authentication and authorization, and the related security mechanisms.

In a centralized deployment as defined in 3GPP TS 23.222 [9], where the CAPIF core function and the API provider domain functions are co-located, the interactions between the CAPIF core function and the API provider domain functions may be independent of the CAPIF-3/3e, CAPIF-4/4e and CAPIF-5/5e reference points.

When CAPIF is used with a UAE Server service, the UAE Server shall register all the northbound APIs features in the CAPIF Core Function.

7.2 Security

When CAPIF is used for external exposure, before invoking an API exposed by the UAE Server, the service API consumer (e.g. UASS) acting as an API invoker shall negotiate the security method (PKI, TLS-PSK or OAuth 2.0) with the CAPIF core function and ensure that the UAE Server has enough credentials to authenticate the service API consumer (e.g. UASS), as defined in clauses 5.6.2.2 and 6.2.2.2 of 3GPP TS 29.222 [10].

If PKI or TLS-PSK is selected as the security method to be used between the service API consumer (e.g. UASS) and the UAE Server, upon API invocation, the UAE Server shall retrieve the authorization information from the CAPIF core function as described in clause 5.6.2.4 of 3GPP TS 29.222 [10].

As indicated in 3GPP TS 33.122 [11], the access to the UAE Server APIs may be authorized by means of the OAuth 2.0 protocol (see IETF RFC 6749 [12]), using the "Client Credentials" authorization grant, where the CAPIF core function (see 3GPP TS 29.222 [10]) plays the role of the authorization server.

NOTE 1: In this release, only "Client Credentials" authorization grant is supported.

If OAuth 2.0 is selected as the security method to be used between the service API consumer (e.g. UASS) and the UAE Server, the service API consumer (e.g. UASS) shall, prior to consuming the services offered by the UAE Server APIs, obtain a "token" from the authorization server, by invoking the Obtain_Authorization service operation as described in clause 5.6.2.3.2 of 3GPP TS 29.222 [10].

The UAE Server APIs do not define any scopes for OAuth 2.0 authorization. It is the UAE Server responsibility to check whether the service API consumer (e.g. UASS) is authorized to use an API based on the provided "token". Once the UAE Server verifies the "token", it shall check whether the UAE Server identifier in the "token" matches its own published identifier, and whether the API name in the "token" matches its own published API name. If those checks are passed, the service API consumer (e.g. UASS) has full authority to access any resource or operation provided by the invoked API.

NOTE 2: For the aforementioned security methods, the UAE Server needs to apply admission control according to access control policies after performing the authorization checks.

Annex A (normative): OpenAPI specification

A.1 General

This Annex specifies the formal definition of the API(s) defined in the present specification. It consists of OpenAPI specifications in YAML format.

This Annex takes precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API(s).

NOTE 1: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification files contained in this 3GPP Technical Specification are available on a Git-based repository that uses the GitLab software version control system (see clause 5.3.1 of 3GPP TS 29.501 [3] and clause 5B of 3GPP TR 21.900 [5]).

