# CAR-ASP
# AIRSPACE

# PART-U-SPACE
# U-SPACE SERVICE PROVIDERS

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# FOREWORD

## PURPOSE

Federal Decree-Law No. 26 of 2022 of the United Arab Emirates, On the Regulation of the Civil Use of Unmanned Aircraft and Related Activities which aims to:

(1) Ensure the safe use of Unmanned Aircraft and maintain the safety and security of the UAE Airspace;

(2) regulate and control air navigation services of Unmanned Aircraft;

(3) manage and regulate the operation of Unmanned Aircraft and Related Activities in the UAE safely and effectively and standardize its systems and procedures in the UAE; and

(4) minimise the risks arising from the operation of Unmanned Aircraft, and determine the competencies of the relevant entities in this respect.

The GCAA is required under article 4 of the Unmanned Aircraft and Related Activities Law, to determine and adopt the conditions and procedures required for the issuance of Permits and Certificates for conducting Operations; and to determine and approve the controls and standards for the safe operation of Unmanned Aircraft;

Further Federal Decree Law No. 4 of 1996 and Federal Decree Law No. 20 of 1991, of the United Arab Emirates, established the General Civil Aviation Authority (GCAA) as the Competent Authority with respect to civil aviation activities.

*Note: A Competent Authority is any person or organisation that has the legally delegated or invested authority, capacity, or power to perform a designated function. Similarly, once an authority is delegated to perform a certain act, only the Competent Authority is entitled to take accounts therefrom and no one else.*

Federal Decree-Law No. (26) of 2022 on the Regulation of the Civil Use of Unmanned Aircraft and Related Activities

As the Competent Authority, the GCAA has implemented CAR – ASP Part U-SPACE for the provision of U-SPACE Services in Emirates FIR.

The PART-U-SPACE provides common requirements for all U-SPACE Service providers (USSP).

These regulations represent the minimum requirements designed to achieve an acceptable level of safety, considering the various nature of operations within the UAE. USSPs are expected to meet or exceed the regulations.

## INTERPRETATION

(a) The following terms have the corresponding meaning within this Regulation:

(1) Shall: The term 'shall' is used in the GCAA regulation to impose an obligation or a requirement or a prohibition

(2) Should:

(i) Should in an AMC: the term 'should' is used to indicate any specification which is recognized as necessary in the interest of safety unless an alternative is accepted by the GCAA.

(ii) Should in a publication other than an AMC (GM, safety alert, etc): the term 'should' is used to indicate any specification which is recognized as desirable in the interest of safety.

(3) The terms '*Competent Authority*', or '*GCAA*', may be used to refer to the General Civil Aviation Authority of the United Arab Emirates.

(4) The term '*certificate*', '*service certificate*', or '*USSP certificate*' refers to any certificate issued to a provider of U-SPACE services under this Regulation

(5) The term '*USSP*', '*certificate holder*', '*organisation*', or '*USSP*' may be used to refer to any entity that is required to meet the certification requirements of this regulation or is in possession of a USSP Certificate

(6) The term '*service'* is used as an abstract noun to designate functions, or services rendered, and the term '*unit'* is used to designate a collective body performing a service

## IMPLEMENTING RULE (IR)

(a) Implementing Requirements may be supported by one or more AMC and/or one or more GM.

(b) Each implementing requirement is designed in a manner that addresses one or more safety objective(s), through creating or limiting rights, creating or limiting duties and responsibilities.

(c) Compliance is mandatory unless a waiver has been granted by the GCAA Is binding in entirety and used to specify a high and uniform level of safety and uniform conformity and compliance.

## ACCEPTABLE MEANS OF COMPLIANCE (AMC)

(a) Are standards (but not necessarily the only standards) adopted by the GCAA to illustrate means to establish compliance with the CARs.

(b) An entity/or a person wishing not to comply with the AMC must comply using other means accepted by the Competent Authority.

(c) Where multiple AMC exist for an IR then all AMC are applicable unless specified otherwise.

(d) However, applicants may propose to show compliance with the requirements using other means. Organisations may propose 'Alternative Means of Compliance' (AltMoC) that propose an alternative

to an existing AMC, but this is subject to review and approval by the Authority. Alternative Means of Compliance proposals shall be accompanied by evidence of the ability to meet the intent of the IR.

(e) The Alternative Means of Compliance (AltMoC) is therefore a regulatory instrument that serves as:

(1) an alternative to an existing AMC; or

(2) a means to establish compliance with an implementing requirement contained in a CAR or Safety Decision for which no associated AMC has been promulgated by the GCAA.

(f) Compliance with AMC is mandatory unless an Alternative Means of Compliance has been accepted by the GCAA.

(g) Once an AltMoC is accepted by the GCAA, compliance therewith is mandatory.

**GUIDANCE MATERIAL (GM)**

(a) Is non-binding explanatory and interpretation material on how to achieve the requirements contained in the IRs and the AMCs. It contains information, including examples, to assist the user in the interpretation and application of the requirements.

