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**UAS traffic management (UTM) —
Part 9:
Interface between UTM service
providers and users**

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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This document was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 16, *Unmanned aircraft systems*.

A list of all parts in the ISO 23629 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

To manage rapid growth of the unmanned aircraft system (UAS) operations, governments and organizations have made efforts to develop UAS traffic management (UTM), such as UTM concept of operations developed in USA, U-space concept of operations developed in Single European Sky ATM Research (SESAR) and a common framework of UTM proposed by ICAO. According to these concepts and perspectives, UTM service provider (USP) plays a core role in the UTM ecosystem. Hence, it is significant to define the interfaces between USP and the users so that elements of exchanging information between them for the implementation of UTM services can be clarified.

This document aims to help the sharing of information and interoperability between USP and the users of UTM services and build a common cognition across states, regulators, industries and other UTM stakeholders. It is in conformity with the structure of the ISO 23629 series, while making relevant materials as references such as the documents of the American Society of Testing Materials (ASTM) and operational concepts proposed by governments and organizations. This document only defines the information exchanged in the interface under the structure in ISO 23629-5 and the requirement in ISO 23629-12, while the protocol and data model used to realize the interface is not included.

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UAS traffic management (UTM) —

Part 9:

Interface between UTM service providers and users

1 Scope

This document mainly specifies elements of information exchange between unmanned aircraft system (UAS) traffic management (UTM) service providers (USP) and different users to support relevant UTM services between them, while the protocol requirements and the transmission requirements at the operational level are not included.

This document excludes the interface between USP and USP and the interface between USP and providers of operation support services.

2 Normative reference

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 21384-4, *Unmanned aircraft systems — Part 4: Vocabulary*

3 Terms and definitions

ISO/FDIS 23629-9

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For the purposes of this document, the terms and definitions given in ISO 21384-4 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

UAS traffic management

UTM

set of traffic management and air navigation services aiming at safe, secure and efficient integration of multiple manned and unmanned aircraft flying inside the respective designated operational coverage of each service

[SOURCE: ISO 23629-7:2021, 3.11]

3.2

UTM service

result of at least one activity necessarily performed at the interface between the *UTM service provider (USP)* (3.3) and the *UTM user* (3.4), which consists in the provisions of digital data and information, in the context of UTM

[SOURCE: ISO 23629-12:2022, 3.9, modified — “or operation support provider” has been removed; “in the context of UTM” has been added; notes to entry have been removed.]

3.3

UTM service provider

USP

organization playing the role of a *UTM* (3.1) actor, which provides, normally in exchange for a fee, digital data and information to *UTM users* (3.4) who may choose to take advantage of the offered service

[SOURCE: ISO 23629-12:2022, 3.10, modified — The abbreviated term has been changed from “UTM SP” to “USP”; note 1 to entry has been removed.]

3.4

UTM user

organization or system which uses digital data and information offered by a *USP* (3.3) to fulfil their mission, that is neither a USP nor an operation support service provider

[SOURCE: ISO 23629-12:2022, 3.12, modified — “UTM SP” has been replaced by “USP”.]

4 Abbreviated terms

AGI	authority-issued ad hoc published geospatial information
AI	aeronautical information
ATSP	air traffic service provider
BDCS	BeiDou Coordinate System
BRLOS	beyond radio line-of-sight
BVLOS	beyond visual line-of-sight
CCI	communication coverage information
CGCS2000	China Geodetic Coordinate System 2000
CGI	collected geospatial information
EMI	electromagnetic interference information
EVLOS	extended visual line-of-sight
FPI	flight plan information
geozone	geographical zones
MATI	manned air traffic information
NCI	navigation coverage information
PDI	population density information
IT	information technology
OGI	operation guidance information
OPA	operation plan application
OPR	operation plan reply
RA	registration application
RR	application reply
UA	unmanned aircraft
UAS	unmanned aircraft system
UATI	unmanned air traffic information
VLOS	visual line-of-sight
WI	weather information
WGS-84	World Geodetic System 1984 Coordinate System

5 Overview

5.1 UTM users

In light of the descriptions in ISO 23629-5 and ISO 23629-12, UTM users can be sorted into five main categories: the operators, the aviation and airspace authority, the security and enforcement authority, the public and the air traffic service provider (ATSP).

- a) Operator. Encompassing both the UAS operator and the vertiport operator. The UAS operator is defined as the person, organization or enterprise engaged in or offering to engage in a UAS operation. The vertiport operator is defined as the person, organization or enterprise engaged in or offering to engage in vertiport operations.

NOTE 1 The UAS operator and the vertiport operator can be different legal entities.

NOTE 2 See ISO 21384-4.

NOTE 3 Typically, three different information technology (IT) entities are under managerial control of the UAS operator:

- the UA which, during the flight, can exchange digital data;
- the station of the remote pilot, which is also active and exchanges data with USP during the flight;
- the working position of the fleet manager, which can be always active and which exchanges data with USP mainly in the flight preparation phase.

- b) Aviation and airspace authority. The airspace regulatory body and the aviation authority exercising oversight of all aviation activities, including operations of manned and unmanned aircraft, related services, including air navigation services and air traffic management/services, as well as aerodromes and vertiports.

NOTE 4 The oversight authority for civil activities is usually named the civil aviation administration (CAA) and its tasks are mainly based on Annex 19 to the Chicago Convention.

NOTE 5 Based on Articles 1 and 2 of the Chicago Convention, states have sovereignty on the airspace above their territory, including territorial waters. The organization of the airspace and its management requires coordination between the CAA and corresponding military authorities.