A.2 UAE_C2OperationModeManagement API

```
openapi: 3.0.0

info:
  title: UAE Server C2 Operation Mode Management Service
  version: 1.1.0-alpha.2
  description: |
    UAE Server C2 Operation Mode Management Service.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.257 V18.3.0; Application layer support for Uncrewed Aerial System (UAS);
    UAS Application Enabler (UAE) Server Services; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.257/

servers:
  - url: '{apiRoot}/uae-c2opmode-mngt/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

security:
  - {}
  - oAuth2ClientCredentials: []

paths:
  /initiate:
    post:
      summary: Request the provisioning of C2 Operation Mode configuration information for a UAS
(i.e. pair of UAV and UAV-C).
      operationId: InitiateC2OpModeConfig
      tags:
        - Initiate C2 Operation Mode configuration
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ConfigureData'
      responses:
        '200':
          description: >
            The communicated C2 Operation Mode configuration information was successfully
            received. The response body contains the feedback of the UAE Server on whether
            this C2 Operation Mode configuration request is confirmed (i.e. can be undertaken
            by the UAE Server) or not.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/C2Result'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
```

```
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    callbacks:
      C2OpModeMngtCompletionNotification:
        '{$request.body#/notificationUri}/c2mode-mngt-completion':
          post:
            requestBody:
              required: true
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/C2OpModeMngtCompStatus'
            responses:
              '204':
                description: >
                  No Content. The notification was succesfull and the C2 Operation Mode
                  Management Completion status for the concerned UAS (i.e. pair of UAV
                  and UAV-C) was successfully received and acknowledged by the service consumer.
              '307':
                $ref: 'TS29122_CommonData.yaml#/components/responses/307'
              '308':
                $ref: 'TS29122_CommonData.yaml#/components/responses/308'
              '400':
                $ref: 'TS29122_CommonData.yaml#/components/responses/400'
              '401':
                $ref: 'TS29122_CommonData.yaml#/components/responses/401'
              '403':
                $ref: 'TS29122_CommonData.yaml#/components/responses/403'
              '404':
                $ref: 'TS29122_CommonData.yaml#/components/responses/404'
              '411':
                $ref: 'TS29122_CommonData.yaml#/components/responses/411'
              '413':
                $ref: 'TS29122_CommonData.yaml#/components/responses/413'
              '415':
                $ref: 'TS29122_CommonData.yaml#/components/responses/415'
              '429':
                $ref: 'TS29122_CommonData.yaml#/components/responses/429'
              '500':
                $ref: 'TS29122_CommonData.yaml#/components/responses/500'
              '503':
                $ref: 'TS29122_CommonData.yaml#/components/responses/503'
              default:
                $ref: 'TS29122_CommonData.yaml#/components/responses/default'
      SelectedC2CommunicationModeNotification:
        '{$request.body#/notificationUri}/inform-selec-c2mode':
          post:
            requestBody:
              required: true
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/SelectedC2CommModeNotif'
            responses:
              '204':
                description: >
                  No Content. The notification was succesfull and the C2 Communication Mode
                  selected by the concerned UAS (i.e. pair of UAV and UAV-C) was successfully
                  received and acknowledged by the service consumer.
              '307':
                $ref: 'TS29122_CommonData.yaml#/components/responses/307'
              '308':
                $ref: 'TS29122_CommonData.yaml#/components/responses/308'
              '400':
                $ref: 'TS29122_CommonData.yaml#/components/responses/400'
              '401':
                $ref: 'TS29122_CommonData.yaml#/components/responses/401'
              '403':
                $ref: 'TS29122_CommonData.yaml#/components/responses/403'
              '404':
                $ref: 'TS29122_CommonData.yaml#/components/responses/404'
              '411':
                $ref: 'TS29122_CommonData.yaml#/components/responses/411'
              '413':
                $ref: 'TS29122_CommonData.yaml#/components/responses/413'
              '415':
                $ref: 'TS29122_CommonData.yaml#/components/responses/415'
```

```
                '429':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
                '500':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
                '503':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
                default:
                  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
        C2CommunicationModeSwitchingNotification:
          '{$request.body#/notificationUri}/inform-c2mode-switch':
            post:
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/C2CommModeSwitchNotif'
              responses:
                '200':
                  description: >
                    OK. The targeted C2 Communication Mode switching for the concerned UAS
                    (i.e. pair of UAV and UAV-C) is successfully received. The response body
                    contains the feedback of the service consumer on whether this C2 Communication
                    Mode switching is confirmed (i.e. validated) or not.
                  content:
                    application/json:
                      schema:
                        $ref: '#/components/schemas/C2Result'
                '204':
                  description: >
                    No Content. The targeted C2 Communication Mode switching for the concerned
                    UAS (i.e. pair of UAV and UAV-C) is successfully received and acknowledged,
                    and the service consumer does not need to confirm (i.e. validate) it.
                '307':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
                '308':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
                '400':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
                '401':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
                '403':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
                '404':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
                '411':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
                '413':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
                '415':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
                '429':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
                '500':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
                '503':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
                default:
                  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    ConfigureData:
      description: >
        Represents the parameters to request to provision C2 Operation Mode configuration
        information for a UAS (i.e. pair of UAV and UAV-C).
      type: object
      properties:
        uassId:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
```

```
      uasId:
        $ref: '#/components/schemas/UasId'
      allowedC2CommModes:
        type: array
        items:
          $ref: '#/components/schemas/C2CommMode'
        minItems: 1
      c2CommModeSwitchTypes:
        type: array
        items:
          $ref: '#/components/schemas/C2CommModeSwitching'
        minItems: 1
      notificationUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      primaryC2CommMode:
        $ref: '#/components/schemas/C2CommMode'
      secondaryC2CommMode:
        $ref: '#/components/schemas/C2CommMode'
      c2SwitchPolicies:
        $ref: '#/components/schemas/C2SwitchPolicies'
      c2ServiceArea:
        $ref: '#/components/schemas/C2ServiceArea'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - uassId
      - uasId
      - allowedC2CommModes
      - c2CommModeSwitchTypes
      - notificationUri
      - primaryC2CommMode