## DOCUMENTATION HIERARCHY

(a) UAE Civil Aviation Law

(1) Federal Decree Law No. 20 of 1991, of the United Arab Emirates

(2) Federal Decree Law No. 4 of 1996

(b) Federal Decree-Law No. 26 of 2022 of the United Arab Emirates, On the Regulation of the Civil Use of Unmanned Aircraft and Related Activities

(c) UAE Civil Aviation Regulations

(d) Other regulatory material published by the Competent Authority

(e) ICAO Annexes

(f) ICAO Documents

*Note: Article 19 of the UAE Civil Aviation Law (1991) states that "The Chicago Convention and other protocols and agreements pertaining to civil aviation and its protection, of which the State is a party, shall be considered complementary to the provisions of this Law in as much as they do not contradict its provisions"*

## REFERENCES

(a) Federal Decree-Law No. 26 of 2022 of the United Arab Emirates, On the Regulation of the Civil Use of Unmanned Aircraft and Related Activities

(b) United Arab Emirates Civil Aviation Regulations:

(1) CAR – ANS – PART – ATS – AIR TRAFFIC SERVICES

(2) CAR- ANS – PART ANSP – AIR NAVIGATION SERVICE PROVIDER

(3) CAR - UA-ATO - UNMANNED AIRCRAFT APPROVED TRAINING ORGANISATIONS

(4) CAR-UAD - UNMANNED AIRCRAFT (UA) DEMONSTRATION OPERATIONS

(5) CAR-UAEV - UNMANNED AIRCRAFT (UA) EVENT OPERATIONS

(6) CAR-UAEX - UNMANNED AIRCRAFT (UA) EXPERIMENTATION OPERATIONS

(7) CAR-UAR - UNMANNED AIRCRAFT (UA) RECREATIONAL FLIGHT

(c) International Civil Aviation Organization (ICAO):

(1) International Convention on Civil Aviation (ICAO Doc 7300), and its annexes and documents including:

(i) Annex 3, Meteorological Service for International Air Navigation

(ii) Annex 10, Aeronautical Telecommunications

(iii) Annex 11, Air Traffic Services

(iv) Annex 15, Aeronautical Information Services

(v) Document 9426, Air Traffic Services Planning Manual

(vi) Document 10019, Manual on Remotely Piloted Aircraft Systems

(d) European Union, European Aviation Safety Agency (EASA):

(1) 'Easy Access Rules for Unmanned Aircraft Systems, published 28 September 2022, includes:

(2) Easy Access Rules for U-SPACE (Regulation (EU) 2021/664)

(3) Commission Implementing Regulation (EU) 2019/947

(4) ED Decision 2022/002/R

## RECORD OF AMENDMENTS

| ISSUE | DATE OF ISSUE | DATE OF APPLICABILITY |
|---|---|---|
| **01** | 31ST December 2024 | 31ST December 2025 |

## SUMMARY OF CHANGES IN THIS VERSION

(a) An entire new issue.

# SUBPART – DEF (USSP.DEF)
# TERMS AND DEFINITIONS

## USSP.DEF.001 Applicability

(a) The definitions within this part shall be applicable within:

(1) CAR-ASP PART U-SPACE

(b) Definitions shall be interpreted in the following order of precedence:

(1) The regulation specific to the discipline (CAR-ASP part U-SPACE)

(2) CAR-DEF

## U-SPACE.DEF.005 Common Reference Systems & Units of Measurement

(a) The horizontal (geodetic) reference system is the World Geodetic System - 1984 (WGS-84).

(b) Reported aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.

(c) The vertical reference system is the Mean Sea level (MSL) datum, which gives the relationship of gravity-related height (elevation) to a surface known as the geoid.

(d) The Earth Gravitational Model — 1996 (EGM-96) shall be used as the global gravity model for international air navigation. Alternatively, the use of the Earth Gravitational Model 2008 (EGM-2008) is acceptable to the Competent Authority.

(e) The temporal reference system is the Gregorian calendar in Coordinated Universal Time (UTC).

(f) Subject to (g), the units of measure used for aeronautical purposes in the United Arab Emirates are those specified in the International System of Units as adopted in ICAO Annex 5.

(g) Non-International System Units adopted by ICAO Annex 5 are used in accordance with the following table within the UAE:

| QUANTITY | NON SI SYMBOL. |
|---|---|
| **Altitude** | Foot (ft). |
| **Distance** | Nautical Mile (NM). |
| **Elevations** | Foot (ft). |
| **Heights** | Foot (ft). |
| **Speed, including wind speed** | Knot (kt). |
| **Vertical speed** | Feet per minute (ft/min). |

## USAPCE.DEF.010 Definitions

(a) The definitions, acronyms and abbreviations in CAR-DEF shall be considered when there is no conflicting definition in the specific GCAA publication.

(b) In the context of Part-U-SPACE, additional definitions include:

1. **Air Navigation Service Provider**
   Any organisation that is providing air navigation services to air traffic and that is functionally separated from its regulator.

2. **Airspace Risk Assessment**
   An evaluation of operational, safety and security risks that takes into account the required levels of safety performance, the type, complexity and density of the traffic, the location, altitudes or heights and the airspace classification;

3. **Beyond Visual Line-of-Sight Operation.**
   An operation in which the remote crew does not maintain direct visual contact with the aircraft, but is operated remotely to manage its flight and meet separation and collision avoidance responsibilities.

4. **Common Information Service**
   A service consisting in the dissemination of static and dynamic data to enable the provision of U-SPACE services for the management of traffic of unmanned aircraft, through a digital environment (network or platform) that in which the common information elements (data) that support the implementation and proper functioning of the U-SPACE airspace are provided/exchanged.

5. **Contracted CIS organisations**
   An organisation that ensures the interface as a data exchange platform where real-time and non-real-time aeronautical, airspace, and meteorological data can be shared and exchanged between USSP, on the principles that the contracted CIS organisation supports the provision of U-SPACE services by providing common information to USSP, but does not have active operational roles and responsibilities. For instance, it should not take part in the flight authorisation, which is the sole responsibility of the USSP.

6. **Crew**
   Qualified person or person(s) assigned by an Operator to perform any duties related to Unmanned Aircraft systems throughout a flight.

7. **Detect And Avoid**
   The capability to see, sense or detect conflicting traffic or other hazards and take the appropriate action.

