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UAS traffic management (UTM) —

Part 9: Interface between UTM service providers and users

Gestion du trafic d'UAS (UTM) —

Partie 9: Interface entre les fournisseurs de services UTM et les utilisateurs

Reference number
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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.

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

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.

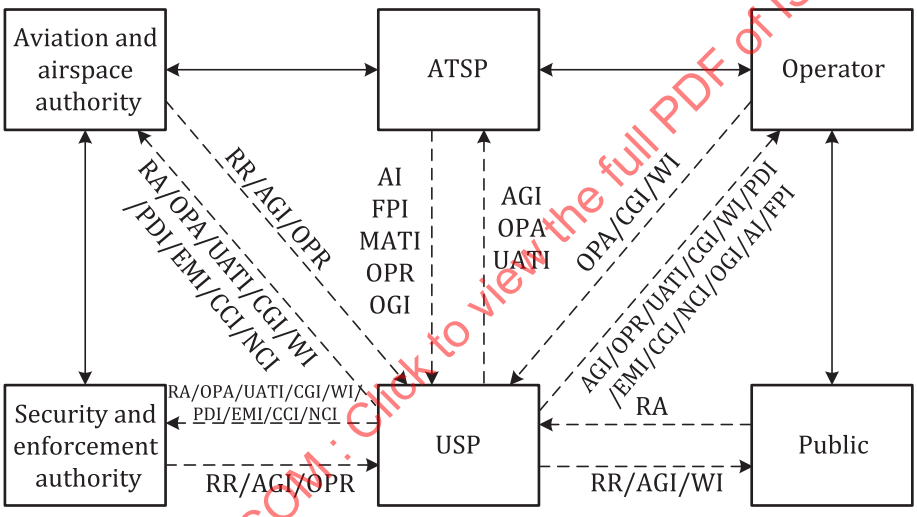
c) Information for guidance service.

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.

6.4 Population density information

Table 4 summarizes elements of population density information, including the PDI.

Table 4 — Elements of population density information

Attribute	Description
Identifier	Information for identifying the data package.
Area boundary	Information indicating the boundary of area in which the population density is provided.
Refreshing frequency	Information indicating the refreshing frequency of the data.
Density value	Information indicating the population density value in the area.
Updated time	Information indicating the published time of the data package.

6.5 Environmental information

Table 5 summarizes elements of environmental information, including the EMI, CCI and NCI.

Table 5 — Elements of environmental information

Attribute	Description
Identifier	Information for identifying the data package.
Electromagnetic interference	Information indicating the degree of electromagnetic interference.
Communication signal coverage	Information indicating the applicability of communication signals.
Navigation signal coverage	Information indicating the applicability of navigation signals.
Updated time	Information indicating the published time of the data package.

6.6 Aeronautical information

Table 6 summarizes elements of aeronautical information (AI).

Table 6 — Elements of aeronautical information

Attribute	Description
Identifier	Information for identifying the data package.
Aeronautical information product	Information indicating the aeronautical information products of airspace, routes, vertiports and other UAS operation relative aeronautical elements includes, but is not limited to: — aeronautical information circulars (AIC); — aeronautical charts; — aeronautical communications frequencies.
Updated time	Information indicating the published time, active time and expiry time of the data package.

6.7 Weather information

Table 7 summarizes elements of weather information (WI).

Table 7 — Elements of weather information

Attribute	Description
Identifier	Information for identifying the data package.
Information covering area	Information indicating the covering area of the data package.
Temperature	Information of air temperature.
Humidity	Information for the concentration of water vapour present in the air.
Precipitation	Information for current precipitation or precipitation forecast.
Visibility	Information for a measure of the distance at which an object or light can be clearly discerned.
Wind	Information indicating the wind speed and direction.
Cloud	Information for cloud cover/type and ceiling.
Updated time	Information indicating the published time of the data package.

6.8 Operation plan information

Table 8 summarizes elements of operation plan information, including the OPA and OPR.

Table 8 — Elements of operation plan information

Attribute	Description
Identifier	Information for identifying the data package.
Operator	Information indicating the operator applying for the operation plan, organization or individual.
UAS	Information indicating the UAS and for the planned operation (see Table A.1 in Annex A).
Pilot	Information indicating the pilot in charge of the planned operation.
Status	Information indicating the status of the operation plan, e.g. application or approval.
Airspace/route	Information indicating the planned airspace/route.
Start time	The time when this flight segment will begin.
End time	The time when this flight segment will be completed.
Operation type	VLOS, BVLOS, EVLOS or BRLOS.
Operation mode	The mode that the UAS is being operated in, including remote piloted operation, autonomous operation and distributed operation.
Operation mission	Agricultural survey, delivery, etc.
Mission specified data	Special information related to the mission.
Strategic conflict management plan	Provide traffic de-confliction solutions at strategic level based on risk prediction analysis, if necessary.
Emergency procedures	In case of emergencies, make pre-arranged procedures to ensure the operation safety.
Updated time	Information indicating the delivered time of the data package.