      - c2SwitchPolicies

  SelectedC2CommModeNotif:
    description: >
      Represents information on the C2 Communication Mode selected by a UAS (i.e. pair of
      UAV and UAV-C).
    type: object
    properties:
      uasId:
        $ref: '#/components/schemas/UasId'
      selPrimaryC2CommMode:
        $ref: '#/components/schemas/C2CommMode'
      selSecondaryC2CommMode:
        $ref: '#/components/schemas/C2CommMode'
    required:
      - uasId
      - selPrimaryC2CommMode

  C2CommModeSwitchNotif:
    description: >
      Represents information on the targeted C2 Communication Mode switching for a UAS
      (i.e. pair of UAV and UAV-C).
    type: object
    properties:
      uaeServerId:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      uasId:
        $ref: '#/components/schemas/UasId'
      c2CommModeSwitchType:
        $ref: '#/components/schemas/C2CommModeSwitching'
      switchingCause:
        $ref: '#/components/schemas/C2SwitchingCause'
    required:
      - uaeServerId
      - uasId
      - c2CommModeSwitchType

  C2Result:
    description: Represents the result of an action related to C2 of a UAS.
    type: object
    properties:
      c2OpConfirmed:
        type: boolean
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - c2OpConfirmed
```

```
    UasId:
      description: Represents the identifier of a UAS (i.e. pair of UAV and UAV-C).
      type: object
      properties:
        groupId:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
        individualUasId:
          type: array
          items:
            $ref: '#/components/schemas/UavId'
          minItems: 2
      oneOf:
        - required: [groupId]
        - required: [individualUasId]

    UavId:
      description: Represents the identifier of a UAV (e.g. UAV, UAV-C).
      type: object
      properties:
        gpsi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        caaId:
          type: string
      anyOf:
        - required: [gpsi]
        - required: [caaId]

    C2ServiceArea:
      description: Represents a C2 service area.
      type: object
      properties:
        ncgiList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Ncgi'
        taiList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Tai'
        geographicAreaList:
          type: array
          items:
            $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
      oneOf:
        - required: [geographicAreaList]
        - anyOf:
          - required: [ncgiList]
          - required: [taiList]

    C2OpModeMngtCompStatus:
      description: >
        Represents the C2 Operation Mode Management Completion status for a UAV
        (e.g. UAV, UAV-C).
      type: object
      properties:
        uasId:
          $ref: '#/components/schemas/UasId'
        status:
          $ref: '#/components/schemas/C2OpModeStatus'
      required:
        - uasId
        - status

    C2SwitchPolicies:
      description: Represents the C2 operation mode switching policies.
      type: object
      properties:
        directC2LinkQualityThrlds:
          $ref: '#/components/schemas/C2LinkQualityThrlds'
        uuC2LinkQualityThrlds:
          $ref: '#/components/schemas/C2LinkQualityThrlds'

    C2LinkQualityThrlds:
      description: Represents the C2 link quality thresholds.
      type: object
      properties:
        nrRsrpThrldLow:
```

```
          type: integer
          minimum: 0
          maximum: 127
        nrRsrpThrldHigh:
          type: integer
          minimum: 0
          maximum: 127
        nrRsrqThrldLow:
          type: integer
          minimum: 0
          maximum: 127
        nrRsrqThrldHigh:
          type: integer
          minimum: 0
          maximum: 127
        packetLossThrldLow:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
        packetLossThrldHigh:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'

# ENUMS:

    C2CommMode:
      anyOf:
        - type: string
          enum:
          - DIRECT_C2_COMMUNICATION
          - NETWORK_ASSISTED_C2_COMMUNICATION
          - UTM_NAVIGATED_C2_COMMUNICATION
        - type: string
          description: >
            This string provides forward-compatibility with future extensions to the enumeration
            and is not used to encode content defined in the present version of this API.
      description: |
        Represents the C2 Communication Mode.
        Possible values are:
        - DIRECT_C2_COMMUNICATION: Indicates Direct C2 Communication mode.
        - NETWORK_ASSISTED_C2_COMMUNICATION: Indicates Network-Assisted C2 Communication mode.
        - UTM_NAVIGATED_C2_COMMUNICATION: Indicates UTM-Navigated C2 communication mode.

    C2CommModeSwitching:
      anyOf:
        - type: string
          enum:
          - DIRECT_TO_NETWORK_ASSISTED_C2
          - NETWORK_ASSISTED_TO_DIRECT_C2
          - DIRECT_TO_UTM_NAVIGATED_C2
          - NETWORK_ASSISTED_TO_UTM_NAVIGATED_C2
        - type: string
          description: >
            This string provides forward-compatibility with future extensions to the enumeration
            and is not used to encode content defined in the present version of this API.
      description: |
        Represents the C2 Communication Mode Switching type.
        Possible values are:
        - DIRECT_TO_NETWORK_ASSISTED_C2: Indicates the C2 Communication Mode switching from Direct
          C2 Communication mode to Network-Assisted C2 Communication mode.
        - NETWORK_ASSISTED_TO_DIRECT_C2: Indicates the C2 Communication Mode switching from
          Network-Assisted C2 Communication mode to Direct C2 Communication mode.
        - DIRECT_TO_UTM_NAVIGATED_C2: Indicates the C2 Communication Mode switching from
          Direct C2 Communication mode to UTM-Navigated C2 communication mode.
        - NETWORK_ASSISTED_TO_UTM_NAVIGATED_C2: Indicates the C2 Communication Mode switching
          from Network-Assisted C2 Communication mode to UTM-Navigated C2 communication mode.

    C2SwitchingCause:
      anyOf:
        - type: string
          enum:
          - DIRECT_LINK_QUALITY_DEGRADATION
          - DIRECT_LINK_AVAILABLE
          - MOVING_BVLOS
          - LOCATION_CHANGE
          - TRAFFIC_CONTROL_NEEDED
          - SECURITY_REASONS
          - OTHER_REASONS
        - type: string
          description: >
            This string provides forward-compatibility with future extensions to the enumeration
```

```
        and is not used to encode content defined in the present version of this API.
    description: |
      Represents the C2 Communication Mode switching cause.
      Possible values are:
      - DIRECT_LINK_QUALITY_DEGRADATION: Indicates that the C2 Communication Mode switching
        was triggered due to a degradation in the direct radio link quality.
      - DIRECT_LINK_AVAILABLE: Indicates that the C2 Communication Mode switching was triggered
        due to the availability of a direct link, i.e. direct radio link quality enables its
        usage.
      - MOVING_BVLOS: Indicates that the C2 Communication Mode switching was triggered due to
        the UAV moving BVLOS.
      - LOCATION_CHANGE: Indicates that the C2 Communication Mode switching was triggered due to
        an actual or expected location/mobility of the UAV (e.g. which impacts the UAV-to-UAV-C
        location).
      - TRAFFIC_CONTROL_NEEDED: Indicates that the C2 Communication Mode switching was triggered
        due to the necessity to have air traffic control.
      - SECURITY_REASONS: Indicates that the C2 Communication Mode switching was triggered due to
        security reasons.
      - OTHER_REASONS: Indicates that the C2 Communication Mode switching was triggered due to
        other reasons (e.g. unpredictable event, unknown reason, weather conditions, topography,
        etc.).

  C2OpModeStatus:
    anyOf:
      - type: string
        enum:
        - SUCCESSFUL
        - NOT_SUCCESSFUL
      - type: string
        description: >
          This string provides forward-compatibility with future extensions to the enumeration
          and is not used to encode content defined in the present version of this API.
    description: |
      Represents the C2 operation mode management completion status.
      Possible values are:
      - SUCCESSFUL: Indicates that the C2 operation mode configuration was successful.
      - NOT_SUCCESSFUL: Indicates that the C2 operation mode configuration was not successful.
```