8. **Dynamic Airspace Reconfiguration**
   The temporary modification of the U-SPACE airspace in order to accommodate short-term changes in manned traffic demand, by adjusting the geographical limits of that U-SPACE airspace.

9. **Geo-Awareness**
   A function that, based on the data that detects a potential breach of airspace limitations, and alerts the remote pilots so that they can take immediate and effective action to prevent that breach.

10. **Geofence**
    A virtual three-dimensional perimeter around a geographic point, either fixed or moving, that can be predefined or dynamically generated and that enables software to trigger a response when a device approaches the perimeter (also referred to as geo-awareness or geo-caging).

11. **UAS Operator**
    A natural person responsible for safely conducting the flight of a UA by operating its flight controls, either manually or, when the UA flies automatically, by monitoring its course and remaining able to intervene and change its course at any time

12. **U-SPACE Coordinator**
    A natural person responsible for the monitoring, supervision and the UAS operations taking place within the U-SPACE Airspace

13. **U-SPACE Airspace**
    A UAS geographical zone designated by the Competent Authority, where UAS operations are only allowed to take place with the support of U-SPACE services;

14. **U-SPACE Service**
    A Service relying on digital services and automation of functions designed to support safe, secure and efficient access to U-SPACE airspace for a large number of UAS;

15. **U-SPACE Service Provider**
    Any certified organisation by the Competent authority that is providing unmanned air traffic management services to unmanned air traffic management and that is functionally separated from its regulator.

16. **Visual Line-of-Sight Operation.**
    An operation in which the remote crew maintains direct visual contact with the aircraft to manage its flight and meet separation and collision avoidance responsibilities.

## U-SPACE.DEF.015 Acronyms and Abbreviations

(a) In the context of Part-USAPCE, additional acronyms include:

1. **ANSP** Air Navigation service Provider
2. **ATCO** Air Traffic Control Officer
3. **CIS** Common Information Services
4. **USSP** U-SPACE Service Provider
5. **EASA** European Aviation Safety Agency
6. **EUROCONTROL** European Organisation for the Safety of Air Navigation
7. **UAS** Unmanned Aircraft System
8. **BVLOS** Beyond Visual Line of Sight
9. **DAA** Detect and Avoid
10. **DEM** Digital Elevation Model
11. **SWAL** Software Assurance Level
12. **UA** Unmanned Aircraft
13. **UTM** Unmanned Aircraft System Traffic Management
14. **VLOS** Visual Line of Sight
15. **VTOL** Vertical take-off and landing

# SUBPART – GEN (U-SPACE.GEN)
# GENERAL REQUIREMENTS

## SECTION 1 – CERTIFICATION

### U-SPACE.GEN.101 Scope & Applicability

(a) This regulation establishes the requirements to be met in order to provide U-SPACE services defined in this regulation;

(b) An organisation shall not provide a service to civil UAS within the Emirates FIR except under the authority of, and in accordance with the provisions of, a valid U-SPACE Service Provider (USSP) certificate issued under this regulation.

### U-SPACE.GEN.105 USSP Certificate

(a) An application for a USSP certificate or an amendment to an existing certificate shall be made in a form and manner established by the Competent authority, taking into account the applicable requirements of this regulation.

(b) In order to obtain the certificate, the USSP shall comply with:

(1) the requirements set out in this Regulation; and

(2) the Competent authority is satisfied that the granting of the certificate is not contrary to the interests of aviation safety.

(c) The scope of the service, and any conditions thereon, shall be specified on the USSP certificate.

### AMC1 U-SPACE.GEN.105(a) USSP Certificate

**USSP CERTIFICATE - METHOD OF APPLICATION**

(a) Applications for a USSP certificate should be submitted through the GCAA E-Service System.

(b) The application submitted to the Competent Authority for consideration should be accompanied by the necessary documentation to demonstrate compliance with the regulations, including at least the documents listed in AMC1 U-SPACE.ORG.305(b).

(c) Any additional documentation may be requested at the discretion of the Competent Authority.

(d) The processing of the application is subject to successful payment of any fees as specified by the Competent Authority.

### AMC1 U-SPACE.GEN.105(c) USSP Certificate

**SCOPE OF SERVICE**

(a) The scope of service should include the geographical and aerial area which the service would be provided.

(b) The geographical and aerial area designated for the scope of the service may be extended subject to the competent Authority's approval

## U-SPACE.GEN.110 Continued validity of a USSP certificate

(a) A USSP certificate shall remain valid subject to:

(1) the USSP remaining in compliance with the law, and the applicable requirements of:

(i) the common requirements set out in this Regulation; and

(ii) the specific requirements set out in this regulation, where those requirements are applicable in light of the services that the USSP provides or plans to provide; and

(2) the certificate not having been surrendered, suspended or revoked.

(b) Upon revocation or surrender, the certificate shall be returned to the Competent Authority without delay.

## U-SPACE.GEN.115 Transfer or Withdrawal of Service provider Certificate

(a) Transfer of a Service Provider certificate may only be initiated to an organisation that:

(1) is able to undertake the obligations of the privileges of the certificate; and

(2) has demonstrated its ability to qualify under this Regulation and the applicable service specific regulations.

(b) The existing certificate holder shall not hinder the preparation and execution of the transitional arrangements.

(c) The holder of an existing certificate intending to transfer, permanently withdraw or alter the hours of operation of the service shall notify the Competent Authority at least 90 days in advance.

(d) The transfer process may be subject to conditions as determined by the Competent Authority.