6.9 Flight plan information

Table 9 summarizes elements of flight plan information (FPI).

Table 9 — Elements of flight plan information

Attribute	Description
Identifier	Information for identifying the data package.
Body of the flight plan in ATM	Information indicating the flight plans involved in this data package. See Reference [13] for details of the flight plan format.
Updated time	Information indicating the delivered time of the data package.

6.10 Traffic information

Traffic information includes unmanned air traffic information (UATI) and manned air traffic information (MATI). Table 10 summarizes elements of UATI. Table 11 summarizes elements of MATI.

Table 10 — Elements of unmanned air traffic information

Attribute	Description
Identifier	Information for identifying the data package.
UA	Information indicating the identified operating UA.
Flight status	Information describing the flight status of UA, including take-off, in-flight, landing.
Timestamp	Information indicating the time when the messages are generated.
UA latitude	Information indicating the latitude of the UA.
UA longitude	Information indicating the longitude of the UA.
UA altitude	Information indicating the altitude of the UA.
UA height	Information indicating the height of the UA (above ground level).
Coordinates system type	CGCS2000, GLONASS-PZ90, WGS-84, etc.
Ground speed	Information indicating the current flight speed of the UA relative to the ground.
Course	Information indicating the route course measured clockwise from true north.
Communication means with ATS	Information indicating automated digital means for UAS crews to communicate with ATS when a flight intends to enter controlled airspace and when a flight is in controlled airspace.
Alert	Information alerting tactical conflict.
Incident/accident	Information reporting incident/accident.
Updated time	Information indicating the delivery time of the data package.

Table 11 — Elements of manned air traffic information

Attribute	Description
Identifier	Information for identifying the data package.
Manned aircraft	Information indicating the identified operating manned aircraft.
Flight status	Information describing the flight status of manned aircraft, including take-off, in-flight, landing.
Timestamp	Information indicating the time when the messages are generated.
Manned aircraft latitude	Information indicating the latitude of the manned aircraft.
Manned aircraft longitude	Information indicating the longitude of the manned aircraft.
Manned aircraft altitude	Information indicating the vertical distance of the manned aircraft of a level, a point or an object considered as a point, measured from mean sea level (MSL).
Coordinates system type	CGCS2000, GLONASS-PZ90, WGS-84, BDCS, etc.
Ground speed	Information indicating the current flight speed of the operating manned aircraft relative to the ground.
Course	Information indicating the route course measured clockwise from true north.

Table 11 *(continued)*

Attribute	Description
Alert	Information alerting tactical conflict.
Incident/accident	Information reporting incident/accident.
Updated time	Information indicating the delivered time of the data package.

6.11 Operation guidance information

Table 12 summarizes elements of operation guidance information (OGI).

Table 12 — Elements of operation guidance information

Attribute	Description
Identifier	Information for identifying the data package.
UA ID	Information indicating the unique identification number of UA.
Alert	Information indicating the air alert in the operation when promising collision is detected.
Action	Information indicating the actions required to be executed to maintain separation among air traffic by the operator or the pilot, e.g. accelerate, decelerate, deviate, holding, fixed-course flying, landing clearance, change to alternative flight plan, execute contingency or emergency procedure.

7 Interface between USP and operators

7.1 UTM service

Services between USP and operator can include, but are not limited to, those listed in Table 13.

Table 13 — Service between USP and operator

UTM functions	UTM services	Information exchanged
Flight information management function	Aeronautical information management for UAS	Aeronautical information, flight plan information
Operation plan management function	Dynamic (airspace) capacity management service	Operation plan information
	UTM route design service	Operation plan information
	Strategic conflict management service	Operation plan information
	Flight clearance service	Operation plan information
	Geo-awareness service	Authority-issued geospatial information
NOTE 1 The names and explanations of functions are adapted from ISO 23629-5.		
NOTE 2 The names and explanations of services are adapted from ISO 23629-12.		
NOTE 3 The “authenticated tracking service” is an extension of the “tracking service” included in ISO 23629-12.		