A.3 UAE_RealtimeUAVStatus API

```
openapi: 3.0.0
info:
  title: UAE Server Real-time UAV Status Service
  version: 1.0.0
  description: |
    UAE Server Real-time UAV Status Service.
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.257 V17.1.0; Application layer support for Uncrewed Aerial System (UAS);
    UAS Application Enabler (UAE) Server Services; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.257/

servers:
  - url: '{apiRoot}/uae-uav-status/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

security:
  - {}
  - oAuth2ClientCredentials: []

paths:
  /subscriptions:
    get:
      summary: Retrieve all the active real-time UAV status subscriptions managed by the UAE Server.
      operationId: GetRTUavStatusSubscriptions
      tags:
        - Real-time UAV Status Subscriptions (Collection)
      responses:
        '200':
          description: >
            OK. All the active real-time UAV status subscriptions managed by the UAE Server
            shall be returned.
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/RTUavStatusSubsc'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    post:
      summary: Request the creation of a subscription to real-time UAV status reporting.
      operationId: CreateRTUavStatusSubsc
      tags:
        - Real-time UAV Status Subscriptions (Collection)
      requestBody:
        required: true
        content:
```

```
    application/json:
      schema:
        $ref: '#/components/schemas/RTUavStatusSubsc'
responses:
  '200':
    description: >
      OK. The subscription is successfully created and a representation of the created
      Individual Real-time UAV Status Subscription resource shall be returned.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/RTUavStatusSubsc'
    headers:
      Location:
        description: >
          Contains the URI of the created Individual Real-time UAV Status Subscription
          resource.
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  RTUavStatusNotification:
    '{$request.body#/notificationUri}/uav-status':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/RTUavStatusNotif'
        responses:
          '204':
            description: >
              No Content. The real-time UAV status notification is successfully
              received and acknowledged.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
```

```
                $ref: 'TS29122_CommonData.yaml#/components/responses/500'
              '503':
                $ref: 'TS29122_CommonData.yaml#/components/responses/503'
              default:
                $ref: 'TS29122_CommonData.yaml#/components/responses/default'


  /subscriptions/{subscriptionId}:
    get:
      summary: Retrieve a real-time UAV status subscription resource.
      operationId: GetRTUavStatusSubscription
      tags:
        - Individual Real-time UAV Status Subscription (Document)
      parameters:
        - name: subscriptionId
          in: path
          description: Individual Real-time UAV Status Subscription identifier.
          required: true
          schema:
            type: string
      responses:
        '200':
          description: OK. The requested real-time UAV status subscription resource shall be
returned.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/RTUavStatusSubsc'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    put:
      summary: Request the update of an existing real-time UAV status subscription.
      operationId: UpdateRTUavStatusSubscription
      tags:
        - Individual Real-time UAV Status Subscription (Document)
      parameters:
        - name: subscriptionId
          in: path
          description: Individual Real-time UAV Status Subscription identifier.
          required: true
          schema:
            type: string
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/RTUavStatusSubsc'
      responses:
        '200':
          description: >
            OK. The real-time UAV status subscription is successfully updated and a
            representation of the updated Individual Real-time UAV Status Subscription
            resource shall be returned.
          content:
            application/json:
              schema:
```

```
              $ref: '#/components/schemas/RTUavStatusSubsc'
        '204':
          description: No Content. The real-time UAV status subscription is successfully updated.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    delete:
      summary: Request the deletion of an existing real-time UAV status subscription.
      operationId: DeleteRTUavStatusSubscription
      tags:
        - Individual Real-time UAV Status Subscription (Document)
      parameters:
        - name: subscriptionId
          in: path
          description: Individual Real-time UAV Status Subscription identifier.
          required: true
          schema:
            type: string
      responses:
        '204':
          description: >
            No Content. The Individual Real-time UAV Status Subscription resource
            is successfully deleted.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'


components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    RTUavStatusSubsc:
```

```
    description: >
      Represents the parameters to request the creation or update of a subscription
      to real-time UAV status reporting.
    type: object
    properties:
      uassId:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      uavIds:
        type: array
        items:
          $ref: 'TS29257_UAE_C2OperationModeManagement.yaml#/components/schemas/UavId'
        minItems: 1
      notificationUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - uassId
      - uavIds
      - notificationUri

  RTUavStatusNotif:
    description: Represents a real-time UAV status notification.
    type: object
    properties:
      subscriptionId:
        type: string
      rTUavStatus:
        type: array
        items:
          $ref: '#/components/schemas/RTUavStatus'
        minItems: 1
    required:
      - subscriptionId
      - rTUavStatus

  RTUavStatus:
    description: Represents real-time UAV status information.
    type: object
    properties:
      uavId:
        $ref: 'TS29257_UAE_C2OperationModeManagement.yaml#/components/schemas/UavId'
      uavNetConnStatus:
        $ref: '#/components/schemas/UavNetConnStatus'
      uavLocInfo:
        $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
    allOf:
      - required: [uavId]
      - oneOf:
        - required: [uavLocInfo]
        - allOf:
          - required: [uavLocInfo]
          - required: [uavNetConnStatus]

  UavNetConnStatus:
    description: Represents UAV network connection status information.
    type: object
    properties:
      statusInfo:
        $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/MonitoringType'
      timestamp:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    required:
      - statusInfo
      - timestamp
```