## AMC1 U-SPACE.GEN.120 Transfer or withdrawal of Service Provider certificate

**NOTIFICATION OF TRANSFER OR WITHDRAWAL**

(a) The notification should include the new proposal and include a summary of the factors considered in arriving at the decision to transfer, withdraw, or alter the hours of operation of the service.

(b) An application should be made via the GCAA E-Service System at least 90 days prior to the intended change of service date.

## AMC2 U-SPACE.GEN.115 Transfer or withdrawal of Service Provider certificate

**TRANSFER ARRANGEMENTS**

(a) The applicant intending to assume responsibility for providing a service from an existing certificate holder should include with its application a full detail of transitional arrangements endorsed by the Accountable Manager of both organisations.

# SECTION 2 – OVERSIGHT

## U-SPACE.GEN.210 Facilitation and cooperation

(a) A USSP shall:

(1) facilitate planned and unplanned inspections and audits by the Competent Authority and it shall cooperate as necessary for the efficient and effective exercise of the powers of the Competent Authority;

(2) provide access to any offices, facilities, documentation, record, certificate, report, or any other evidence required by the Competent Authority for the purpose of audits, investigations, enforcement, certification, approval or any other reason as decided by the Competent Authority; and

(3) facilitate the access and use of electronic equipment provided to inspectors to support their oversight functions. This includes computers, cameras and audio recording devices, utilised by the Competent Authority to support regulatory oversight activities.

(b) A USSP shall not, directly or indirectly, restrict, impede or delay, the activities in (a).

(c) A USSP shall give the oversight process the necessary priority to function efficiently and effectively.

## GM1 U-SPACE.GEN.210(a)(1) Facilitation and cooperation

**COMPLIANCE AUDIT FREQUENCY**

(a) The Competent Authority may conduct a full compliance audit at any time, but usually not more than eighteen (18) months from the previous audit, based on the organisational risk profiling as determined by Competent Authority.

## GM2 U-SPACE.GEN.210(a)(1) Facilitation and cooperation

**ONLINE AUDIT SYSTEM**

(a) Compliance audit reports are processed through the online e Audit system ('Q Pulse').

(b) Organisations should nominate Q Pulse users to respond to the audits, this would normally be the Quality Post Holder.

## AMC1 U-SPACE.GEN.210(c) Facilitation and cooperation

**ATTENDANCE AT AUDITS**

(a) Audits are an essential tool in the oversight process and allow the Competent Authority to monitor the performance of the Management System and the Post Holders responsible for it, therefore all relevant Post Holders should be available for a planned audit.

(b) The opening and closing meetings should be attended by the Accountable Manager or their official delegate, supported by all relevant post holders. All other attendees are considered observers.

## GM1 U-SPACE.GEN.210(c) AUDIT PLANNING

(a) For planned audits, the Competent Authority will endeavour to provide at least two weeks' notice. Unplanned audits do not require notification.

(b) Upon receipt of audit notification, the USSP should clarify what access requirements are in place, to ensure the inspectors can provide the necessary documentation in time.

(c) Planned audits may be rescheduled by the Competent Authority in coordination with the USSP.

(d) The USSP may request a planned audit to be rescheduled by the Competent Authority where unforeseen circumstances may limit the effectiveness of the audit process.

## U-SPACE.GEN.220 Findings and corrective actions

(a) After receipt of notification of findings from the Competent Authority, the USSP shall:

(1) identify the root cause of the non-compliance;

(2) define a corrective action plan that meets the acceptance of the Competent Authority;

(3) demonstrate corrective action implementation to the satisfaction of the Competent Authority within the time period proposed by the Competent Authority.

## GM1 U-SPACE.GEN.220 Findings and corrective actions

**FINDING LEVELS**

(a) Findings of non-compliance should be categorised as per CAR ANS PART ANSP, GM1 ANSP.220 and actioned as per CAR ANS PART ANSP, GM1 ANSP.240

# SECTION 3 – OCCURRENCE REPORTING AND INVESTIGATIONS

## U-SPACE.GEN.305 Occurrence reporting

(a) A USSP shall report to the Competent Authority, any accident, serious incident and occurrence as required by CAR-UAC, AMC to UAC.035.

(b) A USSP shall investigate any accident, serious incident and occurrence as required by CAR-UAC, AMC to UAC.035.

## AMC1 U-SPACE.GEN.305 Occurrence reporting

(a) The USSP should submit all reportable occurrences as defined in CAR-UAC, AMC to UAC.035.

## AMC1 U-SPACE.GEN.305 Corrective Action Reports

(a) Investigations should aim to identify the root cause and explanations for each occurrence. The focus should be placed on organisation and system shortcomings rather than the behaviour of individuals.

(b) Reports should be laid out in a clear and logical manner.

(c) Reports should clearly identify findings, conclusions, and recommendations.

(d) Recommendations should be presented in a manner that enables easy reference, identification of responsibility, and action time period.

## AMC2 U-SPACE.GEN.305 Investigators

(a) Investigations should be performed by suitably experienced personnel, who have completed an aviation-based investigator course. The course may be internally or externally provided.

(b) Investigating personnel should be technically knowledgeable in the area under investigation.

(c) Based on the size and complexity of the USSP the investigations could be conducted by personnel that are assigned with additional, different responsibilities within the organisation

## U-SPACE.GEN.310 Voluntary Reporting Systems

(a) A USSP shall establish a system to educate their personnel on how to report an actual or potential safety deficiency through the Competent Authority's voluntary reporting system VORSY - "Voluntary Reporting System", as amended.

## GM1 U-SPACE.GEN.310 Voluntary Reporting Systems

(a) It is recognised that a mature safety culture will support healthy internal reporting and will rarely require issues to be raised external to the organisation. Nevertheless, there should be no documentation, publication, or actions that discourage, directly or indirectly, the use of the VORSY external reporting system.