Table 13 *(continued)*

UTM functions	UTM services	Information exchanged
Position data management function	Traffic information service	Unmanned air traffic information
	Network (electronic) identification service	Unmanned air traffic information
	Tracking service	Unmanned air traffic information
	Authenticated tracking service	Unmanned air traffic information
	Real-time GIS	Unmanned air traffic information
	Vertical alert service	Unmanned air traffic information, operation guidance information
	Tactical conflict management service	Unmanned air traffic information, operation guidance information
	Conformity monitoring service	Unmanned air traffic information
	Procedural interface with ATC	Unmanned air traffic information
	Collaborative interface with ATC	Unmanned air traffic information
Reporting function	Traffic information service	Unmanned air traffic information
Supplemental data supply function	Geospatial information service	Collected geospatial information
	Weather information service	Weather information
	Population density information service	Population density information
	Electromagnetic interference information service	Electromagnetic interference information
	Communication coverage information service	Communication coverage information
	Navigation coverage information service	Navigation coverage information
NOTE 1 The names and explanations of functions are adapted from ISO 23629-5.		
NOTE 2 The names and explanations of services are adapted from ISO 23629-12.		
NOTE 3 The “authenticated tracking service” is an extension of the “tracking service” included in ISO 23629-12.		

7.2 Information exchange

7.2.1 From USP to operator

a) Authority-issued ad hoc published geospatial information (AGI).

b) Operation plan reply (OPR).

c) Unmanned air traffic information (UATI).

d) Collected geospatial information (CGI).

e) Weather information (WI).

f) Population density information (PDI).

g) Electromagnetic interference information (EMI).

h) Communication coverage information (CCI).

i) Navigation coverage information (NCI).

j) Operation guidance information (OGI).

k) Aeronautical information (AI).

l) Flight plan information (FPI).

NOTE Information exchanged between USP and UAS operator in item derives from ISO 23629-5.

7.2.2 From operator to USP

a) Operation plan application (OPA).

b) Collected geospatial information (CGI).

c) Weather information (WI).

8 Interface between USP and aviation and airspace authority

8.1 UTM service

Services between USP and aviation and airspace authority can include, but are not limited to, those listed in Table 14.

Table 14 — Service between USP and aviation and airspace authority

UTM functions	UTM services	Information exchanged
Registration function	Electronic registration service	Registration information
Operation plan management function	Dynamic (airspace) capacity management service	Operation plan information
	UTM route design service	Operation plan information
	Strategic conflict management service	Operation plan information
	Flight clearance service	Operation plan information
	Geo-awareness service	Authority-issued geospatial information
NOTE 1 The names and explanations of functions are adapted from ISO 23629-5. NOTE 2 The names and explanations of services are adapted from ISO 23629-12. NOTE 3 The “authenticated tracking service” is an extension of the “tracking service” included in ISO 23629-12.		

Table 14 *(continued)*

UTM functions	UTM services	Information exchanged
Position data management function	Traffic information service	Unmanned air traffic information
	Network (electronic) identification service	Unmanned air traffic information
	Tracking service	Unmanned air traffic information
	Authenticated tracking service	Unmanned air traffic information
	Real-time GIS	Unmanned air traffic information
	Vertical alert service	Unmanned air traffic information
	Tactical conflict management service	Unmanned air traffic information
	Conformance monitoring service	Unmanned air traffic information
	Procedural interface with ATC	Unmanned air traffic information
	Collaborative interface with ATC	Unmanned air traffic information
Reporting function	Traffic information Service	Unmanned air traffic information
Supplemental data supply function	Geospatial information service	Collected geospatial information, authority-issued geospatial information
	Weather information service	Weather information
	Population density information service	Population density information
	Electromagnetic interference information service	Electromagnetic interference information
	Communication coverage information service	Communication coverage information
	Navigation coverage information service	Navigation coverage information
NOTE 1 The names and explanations of functions are adapted from ISO 23629-5.		
NOTE 2 The names and explanations of services are adapted from ISO 23629-12.		
NOTE 3 The “authenticated tracking service” is an extension of the “tracking service” included in ISO 23629-12.		

8.2 Information exchange

8.2.1 From USP to aviation and airspace authority

a) Registration application (RA).

b) Operation plan application (OPA).

c) Unmanned air traffic information (UATI).

d) Collected geospatial information (CGI).

e) Weather information (WI).

f) Population density information (PDI).

g) Electromagnetic interference information (EMI).

h) Communication coverage information (CCI).

i) Navigation coverage information (NCI).

8.2.2 From aviation and airspace authority to USP

a) Registration reply (RR).

b) Authority-issued ad hoc published geospatial information (AGI).

c) Operation plan reply (OPR).

9 Interface between USP and security and enforcement authority

9.1 UTM service

Services between USP and security and enforcement authority can include, but are not limited to, those listed in Table 15.