NOTE 6 Involved public authorities can also include geozone managers, who can issue flight authorisations, such as managers of critical infrastructures or municipalities.

- c) Security and enforcement authority. The bodies responsible for national security and responding to security incidents, as well as the law enforcement agencies (e.g. police) conducting investigations, enforcing regulations and issuing sanctions, including in response to local complaints.

NOTE 7 The tasks of such authorities can include counter-UAS measures to neutralize unlawful UA.

- d) Public. The public bodies obtaining UTM services, including people, organizations and enterprises.
- e) ATSP. The organization responsible for providing air traffic services (ATS) in a designated volume of coverage, within which the majority of air traffic constitutes manned aircraft.

5.2 Information exchange

Information exchanged between USP and the five main groups of UTM users includes, but is not limited to, the following, some of which may be optional in practice:

- a) Information for strategic service.

Traffic information for flight identification, tracking, de-confliction to ensure operation safety, including UATI, MATI and AGI.

Supplemental information to support operation safety, including CGI, WI, PDI, EMI, CCI, NCI, AI and FPI.

b) Information for agent service.

USP provides agent service for RA from public and RR to the applicant.

USP provides agent service for OPA from operator and OPR to the applicant.

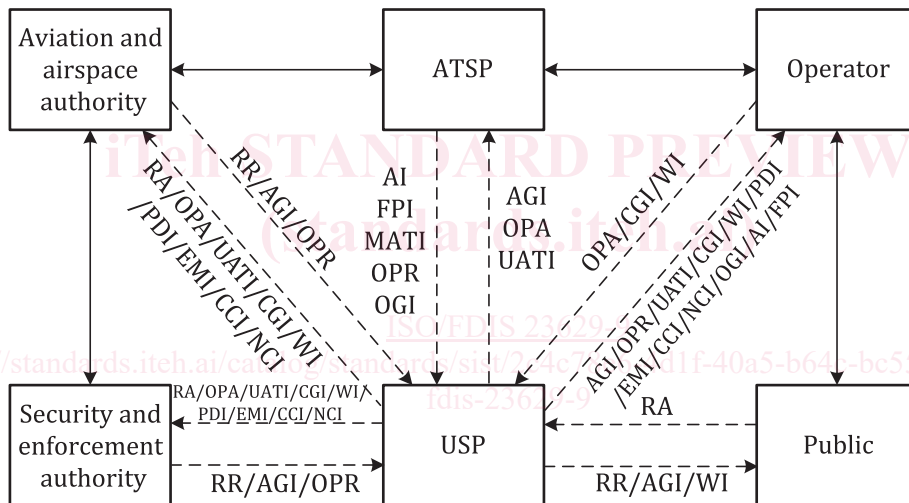
c) Information for guidance service.

USP provides tactical conflict alleviating actions to the operator, including OGI.

d) Information for support service.

USP provides support services to assist the operator in the operation plan, including traffic accommodation capacity analysis, risk prediction analysis and emergency procedure plans.

Figure 1 shows the information exchange flows in the digital ecosystem in which UTM services are actors. Dashed arrows depict interconnections between USP and the five different users defined in this document. Solid arrows stand for other connections across the users. However, these connections are out of the scope of this document; the presentation is only for the integrity of the ecosystem.



Key

dashed arrow	interconnections between USP and different users	PDI	population density information
solid arrow	other connections across the users.	EMI	electromagnetic interference information
AGI	authority-issued ad hoc published geospatial information	CCI	communication coverage information
OPA	operation plan application	NCI	navigation coverage information
OPR	operation plan reply	OGI	operation guidance information
MATI	manned air traffic information	AI	aeronautical information
UATI	unmanned air traffic information	FPI	flight plan information
CGI	collected geospatial information	RA	registration application
WI	weather information	RR	registration reply

Figure 1 — The information exchange flows in the UTM service ecosystem

6 Elements of information exchange between USP and users

6.1 General

Elements of information exchanged between USP and users to support UTM services are listed in this clause if relevant services are offered.

6.2 Registration information

[Table 1](#) summarizes elements of registration information which include the RA and RR.

Table 1 — Elements of registration information

Attribute	Description
Identifier	Information for identifying the data package.
Operator	Information indicating the operator, only for operator registration.
UAS pilot	Information indicating the UAS pilot, only for UAS pilot registration.
UAS owner	Information indicating the UAS owner, who could be an organization or an individual, only for UAS registration.
UA	The physical and performance characteristics (see Table A.1 in Annex A) indicating the unique serial number of the UA that will be making the flight, only for UA registration.
Status	Information indicating the status of the registration, e.g. application or acceptance.
Updated time	Information indicating the delivered time of the data package.

6.3 Geospatial information

Geospatial information includes collected geospatial information (CGI) and authority-issued ad hoc published geospatial information (AGI). [Table 2](#) summarizes elements of CGI. [Table 3](#) summarizes elements of AGI.

Table 2 — Elements of collected geospatial information

Attribute	Description
Identifier	Information for identifying the data package.
Terrain data	Information indicating the elevation and topographic feature of the ground surface, reference datum and applicable lateral and vertical errors.
Obstacle data	Information indicating the shape, height and other features of the ground buildings and other obstacles, and applicable reference datum
Updated time	Information indicating the published time of the data package.

Table 3 — Elements of authority-issued geospatial information

Attribute	Description
Identifier	Information for identifying the data package.
UTM airspace data	Information indicating the airspace configuration (see Table A.2 in Annex A) related to geozones in which UAS operations are permitted or prohibited.
UTM route data	Refer to the “Attributes of flight route” in ISO 23629-7:2021, 4.4.3.
Updated time	Information indicating the published time of the data package.