# SUBPART – ORG (U-SPACE.ORG)
# ORGANISATION REQUIREMENTS

## SECTION 1 – MANAGEMENT SYSTEM

### U-SPACE.ORG.105 Exposition of the organisation

(a) A USSP shall maintain an Organisation Exposition that defines the organisation's activities and describes the means and methods for its regulatory compliance.

### The exposition shall be acceptable to the Competent Authority.U-SPACE.ORG.105 Exposition of the organisation

(a) The Organisation Exposition is a high-level document describing how an organisation will comply with all applicable legislative requirements, how they will be capable to provide their services, and how they manage the safety and quality of their operations. This objective may be achieved with a single document or a set of documents that form the management system of the organisation.

### GM1 U-SPACE.ORG.105 Document Compliance Matrix

(a) The document matrix in the exposition may be a reference to another document containing the matrix. The matrix should be provided when submitting the exposition for acceptance.

### GM1 U-SPACE.ORG.105 Acceptance of Organisational Structure

(a) Acceptance of the organisational structure is achieved through the acceptance of the Exposition. In the review of the structure, the Competent Authority will normally consider if the proposed structure ensures the following:

(1) that Post Holders have access to the Accountable Manager;

(2) that Post Holders have clear reporting lines and responsibilities; and

(3) that there is no conflict of interest.

### U-SPACE.ORG.120 Quality management system (QMS)

(a) A USSP shall have quality management system tha shall include:

(1) A quality management policy and procedures that are relevant to the USSP organisational goals and the expectations and needs of its customers;

(2) Procedures to ensure that data at any moment is traceable to its origin so as to allow any data anomalies or errors, detected during maintenance phases or in operational use, to be corrected;

(3) Procedures to ensure quality indicators, including equipment availabilities, malfunctions, faults, and personnel and customer feedback, are monitored to identify existing problems or potential causes of problems within the system;

(4) A procedure for corrective action to ensure existing problems that have been identified within the system are corrected, including external audit findings;

(5) A procedure for preventive action to ensure that potential causes of problems that have been identified within the system are remedied;

(6) An internal quality audit programme to audit the applicant's organisation for conformity with its own management system and applicable regulations;

(7) An external quality programme including letters of agreement or service level agreements with third parties which the USSP is reliant upon to provide a service; and if the 3rd party is ISO 9001 certified by an accredited certification body is acceptable.

(8) Procedures to validate competence of all personnel and ensure compliance with all licencing or certification requirements.

The Quality management system of the USSP shall be based on the size and the complexity of the service provided

**AMC1 U-SPACE.ORG.120(a)(5) Quality management system (QMS)**

(a) Senior management should assess the USSP QMS system, at planned intervals, to ensure its continuing suitability, adequacy and effectiveness.

(b) Records from management assessments should be maintained.

**AMC1 U-SPACE.ORG.120(a)(6) Internal quality audit programme**

(a) The internal quality audit programme should:

(1) Ensure audits are carried out by trained quality auditing personnel who are independent of those having direct responsibility for the activity being audited.

(2) Ensure the results of audits are reported to the personnel responsible for the activity being audited and the manager responsible for internal audits.

(3) Require preventive or corrective action to be taken by the personnel responsible for the activity being audited if problems are found by the audit.

(4) Ensure follow-up audits to review the effectiveness of any preventive or corrective action taken.

(5) Ensure all audit findings and observations shall be evidenced and properly recorded and available for audits by the Competent Authority.

**U-SPACE.ORG.130 Safety Management System (SMS)**

(a) USSP shall establish a safety management system (SMS) that complies with CAR-SMS.

(b) The Safety management system of the USSP shall be based on the size and the complexity of the service provided

**GM1 U-SPACE.ORG.130 Interaction of USSP**

(a) All USSP should establish formal interfaces (e.g., service level agreements, letters of understanding, memorandum of cooperation) between the relevant services providers themselves or between the

USSP and other aviation undertakings (e.g., vertiport operators) so as to ensure that hazards associated with the use of the services they provide are identified and the risks assessed and whenever needed mitigated.

(b) The formal interfaces could address the mitigation means to put on the different providers (e.g., visa requirements in a service level agreement).

## U-SPACE.ORG.140 Operations management System

(a) A USSP shall implement and maintain an operational management system that:

(1) clearly define lines of responsibility and accountability throughout the functional system, including at all times who holds operational respobonsability for the service;

(2) procedures for the supervision of operational services;

(b) The USSP shall ensure that there are adequate personnel allocated to provide the planned services.

## GM1 U-SPACE.ORG.140(a)(2) Supervision

(a) The purpose of supervision in operational environments is to provide tactical management of risks while maintaining efficient operations. Supervision involves observation of service delivery and, where necessary, supporting, intervening or directing activities within the area of responsibility.

## U-SPACE.ORG.150 Training and competency

(a) A USSP shall:

(1) Develop and maintain a training and competency management plan;

(2) Determine the necessary competence for personnel performing activities supporting services provision;

(3) Where applicable, provide training or take other actions to achieve the necessary competence;

(4) Evaluate the effectiveness of the actions taken;

(5) Maintain appropriate records of education, training, skills and experience;

(6) The U-SPACE coordinator training shall be in compliance with the provisions listed in Appendix 3 of this regulation

(b) The training and competency of the USSP shall be based on the size and the complexity of the service provided

## AMC1 U-SPACE.ORG.150(a) Training and competency Management Plan

(a) The USSP should establish, document and maintain Training and Competency management plan(s) to achieve the Training and Competency management strategy and deliver the Training and Competency management objectives across the following staff life cycle activities:

(1) Induction;

(2) On the Job;

(3) Off the Job;

(4) Recurrent;

(5) Remedial;

(6) Safety;

(7) Development.

