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Title: Output – initial baseline text of draft Technical Report ITU-T TR.SP-UAV “Signalling requirements and protocols between unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks and beyond” (Geneva, 1-10 May 2024)

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Abstract: This document contains the baseline of draft new Technical Report ITU-T TR.SP-UAV "Signalling requirements and protocols between unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks and beyond" , resulting from the discussion of Q2/11 meeting in Geneva, 1-10 May 2024.

This document contains the baseline of draft new Technical Report TR.SP-UAV "Signalling requirements and protocols between unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks and beyond", resulting from the discussion of Q2/11 meeting in Geneva, 1-10 May 2024.

This document is based on this meeting's discussion and results on the following contribution:

No.	Title	Source	Discussion
SG11-C409	Proposal to start a new work item - ITU-T Q.SP-UAV "Signalling requirements and protocols between unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks and beyond"	Beijing University of Posts and Telecommunications (China), China Telecommunications Corporation, State Grid Corporation of China.	Change the proposal to Technical Report and make some modification based on meeting discussion

Draft new Technical Report ITU-T TR.SP-UAV

Signalling requirements and protocols between unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks and beyond

Summary

The development of connected unmanned aerial vehicles (UAVs) and UAV controllers benefits from the IMT-2020 network capabilities of data rate, latency, coverage, positioning, security and energy efficiency, and enable new applications in areas such as aerial photography, package delivery, surveillance, power line inspection and emergency response. The objective of this technical report is to address the issues on supporting signalling transmission between UAVs and UAV controllers using IMT-2020 networks and beyond.

Keywords

unmanned aerial vehicles; unmanned aerial vehicle controllers;

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Draft Technical Report ITU-T TR.SP-UAV

Signalling requirements and protocols between unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks and beyond

1. Scope

This Technical report describes the considerations of supporting signalling transmission between unmanned aerial vehicles (UAVs) and UAV controllers using IMT-2020 networks and beyond. It describes the following issues:

- Background and motivation of supporting UAVs and UAV controllers using IMT-2020 networks and beyond
- Gap analysis between ITU-T and other SDO's work related to the topic of UAVs and UAV controllers
- Overview of supporting UAVs and UAV controllers using IMT-2020 networks and beyond
- Considerations of enhancing the interfaces of supporting UAVs and UAV controllers using IMT-2020 networks and beyond

2. References

- [ITU-T Y.3102] Recommendation ITU-T Y.3102 (2018), *Framework of the IMT-2020 network*
- [ITU-T Y.3104] Recommendation ITU-T Y.3104 (2018), *Architecture of the IMT-2020 network*

3. Definitions

3.1. Terms defined elsewhere

This Technical Report uses the following terms defined elsewhere:

[TBD]

4. Abbreviations

This Technical Report uses the following abbreviations:

UAV Unmanned Aerial Vehicle

5. Background and motivation of supporting UAVs and UAV controllers using IMT-2020 networks and beyond

In recent years, connected Unmanned Aerial Vehicles (UAVs) and UAV controllers using IMT-2020 networks are a rapidly advancing technology. This integration allows UAVs to leverage existing mobile network infrastructure for control, telemetry, and data transmission without the need for line-of-sight control or dedicated communication links. The development of connected UAVs and UAV controllers benefits from the IMT-2020 network capabilities of data rate, latency, coverage, positioning, security and energy efficiency, and enable new applications in areas such as aerial photography, package delivery, surveillance, power line inspection and emergency response.

ITU-T Recommendation Y.4421 outlines the functional architecture for UAVs and UAV controllers using IMT-2020 networks. This standard defines the roles and interactions of various components involved in UAV operations using IMT-2020 networks.

In order to enable secure, reliable, and efficient integration of UAVs and UAV controllers using IMT-2020 networks and beyond, it is important to specify the signalling requirements and protocols

between unmanned aerial vehicles and unmanned aerial vehicle controllers based on the ITU-T Recommendation Y.4421.

[Editor's Note] Background and motivation of supporting UAVs and UAV controllers using IMT-2020 networks and beyond will be further modified.

6. Gap Analysis with ITU-T and other SDO's work related to the topic of UAVs and UAV controllers

[Editor's Note] Gap analysis with ITU-T and other SDO's work related to the topic of UAVs and UAV controllers will be further added.