A.4 UAE_ChangeUSSManagement API

```
openapi: 3.0.0

info:
  title: UAE Server USS Change Management Service
  version: 1.0.0-alpha.2
  description: |
    UAE Server USS Change Management Service.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.257 V18.3.0; Application layer support for Uncrewed Aerial System (UAS);
    UAS Application Enabler (UAE) Server Services; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.257/

servers:
  - url: '{apiRoot}/uae-ucm/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

security:
  - {}
  - oAuth2ClientCredentials: []

paths:
  /policies:
    get:
      summary: Retrieve all the active USS Change Policies managed by the UAE Server.
      operationId: GetUSSChangePolicies
      tags:
        - USS Change Policies (Collection)
      responses:
        '200':
          description: >
            OK. All the active USS Change Policies managed by the UAE Server shall be returned.
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/USSChangePolicy'
                minItems: 0
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    post:
      summary: Request the creation of a USS Change Policy.
      operationId: CreateUSSChangePolicy
      tags:
        - USS Change Policies (Collection)
      requestBody:
        required: true
```

```
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/USSChangePolReq'
  responses:
    '200':
      description: >
        OK. The USS Change Policy is successfully created and a representation of the created
        Individual USS Change Policy resource shall be returned.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/USSChangePolResp'
      headers:
        Location:
          description: >
            Contains the URI of the created Individual USS Change Policy resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:
    USSChangeNotif:
      '{$request.body#/ussChangePol/notifUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/USSChangeNotif'
          responses:
            '204':
              description: >
                No Content. The USS Change Notification is successfully received and
                acknowledged.
            '307':
              $ref: 'TS29122_CommonData.yaml#/components/responses/307'
            '308':
              $ref: 'TS29122_CommonData.yaml#/components/responses/308'
            '400':
              $ref: 'TS29122_CommonData.yaml#/components/responses/400'
            '401':
              $ref: 'TS29122_CommonData.yaml#/components/responses/401'
            '403':
              $ref: 'TS29122_CommonData.yaml#/components/responses/403'
            '404':
              $ref: 'TS29122_CommonData.yaml#/components/responses/404'
            '411':
              $ref: 'TS29122_CommonData.yaml#/components/responses/411'
            '413':
              $ref: 'TS29122_CommonData.yaml#/components/responses/413'
            '415':
              $ref: 'TS29122_CommonData.yaml#/components/responses/415'
            '429':
              $ref: 'TS29122_CommonData.yaml#/components/responses/429'
            '500':
```

```
                $ref: 'TS29122_CommonData.yaml#/components/responses/500'
              '503':
                $ref: 'TS29122_CommonData.yaml#/components/responses/503'
              default:
                $ref: 'TS29122_CommonData.yaml#/components/responses/default'


/policies/{policyId}:
  parameters:
    - name: policyId
      in: path
      description: Represents the identifier of the Individual USS Change Policy resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual USS Change Policy resource.
    operationId: GetUSSChangePolicy
    tags:
      - Individual USS Change Policy (Document)
    responses:
      '200':
        description: OK. The requested Individual USS Change Policy resource shall be returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/USSChangePolicy'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    summary: Request the update of an existing Individual USS Change Policy resource.
    operationId: UpdateUSSChangePolicy
    tags:
      - Individual USS Change Policy (Document)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/USSChangePolicy'
    responses:
      '200':
        description: >
          OK. The Individual USS Change Policy resource is successfully updated and a
          representation of the updated resource shall be returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/USSChangePolicy'
      '204':
        description: >
          No Content. The Individual USS Change Policy resource is successfully updated and no
          content is returned in the response body.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
```

```
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  patch:
    summary: Request the modification of an existing Individual USS Change Policy resource.
    operationId: ModifyUSSChangePolicy
    tags:
      - Individual USS Change Policy (Document)
    requestBody:
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/USSChangePolicyPatch'
    responses:
      '200':
        description: >
          OK. The Individual USS Change Policy resource is successfully modified and a
          representation of the updated resource shall be returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/USSChangePolicy'
      '204':
        description: >
          No Content. The Individual USS Change Policy resource is successfully modified and no
          content is returned in the response body.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  delete:
    summary: Request the deletion of an existing Individual USS Change Policy resource.
    operationId: DeleteUSSChangePolicy
    tags:
      - Individual USS Change Policy (Document)
    responses:
      '204':
        description: >
          No Content. The Individual USS Change Policy resource is successfully deleted.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
```

```
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  /request-usschange:
    post:
      summary: Enables to request USS change.
      operationId: RequestUSSChange
      tags:
        - USS Change Request
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/USSChangeReq'
      responses:
        '204':
          description: >
            No Content. The USS change request is successfully received and processed.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'


components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:

#
# STRUCTURED DATA TYPES
```

```
#

    USSChangePolReq:
      description: >
        Represents the parameters to request the creation/Update of a USS Change Policy.
      type: object
      properties:
        requestorId:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        ussChangePol:
          $ref: '#/components/schemas/USSChangePolicy'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - requestorId
        - ussChangePol

    USSChangePolResp:
      description: Represents the response to a USS Change Policy create/update request.
      type: object
      properties:
        ussChangePol:
          $ref: '#/components/schemas/USSChangePolicy'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - ussChangePol

    USSChangePolicy:
      description: Represents a USS Change Policy.
      type: object
      properties:
        uasId:
          $ref: 'TS29257_UAE_C2OperationModeManagement.yaml#/components/schemas/UasId'
        notifUri:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        uasRegArea:
          $ref: '#/components/schemas/ServArea'
        uasAllowedRoute:
          type: array
          items:
            $ref: '#/components/schemas/UasRoute'
          minItems: 1
        multiUssPol:
          $ref: '#/components/schemas/MultiUssPol'
      required:
        - uasId
        - notifUri

    USSChangePolicyPatch:
      description: >
        Represents the parameters to request the modification of a USS Change Policy.
      type: object
      properties:
        notifUri:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        uasRegArea:
          $ref: '#/components/schemas/ServArea'
        uasAllowedRoute:
          type: array
          items:
            $ref: '#/components/schemas/UasRoute'
          minItems: 1
        multiUssPol:
          $ref: '#/components/schemas/MultiUssPol'

    MultiUssPol:
      description: Represents a Multi-USS policy.
      type: object
      properties:
        servingUssId:
          $ref: '#/components/schemas/UssId'
        servingUssInfo:
          type: string
        ussChangeArea:
          $ref: '#/components/schemas/ServArea'
        allowedTgtUsss:
          type: array
```

```
        items:
          $ref: '#/components/schemas/UssInfo'
        minItems: 1
    required:
      - servingUssId
      - servingUssInfo
      - ussChangeArea

  ServArea:
    description: Represents a service area.
    type: object
    properties:
      ncgiList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NcgiTai'
        minItems: 1
        description: List of NR cell Ids
      taiList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Tai'
        minItems: 1
        description: List of tracking area Ids
      geographicAreaList:
        type: array
        items:
          $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
        minItems: 1
    oneOf:
      - anyOf:
        - required: [ncgiList]
        - required: [taiList]
      - required: [geographicAreaList]

  UasRoute:
    description: Represents the UAS route.
    type: object
    properties:
      route:
        type: object
        additionalProperties:
          $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
        minProperties: 2
        description: >
          Contains a list of two or more ordered geographic area(s) that constitute the UAS route.
          The key of the map shall be an unsigned integer (with the minimum value being 1)
          indicating the order of the geographic area, provided within the corresponding map
          entry, in the derivation of the route, with the first map entry being the start of the
          route and the last entry of the map being the end of the route.
    required:
      - route

  UssInfo:
    description: Represents USS information.
    type: object
    properties:
      ussId:
        $ref: '#/components/schemas/UssId'
      ussServArea:
        $ref: '#/components/schemas/ServArea'
      ussServReqs:
        type: array
        items:
          $ref: '#/components/schemas/ServReq'
        minItems: 1
      dnais:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
        minItems: 1
      lunId:
        type: string
    required:
      - ussId
      - ussServArea
      - ussServReqs
      - dnais
```

```
      - lunId

  ServReq:
    description: >
      Represents a service requirement.
      metric.
    type: object
    properties:
      reqName:
        type: string
      reqValue:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Bytes'
    required:
      - reqName
      - reqValue

  USSChangeReq:
    description: Represents the parameters to request for USS change.
    type: object
    properties:
      requestorId:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      uasId:
        $ref: 'TS29257_UAE_C2OperationModeManagement.yaml#/components/schemas/UasId'
      targetUssId:
        $ref: '#/components/schemas/UssId'
      targetUssInfo:
        $ref: '#/components/schemas/TgtUssInfo'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - requestorId
      - uasId

  TgtUssInfo:
    description: Represents the target USS related information.
    type: object
    properties:
      ussEdpt:
        $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
      ussServReqs:
        type: array
        items:
          $ref: '#/components/schemas/ServReq'
        minItems: 1
      dnais:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
        minItems: 1
      lunId:
        type: string
    required:
      - ussEdpt

  USSChangeNotif:
    description: Represents the USS Change Notification.
    type: object
    properties:
      event:
        $ref: '#/components/schemas/UssChangeEvent'
      polConfigStatus:
        type: boolean
        default: false
        description: >
          Indicates the status of the USS change policy configuration.
          true indicates that the USS change policy configuration was successful.
          false indicates that the USS change policy configuration failed.
      tgtUssId:
        $ref: '#/components/schemas/UssId'
      ussChgInfo:
        $ref: '#/components/schemas/UssChgInfo'
    required:
      - event

  UssChgInfo:
    description: Represents the target USS related information.
    type: object
```

```
      properties:
        servingUssId:
          $ref: '#/components/schemas/UssId'
        targetUssId:
          $ref: '#/components/schemas/UssId'
        lunId:
          type: string
        mobilityEvent:
          $ref: '#/components/schemas/MobilityEvent'
      required:
        - servingUssId


# SIMPLE DATA TYPES
#


    UssId:
      description: >
        Represents the identifier of a USS, encoded in the form of e.g., an FQDN, a URI, etc.
      type: string


#
# ENUMERATIONS
#

    UssChangeEvent:
      anyOf:
      - type: string
        enum:
           - USS_CHG_POL_CONFIG_STATUS
           - UAE_CLIENT_ASSIST_USS_CHG
           - UAE_SERVER_TRIGG_USS_CHG
      - type: string
        description: >
          This string provides forward-compatibility with future extensions to the enumeration
          and is not used to encode content defined in the present version of this API.
      description: |
        Represents a USS Change Event.
        Possible values are:
        - USS_CHG_POL_CONFIG_STATUS: Indicates that the USS Change Event is USS Change Policy
          Configuration Status.
        - UAE_CLIENT_ASSIST_USS_CHG: Indicates that the USS Change Event is UAE Client Assisted USS
          Change.
        - UAE_SERVER_TRIGG_USS_CHG: Indicates that the USS Change Event is UAE Server initiated
          USS Change Trigger.

    MobilityEvent:
      anyOf:
      - type: string
        enum:
           - OUT_OF_USS_SERV_AREA
      - type: string
        description: >
          This string provides forward-compatibility with future extensions to the enumeration
          and is not used to encode content defined in the present version of this API.
      description: |
        Represents a mobility event.
        Possible values are:
        - OUT_OF_USS_SERV_AREA: Indicates that the mobility event is the expected UAV mobility to a
          service area that is outside the current serving USS's service area.
```