(b) The Training and Competency management plans should be reviewed periodically by the organisation to ensure that they remain effective and consistent with the Organisational Training and Competency management strategy and objectives.

## GM2 U-SPACE.ORG.150 Training and Competency Subjects

(a) The knowledge required to be demonstrated by a trainee should include at least the following subjects:

(1) Federal Decree-Law No. (26) of 2022, concerning the Regulation of the Civil Use of Unmanned Aircraft and Related Activities.

(2) Air Law;

(3) General Civil aviation regulations

(4) General Aviation Knowledge;

(5) UAE Airspace classifications and requirements;

(6) SMS and Human Factors;

(7) Emergency situations;

(8) English Language Expertise;

(9) ICAO Standards and Recommended Practices relevant to USSP,

(10) ICAO UTM Frame work

(11) local USSP Operating Manual and USSP unit operational procedures, and

(12) Additional guidance as contained in Appendix 3 of this regulation.

## U-SPACE.ORG.160 Contingency plans

(a) A USSP shall have in place contingency plan for all the services it provides in the case of an event or series of events which result in a significant degradation or disruptions of its operations.

(b) The contingency plan of the USSP shall be based on the size and the complexity of the service provided.

## AMC1 U-SPACE.ORG.160 Contingency plans

(a) Contingency plan should include services that are complimentary to the provision of services, such as:

(1) Other Service providers that provide services essential to the provision of services (e.g., Communication, Navigation and Surveillance);

(2) Other organisations that are essential to service provision (e.g., telecommunications, or utilities) ;

(3) Adjacent USSP;

(b) Contingency plans should be reviewed and tested at least every 12 months.

## GM1 U-SPACE.ORG.160 Contingency plans

(a) The contingency plan may include the definition of the measures, the coordination with other actors (i.e., the, the competent authorities, other USSP, the insurance companies, etc…);

(b) Contingency plans are considered part of the operational documentation and are subject to acceptance by the Competent Authority

(c) The contingency plan may be added to the existing organisational contingency plan, operational documentation or any placeholder the organisation sees fit subject to the competent authority's acceptance.

## U-SPACE.ORG.170 Contingency Measures and Procedures

(a) The USSP contingency measures and procedures implemented for U-SPACE Airspace Shall address at least the following conditions:

(1) sudden, total or partial unavailability of the U-SPACE airspace,

(2) restriction or revocation of the UAS flight authorization,

(3) unlawful interference,

(4) engine failure,

(5) loss of signal,

(6) loss of control,

(7) loss of payload,

(8) loss of power,

(9) loss of energy reserves,

(10) adverse weather conditions,

(11) foreign object debris (FOD),

(12) unidentified aircraft entering protected volume around the UAS,

(13) unavailability of landing area.

## GM1 U-SPACE.ORG.170 Contingency in Case of Degradation or A Loss of Services

(a) The USSP may evaluate the degradation or the loss of the services in the context of their operations in the U-SPACE airspace and establish appropriate contingency measures against the resulting hazards.

(b) A hazard assessment should consider:

(1) the impact and severity of the hazards on own operations;

(2) the impact and severity of the hazards on other USSP;

(3) the operational environment;

(4) other additional operational mitigation measures, if applicable.

(c) USSP Should provide the effected stakeholders with the necessary actions to be taken in the event of a loss or degradation of the U-SPACE services which could result in an overall reduction of safety or pose a risk to nearby U- space operations, and action would be required to be taken by another USSP. These actions may be contained within an USSP contingency plan. USSP should ensure the effective coverage of the contingency measures in case of degradation or loss of USSP services, especially for services used in flight such as:

(1) the inability to receive information on dynamic airspace reconfiguration and/or modifications to the UAS flight authorization;

(2) a loss of availability of traffic information data;

(3) sharing of contingencies (as applicable).

## U-SPACE.GEN.180 Open and transparent provision of services

(a) A USSP shall provide its services in an open and transparent manner. It shall publish the conditions of access to its services and changes thereto and establish a consultation process with the users of its services on a regular basis or as needed for specific changes in service provision, either individually or collectively.

## AMC1 U-SPACE.GEN.180 User consultation

(a) Consultation should be formal, and all correspondence, meeting materials, and minutes of meetings should be retained for records.

## GM1 U-SPACE.GEN.180 Users of U-SPACE services

(a) Users of U-SPACE services may include:

(1) Vertiports;

(2) UAS Operators;

(3) Airspace users;

(4) Other USSP;

(5) State Aircrafts.

# SECTION 2 – PERSONNEL

## U-SPACE.ORG.205 Technical and operational competence and capability

(a) A USSP shall ensure that it is able to provide its services in a safe, efficient, continuous and sustainable manner, consistent with any foreseen level of overall demand. To this end, it shall maintain adequate technical and operational capacity and expertise.

(b) A USSP shall:

(1) employ sufficient personnel to operate maintain and support the service(s) listed in its exposition;

(2) establish a procedure to initially assess the competence of personnel authorised by the USSP to operate, maintain and support service(s) listed in their exposition;

(3) establish procedures to maintain the competence of authorised personnel;

(4) provide those authorised personnel with written evidence of the scope of their authorisation;

(5) establish procedures to make clear who deputizes for any particular person in the case of lengthy absence of the said person; and

(6) ensure that no person whose function is critical to the safety of aviation (safety sensitive personnel) undertakes that function while under the influence of any psychoactive substance, by reason of which human performance is impaired and that they shall not engage in any problematic use of substances.