Table 15 — Service between USP and security and enforcement authority

UTM functions	UTM services	Information exchanged
Registration function	Electronic registration service	Registration information
Operation plan management function	Dynamic (airspace) capacity management service	Operation plan information
	UTM route design service	Operation plan information
	Strategic conflict management service	Operation plan information
	Flight clearance service	Operation plan information
	Geo-awareness service	Authority-issued geospatial information
Position data management function	Traffic information service	Unmanned air traffic information
	Network (electronic) identification service	Unmanned air traffic information
	Tracking service	Unmanned air traffic information
	Authenticated tracking service	Unmanned air traffic information
	Real-time GIS	Unmanned air traffic information
	Vertical alert service	Unmanned air traffic information
	Tactical conflict management service	Unmanned air traffic information
	Conformance monitoring service	Unmanned air traffic information
	Procedural interface with ATC	Unmanned air traffic information
	Collaborative interface with ATC	Unmanned air traffic information

NOTE 1 The names and explanations of functions are adapted from ISO 23629-5.

NOTE 2 The names and explanations of services are adapted from ISO 23629-12.

NOTE 3 The “authenticated tracking service” is an extension of the “tracking service” included in ISO 23629-12.

Table 15 *(continued)*

UTM functions	UTM services	Information exchanged
Reporting function	Traffic information Service	Unmanned air traffic information
Supplemental data supply function	Geospatial information service	Collected geospatial information
	Weather information service	Weather information
	Population density information service	Population density information
	Electromagnetic interference information service	Electromagnetic interference information
	Communication coverage information service	Communication coverage information
	Navigation coverage information service	Navigation coverage information
NOTE 1 The names and explanations of functions are adapted from ISO 23629-5. NOTE 2 The names and explanations of services are adapted from ISO 23629-12. NOTE 3 The "authenticated tracking service" is an extension of the "tracking service" included in ISO 23629-12.		

9.2 Information exchange

9.2.1 From USP to security and enforcement authority

a) Registration application (RA).

b) Operation plan application (OPA).

c) Unmanned air traffic information (UATI).

d) Collected geospatial information (CGI).

e) Weather information (WI).

f) Population density information (PDI).

g) Electromagnetic interference information (EMI).

h) Communication coverage information (CCI).

i) Navigation coverage information (NCI).

9.2.2 From security and enforcement authority to USP

a) Registration reply (RR).

b) Authority-issued ad hoc published geospatial information (AGI).

c) Operation plan reply (OPR).

10 Interface between USP and public

10.1 UTM service

Services between USP and the public can include, but are not limited to, those listed in Table 16.

Table 16 — Service between USP and the public

UTM functions	UTM services	Information exchange
Registration function	Electronic registration service	Registration information
Supplemental data supply function	Geospatial information service	Authority-issued geospatial information
	Weather information service	Weather information
NOTE 1 The names and explanations of functions are adapted from ISO 23629-5.		
NOTE 2 The names and explanations of services are adapted from ISO 23629-12.		

10.2 Information exchange

10.2.1 From USP to the public

a) Registration reply (RR).

b) Authority-issued ad hoc published geospatial information (AGI).

c) Weather information (WI).

10.2.2 From the public to USP

a) Registration application (RA).

11 Interface between USP and ATSP

11.1 UTM service

Services between USP and ATSP can include, but are not limited to, those listed in Table 17. These services provide the USP and the ATSP with information exchange related to the UTM and ATS in order to avoid the proximity between UA and manned aircraft and to hand over when transition between controlled and uncontrolled airspace occurs during a UA flight.

Table 17 — Service between USP and ATSP

UTM functions	UTM services	Information exchange
Flight information management function	Aeronautical information management for UAS	Aeronautical information, flight plan information
	Traffic information Service	Manned air traffic information
	Vertical alert service	Manned air traffic information
Operation plan management function	Dynamic (airspace) capacity management service	Operation plan information
	UTM route design service	Operation plan information
	Strategic conflict management service	Operation plan information
	Flight clearance service	Operation plan information
Position data management function	Traffic information service	Unmanned air traffic information
	Network (electronic) identification service	Unmanned air traffic information
	Tracking service	Unmanned air traffic information
	Authenticated tracking service	Unmanned air traffic information
	Real-time GIS	Unmanned air traffic information
	Vertical alert service	Unmanned air traffic information
	Tactical conflict management service	Unmanned air traffic information
	Conformance monitoring service	Unmanned air traffic information
	Procedural interface with ATC	Unmanned air traffic information
	Collaborative interface with ATC	Unmanned air traffic information
Reporting function	Traffic information service	Unmanned air traffic information, manned air traffic information
Supplemental data supply function	Geospatial information service	Authority-issued geospatial information

NOTE 1 The names and explanations of functions are adapted from ISO 23629-5.

NOTE 2 The names and explanations of services are adapted from ISO 23629-12.

NOTE 3 The "authenticated tracking service" is an extension of the "tracking service" included in ISO 23629-12.

11.2 Information exchange

11.2.1 From USP to ATSP

a) Authority-issued ad hoc published geospatial information (AGI).

b) Operation plan application (OPA).

c) Unmanned air traffic information (UATI).