A.5 UAE_DAASupport API

```
openapi: 3.0.0

info:
  title: UAE Server DAA Support Service
  version: 1.0.0-alpha.3
  description: |
    UAE Server DAA Support Service.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.257 V18.3.0; Application layer support for Uncrewed Aerial System (UAS);
    UAS Application Enabler (UAE) Server Services; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.257/

servers:
  - url: '{apiRoot}/uae-daa/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

security:
  - {}
  - oAuth2ClientCredentials: []

paths:
  /policies:
    get:
      summary: Retrieve all the active DAA Policies managed by the UAE Server.
      operationId: GetDAAPolicies
      tags:
        - DAA Policies (Collection)
      responses:
        '200':
          description: >
            OK. All the active DAA Policies managed by the UAE Server shall be returned.
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/DAAPolicy'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    post:
      summary: Request the creation of a DAA Policy.
      operationId: CreateDAAPolicy
      tags:
        - DAA Policies (Collection)
      requestBody:
        required: true
        content:
```

```
      application/json:
        schema:
          $ref: '#/components/schemas/DAAPolReq'
  responses:
    '200':
      description: >
        OK. The DAA Policy is successfully created and a representation of the created
        Individual DAA Policy resource shall be returned.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DAAPolResp'
      headers:
        Location:
          description: >
            Contains the URI of the created Individual DAA Policy resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:
    DAAPolCompStatusNotif:
      '{$request.body#/daaPol/notifUri}/daa-policy':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/DAAPolConfigNotif'
          responses:
            '204':
              description: >
                No Content. The DAA Policy Configuration Status notification is successfully
                received and acknowledged.
            '307':
              $ref: 'TS29122_CommonData.yaml#/components/responses/307'
            '308':
              $ref: 'TS29122_CommonData.yaml#/components/responses/308'
            '400':
              $ref: 'TS29122_CommonData.yaml#/components/responses/400'
            '401':
              $ref: 'TS29122_CommonData.yaml#/components/responses/401'
            '403':
              $ref: 'TS29122_CommonData.yaml#/components/responses/403'
            '404':
              $ref: 'TS29122_CommonData.yaml#/components/responses/404'
            '411':
              $ref: 'TS29122_CommonData.yaml#/components/responses/411'
            '413':
              $ref: 'TS29122_CommonData.yaml#/components/responses/413'
            '415':
              $ref: 'TS29122_CommonData.yaml#/components/responses/415'
            '429':
              $ref: 'TS29122_CommonData.yaml#/components/responses/429'
            '500':
              $ref: 'TS29122_CommonData.yaml#/components/responses/500'
```

```
                '503':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
                default:
                  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

        DAAEventsNotif:
          '{$request.body#/daaPol/notifUri}/daa-events':
            post:
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/DAAEventsInfo'
              responses:
                '200':
                  description: >
                    OK. The DAA Events Notification is successfully received and acknowledged, and
                    updated/additional DAA related event information is returned in the response
body.
                  content:
                    application/json:
                      schema:
                        $ref: '#/components/schemas/DAAEventsInfo'
                '204':
                  description: >
                    No Content. The DAA Events Notification is successfully received and
                    acknowledged.
                '307':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
                '308':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
                '400':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
                '401':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
                '403':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
                '404':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
                '411':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
                '413':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
                '415':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
                '429':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
                '500':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
                '503':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
                default:
                  $ref: 'TS29122_CommonData.yaml#/components/responses/default'


  /policies/{policyId}:
    parameters:
      - name: policyId
        in: path
        description: Represents the identifier of the Individual DAA Policy resource.
        required: true
        schema:
          type: string

    get:
      summary: Retrieve an existing Individual DAA Policy resource.
      operationId: GetIndDAAPolicy
      tags:
        - Individual DAA Policy (Document)
      responses:
        '200':
          description: OK. The requested Individual DAA Policy resource shall be returned.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/DAAPolicy'
        '307':
```

```
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    summary: Request the update of an existing Individual DAA Policy resource.
    operationId: UpdateIndDAAPolicy
    tags:
      - Individual DAA Policy (Document)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DAAPolicy'
    responses:
      '200':
        description: >
          OK. The Individual DAA Policy resource is successfully updated and a
          representation of the updated resource shall be returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/DAAPolicy'
      '204':
        description: >
          No Content. The Individual DAA Policy resource is successfully updated and no
          content is returned in the response body.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  patch:
    summary: Request the modification of an existing Individual DAA Policy resource.
    operationId: ModifyIndDAAPolicy
    tags:
      - Individual DAA Policy (Document)
    requestBody:
      required: true
      content:
        application/merge-patch+json:
```

```
          schema:
            $ref: '#/components/schemas/DAAPolicyPatch'
      responses:
        '200':
          description: >
            OK. The Individual DAA Policy resource is successfully modified and a
            representation of the updated resource shall be returned in the response body.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/DAAPolicy'
        '204':
          description: >
            No Content. The Individual DAA Policy resource is successfully modified and no
            content is returned in the response body.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    delete:
      summary: Request the deletion of an existing Individual DAA Policy resource.
      operationId: DeleteIndDAAPolicy
      tags:
        - Individual DAA Policy (Document)
      responses:
        '204':
          description: >
            No Content. The Individual DAA Policy resource is successfully deleted.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  /inform-events:
    post:
      summary: Inform about and request the management of possible DAA related events.
      operationId: InformDAAEvents
      tags:
        - InformDAAEvents
      requestBody:
        required: true
```

```
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/InformDAAEventsReq'
      responses:
        '204':
          description: >
            No Content. The request is successfully received.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'


components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    DAAPolReq:
      description: >
        Represents the parameters to request the creation of a DAA Policy.
      type: object
      properties:
        requestorId:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        daaPol:
          $ref: '#/components/schemas/DAAPolicy'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - requestorId
        - daaPol

    DAAPolResp:
      description: Represents the response to a DAA Policy creation request.
      type: object
      properties:
        daaPol:
          $ref: '#/components/schemas/DAAPolicy'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - daaPol

    DAAPolicy:
      description: Represents the content of a DAA Policy.
      type: object
      properties:
        uasId:
          $ref: 'TS29257_UAE_C2OperationModeManagement.yaml#/components/schemas/UasId'
```

```
      notifUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      daaAppPol:
        $ref: '#/components/schemas/DAAAppPolicy'
    required:
      - uasId
      - notifUri
      - daaAppPol

  DAAPolicyPatch:
    description: >
      Represents the parameters to request the modification of a DAA Policy.
    type: object
    properties:
      notifUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      daaAppPol:
        $ref: '#/components/schemas/DAAAppPolicy'

  DAAAppPolicy:
    description: Represents a DAA Application Policy.
    type: object
    properties:
      polContainer:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Bytes'
    anyOf:
      - required: [polContainer]

  InformDAAEventsReq:
    description: Represents the parameters to report DAA related event(s).
    type: object
    properties:
      requestorId:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      uasId:
        $ref: 'TS29257_UAE_C2OperationModeManagement.yaml#/components/schemas/UasId'
      daaEventsInfo:
        type: array
        items:
          $ref: '#/components/schemas/DAAEvent'
        minItems: 1
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - requestorId
      - uasId
      - daaEventsInfo

  DAAPolConfigNotif:
    description: Represents a DAA Policy Configuration Status Notification.
    type: object
    properties:
      status:
        $ref: '#/components/schemas/DAAPolConfigStatus'
    required:
      - status

  DAAEventsInfo:
    description: Represents a DAA Events Notification.
    type: object
    properties:
      uasId:
        $ref: 'TS29257_UAE_C2OperationModeManagement.yaml#/components/schemas/UasId'
      daaEventsInfo:
        type: array
        items:
          $ref: '#/components/schemas/DAAEvent'
        minItems: 1
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - uasId
      - daaEventsInfo

  DAAEvent:
    description: Represents a DAA event related information.
    type: object
    properties:
```

```
      uasId:
        $ref: 'TS29257_UAE_C2OperationModeManagement.yaml#/components/schemas/UasId'
      uasLocInfo:
        $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
    required:
      - uasId
      - uasLocInfo

  DAAPolConfigStatus:
    anyOf:
      - type: string
        enum:
        - SUCCESSFUL
        - NOT_SUCCESSFUL
      - type: string
        description: >
          This string provides forward-compatibility with future extensions to the enumeration
          and is not used to encode content defined in the present version of this API.
    description: |
      Represents the DAA Policy configuration completion status.
      Possible values are:
      - SUCCESSFUL: Indicates that the DAA Policy configuration was successful.
      - NOT_SUCCESSFUL: Indicates that the DAA Policy configuration was not successful.
```