## GM1 U-SPACE.ORG.205(a) Technical and operational competence and capability

(a) Technical and operational capacity should include a sufficient number of personnel to perform its tasks and discharge its responsibilities.

## U-SPACE.ORG.210 'Post Holders' of essential positions

(a) A USSP shall ensure the 'Post Holder' roles are continuously occupied by appropriately qualified and experienced persons:

(1) An "Accountable Manager"

(i) have the authority for ensuring that each service listed in their exposition can be financed and provided in accordance with the applicable operational

requirements; and is carried out in accordance with the applicable requirements; and

(ii) be responsible for establishing and maintaining an effective management system

(2) A "Quality Post holder"

(i) have appropriate Quality Management System knowledge and experience

(ii) be responsible for overall performance of the Compliance Monitoring and Quality Assurance System, including implementation, maintenance, documentation, performance, effectiveness and oversight of the organisation;

(iii) be a principal communicator with the Authority in relation to audits and Quality Management System and compliance issues; and

(iv) to have a direct report to the accountable manager

(3) A "Safety Post holder"

(i) have appropriate Safety Management System knowledge and experience;

(ii) be responsible for the overall performance of the Safety Management System, including implementation, maintenance, documentation, performance, effectiveness and oversight of the organisation;

(iii) be a principal communicator with the Authority in relation to Safety Management System issues; and

(iv) to have a direct report to the accountable manager.

(4) An "Operational Post Holder"

(i) have appropriate knowledge and experience relevant to the service certificate and associated privileges sought;

(ii) be responsible for the service implementation, maintenance, documentation, performance, effectiveness and oversight of the organisation;

(iii) be a principal communicator with the Authority in relation to service provision issues relating to the service operational system; and

(iv) to have a direct report to the accountable manager

(5) A 'Training Post Holder' who shall:

(i) have appropriate knowledge and experience relevant to the service certificate and associated privileges sought;

(ii) be responsible for the training system implementation, maintenance, documentation, performance, effectiveness and oversight of the organisation;

(iii) be a principal communicator with the Authority in relation to service provision issues related to the training system; and

(iv) to have a direct report to the accountable manager.

(b) if a certified ANSP is providing U-SPACE Services then the ANSP accepted post holders may be used for the USSP function and roles.

(c) The number of post holders within the USSP can be determined based on the size and complexity of the service provided, and subject to the competence Authority's acceptance. However, in the event a certified ANSP is providing the function of a USSP, combined post holders will not be accepted as per CARANSP.ORG.405

**GM1 U-SPACE.ORG.210 Post Holder Expectations**

(a) These Post Holder positions form an essential component of the organisation's safety, quality and operational effectiveness and sustainability.

(b) The USSP will normally require additional management personnel to support the functions of the organisation Post Holders. The organisation is required to maintain post holders responsible for the effective functioning of the management systems for the services throughout the organisation (e.g., SMS or QMS), this does not however prevent an appropriate hierarchical structure which effectively manages the activities within the USSP organisation. As such, the structure of the USSP is subject to acceptance by the Competent Authority under U-SPACE.ORG.105.

(c) Depending on the organisation's size and complexity of the service and area which the service is provided in, and subject to the competence authority's acceptance, the function of Quality and Safety Post Holder can combined.

**U-SPACE.ORG.220 Rostering**

(a) A USSP shall implement scheduling requirements for all operational personnel and other personnel that interact directly with operational personnel.

(b) USSP shall identify using their SMS which personnel would be considered to fall in this category.

(c) In the event that a certified ANSP conducting the functions of a USSP designates an ATCO to assume the role of a U-SPACE coordinator, the ANSP shall comply with the provisions listed in CAR ANS PART ATS SUBPART FRM Section 2 Duty time limitations

## SECTION 3 - DOCUMENTATION

**U-SPACE.ORG.305 Documentation system**

(a) A USSP management system documentation shall at least include the following information:

(1) procedures describing the function and specifying how the USSP monitors and ensures compliance with the applicable requirements referred to in USSP.ORG.110; and

(2) the amendment procedure for the USSP management system documentation.

(b) Management System documentation is subject to acceptance by the Competent Authority.

(c) The processes and procedures for key areas of the management system shall be contained within the following manuals:

(1) Quality Management System (QMS);

(2) Safety Management System (SMS);

(3) Operations Manual (OPM); and

(4) Training & Competency Manual (TCM).

(d) When provided electronically, management system documentation shall be available to personnel in a searchable format.

(e) Management system documentation shall reflect document ownership by the Certificate Holder.

**AMC1 U-SPACE.ORG.305(b) Documentation Acceptance**

(a) The following documents, or their equivalent, are subject to acceptance by the Competent Authority:

(1) Organisation Exposition;

(2) Quality Management System Manual, including:

(i) 'Management of Change' procedures;

(3) Safety Management System Manual;

(4) Operations Manual, including:

(i) Contingency plans;

(ii) Letters of Agreement;

(5) Training & Competency Plan.

(b) If the applicant for a USSP certificate is a certified ANSP by the Competent Authority the accepted documentation as an ANSP can be accepted for a USSP with the appropriate modifications being made to reflect the roles of a USSP

(c) The Competent Authority may designate additional documents for acceptance.

**AMC2 U-SPACE.ORG.305(b) Documentation Submission**

(a) Documents should be submitted to the Competent Authority for acceptance through GCAA 'Q-pulse Document Module' including Change Requests for any amendments.

(b) All documentation provided to the Competent Authority should be in a searchable Portable Document Format (PDF). If scanned signature pages are necessary, they should be inserted into the searchable document.

