

ETSI TS 122 125 V17.7.0 (2024-05)



5G; Unmanned Aerial System (UAS) support in 3GPP (3GPP TS 22.125 version 17.7.0 Release 17)

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Reference

RTS/TSGS-0122125vh70

Keywords

5G

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Foreword

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Introduction

Interest in using cellular connectivity to support Uncrewed Aerial Systems (UAS) is strong, and the 3GPP ecosystem offers excellent benefits for UAS operation. Ubiquitous coverage, high reliability and QoS, robust security, and seamless mobility are critical factors to supporting UAS command and control functions. In parallel, regulators are investigating safety and performance standards and Registration and licensing programs to develop a well-functioning private and civil UAS ecosystem which can safely coexist with commercial air traffic, public and private infrastructure, and the general population.

The 3GPP system can provide control plane and user plane communication services for UAS. Examples of services which can be offered to the UAS ecosystem includes data services for command and control (C2), telematics, UAS-generated data, remote identification, and authorisation, enforcement, and regulation of UAS operation.

1 Scope

The present document identifies the requirements for operation of Uncrewed Aerial Vehicles (UAVs) via the 3GPP system.

This includes requirements for meeting the business, security, and public safety needs for the remote identification and tracking of UAS linked to a 3GPP subscription.

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] FAA UTM Concept of Operations v1.0, Foundational Principles, Roles and Responsibilities, Use Cases and Operational Threads <https://utm.arc.nasa.gov/docs/2018-UTM-ConOps-v1.0.pdf>
- [3] FAA Remote Identification, https://www.faa.gov/uas/research_development/remote_id/
- [4] 3GPP TS 22.261: "Service requirements for the 5G system; Stage 1".
- [5] IMT 2020(5G): "Application for UAV in 5G White Paper", September 2018

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].

Above ground level (AGL): In the context of a UAV it is the UAV altitude referenced to ground level in the vicinity.

Command and Control (C2) Communication: the user plane link to convey messages with information of command and control for UAV operation between a UAV controller and a UAV.

Uncrewed Aerial System (UAS): Composed of Uncrewed Aerial Vehicle (UAV) and related functionality, including command and control (C2) links between the UAV and the controller, the UAV and the network, and for remote identification. A UAS is comprised of a UAV and a UAV controller.

NOTE: A UAV can be controlled by different UAV controllers, but at any given time, a UAV is under the control of only one UAV controller. The mechanisms to ensure which UAV controller is active and controlling the UAV is out of scope of 3GPP.

Uncrewed Aerial System Traffic Management (UTM): a set of functions and services for managing a range of autonomous vehicle operations.