7. Overview of supporting UAVs and UAV controllers using IMT-2020 networks and beyond

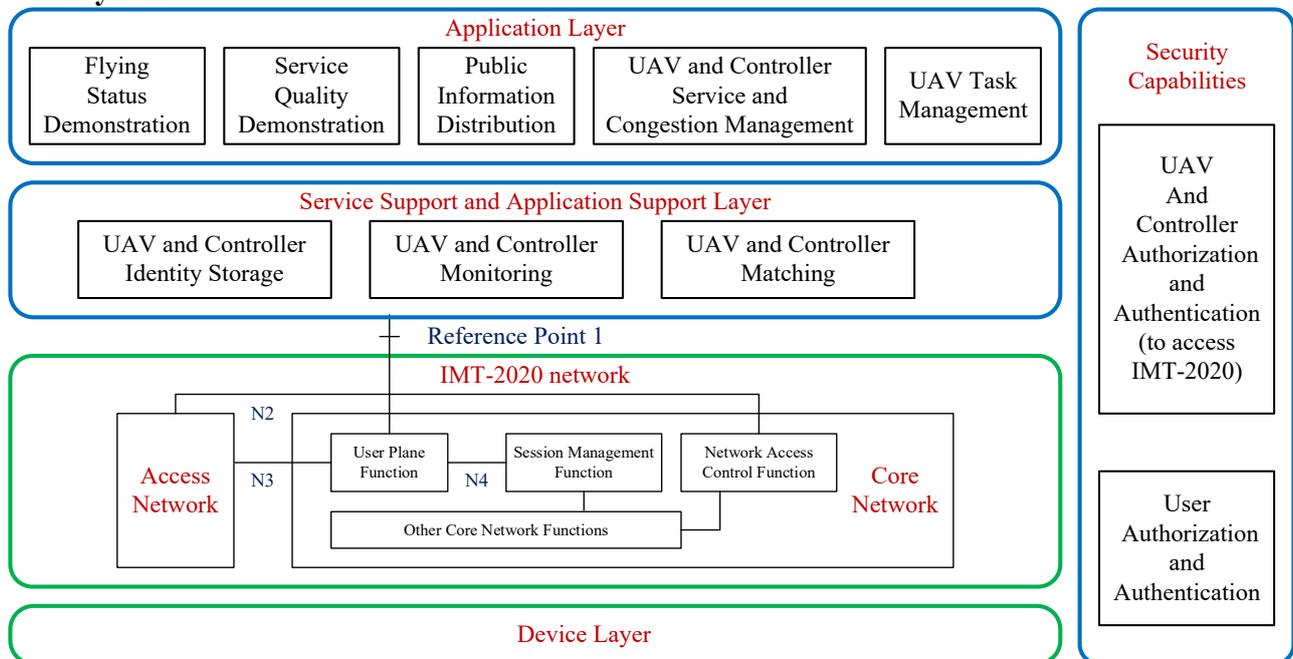


Figure 8-1 – Functional architecture of unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks

Figure 8-1 shows the functional architecture of unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks, which aligns with the Figure 8-1 in [b-ITU-T Y.4421]. According to [b-ITU-T Y.4421], Reference point 1 is between the support layer and the user plane function in the core network of IMT-2020. Reference point 1 can be used for UAV flying status demonstration, service quality demonstration, public information distribution, UAV and controller service and congestion management, UAV task management, UAV and controller identity storage, UAV and controller status monitoring, UAV and controller matching and controller authorization and authentication.

[Editor's Note] This clause will further explain the of signalling architecture supporting UAVs and UAV controllers using IMT-2020 networks and beyond.

8. Considerations of enhancing the interfaces supporting UAVs and UAV controllers using IMT-2020 networks and beyond

[Editor's Note] This clause will further explain the necessity of enhancing the interfaces supporting UAVs and UAV controllers using IMT-2020 networks and beyond.

Bibliography

- [b-ITU-T Y.2011] Recommendation ITU-T Y.2011 (2004), *General principles and general reference model for Next Generation Networks*
- [b-ITU-T Y.3100] Recommendation ITU-T Y.3100 (2017), *Terms and definitions for IMT-2020 network*
- [b-ITU-T Y.3101] Recommendation ITU-T Y.3101 (2018), *Requirements of the IMT-2020 network*
- [b-ITU-T Y.4421] Recommendation ITU-T Y.4421 (2021), *Functional architecture for unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks*
- [b-3GPP TS 22.125] 3GPP TS 22.125 (2022), *Uncrewed Aerial System (UAS) support in 3GPP; Stage 1 (Release 17)*
- [b-3GPP TS 23.256] 3GPP TS 23.256 (2023), *Support of Uncrewed Aerial Systems (UAS) connectivity, identification and tracking; Stage 2 (Release 17)*
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