A.6 UAE_UAVDynamicInfo API

```
openapi: 3.0.0

info:
  title: UAE Server UAV Dynamic Information Service
  version: 1.0.0-alpha.1
  description: |
    UAE Server UAV Dynamic Information Service.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.257 V18.3.0; Application layer support for Uncrewed Aerial System (UAS);
    UAS Application Enabler (UAE) Server Services; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.257/

servers:
  - url: '{apiRoot}/uae-udi/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

security:
  - {}
  - oAuth2ClientCredentials: []

paths:
  /subscriptions:
    post:
      summary: Request the creation of a UAV Dynamic Information Subscription.
      operationId: CreateDynUavSubsc
      tags:
        - UAV Dynamic Information Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/UAVDynInfoSubsc'
      responses:
        '201':
          description: >
            Created. The UAV Dynamic Information Subscription is successfully created and a
            representation of the created Individual UAV Dynamic Information Subscription resource
            shall be returned.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/UAVDynInfoSubsc'
          headers:
            Location:
              description: >
                Contains the URI of the created Individual UAV Dynamic Information Subscription
                resource.
              required: true
              schema:
                type: string
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
```

```
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    callbacks:
      UAVDynInfoNotif:
        '{$request.body#/notifUri}':
          post:
            requestBody:
              required: true
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/UAVDynInfoNotif'
            responses:
              '204':
                description: >
                  No Content. The UAV Dynamic Information Notification is successfully received
                  and Acknowledged.
              '307':
                $ref: 'TS29122_CommonData.yaml#/components/responses/307'
              '308':
                $ref: 'TS29122_CommonData.yaml#/components/responses/308'
              '400':
                $ref: 'TS29122_CommonData.yaml#/components/responses/400'
              '401':
                $ref: 'TS29122_CommonData.yaml#/components/responses/401'
              '403':
                $ref: 'TS29122_CommonData.yaml#/components/responses/403'
              '404':
                $ref: 'TS29122_CommonData.yaml#/components/responses/404'
              '411':
                $ref: 'TS29122_CommonData.yaml#/components/responses/411'
              '413':
                $ref: 'TS29122_CommonData.yaml#/components/responses/413'
              '415':
                $ref: 'TS29122_CommonData.yaml#/components/responses/415'
              '429':
                $ref: 'TS29122_CommonData.yaml#/components/responses/429'
              '500':
                $ref: 'TS29122_CommonData.yaml#/components/responses/500'
              '503':
                $ref: 'TS29122_CommonData.yaml#/components/responses/503'
              default:
                $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  /subscriptions/{subscId}:
    parameters:
      - name: subscId
        in: path
        description: >
          Represents the identifier of the Individual UAV Dynamic Information Subscription resource.
        required: true
        schema:
          type: string

    get:
      summary: Retrieve an existing Individual UAV Dynamic Information Subscription resource.
      operationId: GetIndDynUavSubsc
      tags:
        - Individual UAV Dynamic Information Subscription (Document)
      responses:
        '200':
          description: >
            OK. The representation of the requested Individual UAV Dynamic Information Subscription
            resource shall be returned.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/UAVDynInfoSubsc'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
```

```
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    put:
      summary: Request the update of an existing Individual UAV Dynamic Information Subscription
resource.
      operationId: UpdateIndDynUavSubsc
      tags:
        - Individual UAV Dynamic Information Subscription (Document)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/UAVDynInfoSubsc'
      responses:
        '200':
          description: >
            OK. The Individual UAV Dynamic Information Subscription resource is successfully updated
            and a representation of the updated resource shall be returned in the response body.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/UAVDynInfoSubsc'
        '204':
          description: >
            No Content. The Individual UAV Dynamic Information Subscription resource is successfully
            updated and no content is returned in the response body
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    patch:
      summary: Request the modification of an existing Individual UAV Dynamic Information
Subscription resource.
      operationId: ModifyIndDynUavSubsc
      tags:
        - Individual UAV Dynamic Information Subscription (Document)
      requestBody:
        required: true
        content:
          application/merge-patch+json:
            schema:
              $ref: '#/components/schemas/UAVDynInfoSubscPatch'
      responses:
        '200':
```

```
          description: >
            OK. The Individual UAV Dynamic Information Subscription resource is successfully
            modified and a representation of the updated resource shall be returned in the response
            body.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/UAVDynInfoSubsc'
        '204':
          description: >
            No Content. The Individual UAV Dynamic Information Subscription resource is successfully
            modified and no content is returned in the response body
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    delete:
      summary: Request the deletion of an existing Individual UAV Dynamic Information Subscription
resource.
      operationId: DeleteIndDynUavSubsc
      tags:
        - Individual UAV Dynamic Information Subscription (Document)
      responses:
        '204':
          description: >
            No Content. The Individual UAV Dynamic Information Subscription resource is successfully
            deleted.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'


components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
```

```
  schemas:

#
# STRUCTURED DATA TYPES
#

    UAVDynInfoSubsc:
      description: >
        Represents a UAV Dynamic Information Subscription.
      type: object
      properties:
        uavId:
          $ref: 'TS29257_UAE_C2OperationModeManagement.yaml#/components/schemas/UavId'
        proxRangInfo:
          $ref: '#/components/schemas/ProxRangInfo'
        notifUri:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - uavId
        - proxRangInfo
        - notifUri

    UAVDynInfoSubscPatch:
      description: >
        Represents the requested modifications to a UAV Dynamic Information Subscription.
      type: object
      properties:
        proxRangInfo:
          $ref: '#/components/schemas/ProxRangInfo'
        notifUri:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

    UAVDynInfoNotif:
      description: >
        Represents a UAV Dynamic Information Notification.
      type: object
      properties:
        subscId:
          type: string
        hostUavLoc:
          $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
        uavsInfo:
          type: array
          items:
            $ref: '#/components/schemas/UavInfo'
          minItems: 1
      required:
        - subscId
        - hostUavLoc
        - uavsInfo

    ProxRangInfo:
      description: >
        Represents the proximity range information.
      type: object
      properties:
        range:
          type: number
          format: double
          minimum: 0
        rangeInfo:
          type: string
      anyOf:
        - required: [range]
        - required: [rangeInfo]

    UavInfo:
      description: >
        Represents the UAV information related to the UAV detection in an application defined
        proximity range.
      type: object
      properties:
        nearbyUavId:
          $ref: 'TS29257_UAE_C2OperationModeManagement.yaml#/components/schemas/UavId'
        nearbyUavLoc:
```

```
          $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
        nearbyUavDist:
          $ref: '#/components/schemas/UavDistance'
      required:
        - nearbyUavId
        - nearbyUavLoc
        - nearbyUavDist


# SIMPLE DATA TYPES
#

    UavDistance:
      description: >
        Represents the linear distance between two UAVs.
      type: number
      format: double
      minimum: 0

#
# ENUMERATIONS
#
```

Annex B (informative): Withdrawn API versions

B.1 General

This Annex lists withdrawn API versions of the APIs defined in the present specification. Clause 4.3.1.6 of 3GPP TS 29.501 [5] describes the withdrawal of API versions.

B.2 UAE_C2OperationModeManagement API

The API versions listed in table B.2-1 are withdrawn for the UAE_C2OperationModeManagement API.

Table B.2-1: Withdrawn API versions of the UAE_C2OperationModeManagement service

API version number	Remarks

B.3 UAE_RealtimeUAVStatus API

The API versions listed in table B.3-1 are withdrawn for the UAE_RealtimeUAVStatus API.

Table B.3-1: Withdrawn API versions of the UAE_RealtimeUAVStatus service

API version number	Remarks

B.4 UAE_ChangeUSSManagement API

The API versions listed in table B.4-1 are withdrawn for the UAE_ChangeUSSManagement API.

Table B.4-1: Withdrawn API versions of the UAE_ChangeUSSManagement service

API version number	Remarks

B.5 UAE_DAASupport API

The API versions listed in table B.5-1 are withdrawn for the UAE_DAASupport API.

Table B.5-1: Withdrawn API versions of the UAE_DAASupport service

API version number	Remarks

B.6 UAE_UAVDynamicInfo API

The API versions listed in table B.6-1 are withdrawn for the UAE_UAVDynamicInfo API.

Table B.6-1: Withdrawn API versions of the UAE_DAASupport service

API version number	Remarks

Annex C (informative): Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2021-05	CT3#116-e		-	-	-	Skeleton for the new UASAPP TS	0.0.0
2021-05	CT3#116-e	C3-213503				Inclusion of C3-213539	0.1.0
2021-09	CT3#117-e	C3-214619	-	-	-	Inclusion of: C3-214294, C3-214295, C3-214296, C3-214297, C3-214487, C3-214299, C3-214300, C3-214488, C3-214489	0.2.0
2021-10	CT3#118-e	C3-215478				Inclusion of: C3-215442, C3-215443, C3-215444, C3-215445, C3-215446, C3-215447, C3-215448, C3-215449, C3-215450, C3-215451	0.3.0
2021-11	CT3#119-e	C3-216551	-	-	-	Inclusion of: C3-216211, C3-216212, C3-216213, C3-216214, C3-216215, C3-216216, C3-216217, C3-216218, C3-216219	0.4.0
2021-12	CT#94-e	CP-213206	-	-	-	Presented for information	1.0.0
2022-01	CT3#119-bis-e	C3-220456				Inclusion of: C3-220308, C3-220309, C3-220310, C3-220311, C3-220312, C3-220313, C3-220314, C3-220315	1.1.0
2022-02	CT3#120-e	C3-221557				Inclusion of: C3-221342, C3-221343, C3-221344, C3-221345, C3-221346, C3-221347, C3-221348, C3-221349, C3-221352, C3-221353, C3-221638, C3-221639, C3-221640	1.2.0
2022-03	CT#95e	CP-220162				Presentation to TSG CT for approval	2.0.0
2022-03	CT#95e	CP-220162				Approved by TSG CT	17.0.0
2022-06	CT#96	CP-221160	0001	1	F	Correcting the definition of a mandatory attribute in the OpenAPI file	17.1.0
2022-06	CT#96	CP-221160	0002	1	F	Updating the description fields for enumerations in the OpenAPI file	17.1.0
2022-06	CT#96	CP-221160	0003	1	F	Adding a missing reference number	17.1.0
2022-06	CT#96	CP-221151	0004	-	F	Update of info and externalDocs fields	17.1.0
2023-03	CT#99	CP-230156	0006	-	F	Correction of the description fields in enumerations	18.0.0
2023-03	CT#99	CP-230161	0007	-	F	Update of info and externalDocs fields	18.0.0
2023-06	CT#100	C3-232397	0008	2	B	Definition of the service description clauses of the UAE_ChangeUSSManagement API	18.1.0
2023-06	CT#100	C3-232398	0010	2	B	Definition of the API resources and notifications of the UAE_ChangeUSSManagement API	18.1.0
2023-06	CT#100	C3-232399	0011	1	B	Definition of the API data model clause of the UAE_ChangeUSSManagement API	18.1.0
2023-06	CT#100	C3-231252	0012		B	Definition of the OpenAPI description of the UAE_ChangeUSSManagement API	18.1.0
2023-06	CT#100	C3-232400	0013	1	B	Starting the Definition of the UAE_DAASupport API	18.1.0
2023-06	CT#100	C3-232401	0014		B	Definition of the API clauses of the UAE_DAASupport API	18.1.0
2023-06	CT#100	C3-232402	0015		B	Definition of the OpenAPI description of the UAE_DAASupport API	18.1.0
2023-12	CT#102	CP-233288	0017	1	F	Correct the attributes defined within DAAPolConfigNotif data type.	18.2.0
2023-12	CT#102	CP-233237	0020		F	Update of info and externalDocs fields	18.2.0
2024-03	CT#103	CP-240171	0021	1	F	Various corrections	18.3.0
2024-03	CT#103	CP-240194	0022		B	Complete the definition of the UAE_ChangeUSSManagement API	18.3.0
2024-03	CT#103	CP-240194	0023		B	Complete the definition of the UAE_DAASupport API	18.3.0
2024-03	CT#103	CP-240243	0024	1	B	Define the UAE_UAVDynamicInfo API	18.3.0
2024-03	CT#103	CP-240166	0025		F	Update of info and externalDocs fields	18.3.0

History

Document history		
V18.3.0	May 2024	Publication