(c) The USSP should show that the procedures address all the actions and all the evidence needed in order to comply with the requirements as appropriate. For that purpose, the USSP should include a compliance matrix, which shows:

(1) which part of a procedure addresses which part of the Regulation; and

(2) the rationale explaining how the procedures demonstrate compliance with the Regulation.

**GM1 U-SPACE.ORG.305(b) Document submission**

(a) Document control and submission to the Competent Authority is normally the responsibility of the Quality Post Holder.

**U-SPACE.ORG.310 Operational documentation and technical manuals**

(a) A USSP shall provide and keep up to date its operations manuals relating to the provision of its services for the use and guidance of operations personnel.

(b) A USSP shall hold copies of the relevant technical manuals and all other documents necessary for the provision and operation of the services listed in its exposition.

(c) A USSP shall ensure that:

(1) operations manuals contain the instructions and information required by the operations personnel to perform their duties;

(2) relevant parts of the operations manuals are accessible to the personnel concerned;

(3) the operations personnel are informed of amendments to the operations manual applying to their duties in a manner that enables their application as of their entry into force.

**U-SPACE.ORG.320 Documentation control**

(a) A USSP shall establish procedures to control all the documentation required for the provision of the service(s). The procedures shall ensure that:

(1) Appropriate arrangements are in place to ensure receipt of amendments to documents held by the unit;

(2) All incoming documentation is reviewed and actioned as required by authorised personnel;

(3) All documentation is reviewed and authorised before issue; The review shall be recorded and the updated document shall be authorised before issue;

(4) Current issues of all relevant documentation are available to personnel at all locations where they need access to such documentation for the provision and operation of the services;

(5) All obsolete documentation is promptly removed from all points of issue or use, and retained as archives which are suitably identified as obsolete;

(6) The current version and effective date of each item of documentation can be identified to preclude the use of out-of-date documents; and

(7) A regular document audit is made of the amendment status of controlled documents held in the unit.

(b) All documentation shall be reviewed on a regular basis to ensure that it is accurate, and relevant, and to identify areas for improvement.

(c) A USSP shall subscribe to the notification service of the Competent Authority in order to receive and comply with the latest regulatory requirements. The recipient of such notifications shall forward them to the concerned personnel within the subscribing organisation.

## U-SPACE.ORG.330 Record keeping

(a) A USSP shall establish a system of record-keeping that allows adequate storage of the records and reliable traceability of all its activities.

(b) The format and the retention period of the records referred to in point (a) shall be specified in the USSP's procedures.

(c) Records shall be stored in a manner that ensures protection against damage, alteration and theft.

## AMC1 U-SPACE.ORG.330 Record keeping System

(a) The record-keeping system should ensure that all the records required are accessible whenever needed. These records should be organised in a way that ensures traceability and retrieval throughout the retention period.

(b) Records should be kept in in electronic format. Paper format is also acceptable however not encouraged. The retention period starts when a record has been created or last amended.

(c) Paper systems should use robust material which can withstand normal handling and filing.

(d) Computer systems should have at least one backup system which should be updated within 24 hours of any new entry. Computer systems should include safeguards against the probability of unauthorised personnel altering the data.

(e) All computer hardware used to ensure data backup should be stored in a different location from that containing the working data and in an environment that ensures they remain in good condition. When hardware or software changes take place, special care should be taken that all necessary data continues to be accessible at least through the full retention period.

## AMC1 U-SPACE.ORG.330(b) Record keeping

**RETENTION PERIOD**

(a) The records should be kept for a minimum period of at least 5 years unless otherwise specified by the Competent Authority.

# SECTION 4 – MANAGEMENT OF CHANGE

## U-SPACE.ORG.410 Project planning and management

(a) The USSP shall ensure that all projects are properly planned, managed, and coordinated.

(b) The project plan shall include sufficient time allocated for the necessary testing, readiness verification, and regulatory approval.

## GM1 U-SPACE.ORG.410 Project planning and management

(a) Careful consideration and planning are required when installing a new facility, equipment or system, replacing an existing facility or instigating a new or improved air navigational service.

(b) Planning involves assessing operational objectives and requirements, determining facility, equipment or system functionality requirements, identifying operational readiness imperatives and conducting overall operational readiness time scheduling and monitoring of milestones. A lapse in planning in any one of these areas can lead to a service breakdown in safety-critical areas, particularly in the area of air navigation service provision.

(c) It is therefore critical that a structured approach to operational readiness is taken when changes are being proposed and implemented to:

(1) U-SPACE facilities;

(2) Communication systems including data/playback

(3) Surveillance systems including data recording/playback;

(4) Operational DATA management Systems;

(5) USSP Simulator that can be switched to Operational functions.

(6) Any associated operational procedures concerning any of the above.

## GM2 U-SPACE.ORG.410 Project readiness planning and management

(a) This table outlines some of the key considerations for each key category in readiness planning.

| | |
|---|---|
| **Facilities** | Is the facility or equipment installed and operationally commissioned? |
| | Is the facility or equipment available for use? |
| | Does the facility or equipment meet functional requirements? |
| | Does the facility or equipment meet the supplier's technical specifications? |
| | Is there a minimum equipment or spare parts list and if so, are all items available or held in store? |
| | Does any equipment require to be calibrated? |
| | Does the facility or equipment require to be approved by the Competent Authority? |

| | |
|---|---|
| **Systems** | Is the system and its hardware installed and operationally commissioned? |
| | Is the system available for use? |
| | Does the system meet functional requirements? |
| | Does the system meet technical specifications including system integration and calibration? |
| | Is there a minimum equipment or spare parts list and if so, are all items available or held in store? |
| | Does the system require to be approved by the appropriate regulatory authorities? |
| **Human Resources** | Is there enough staff to operate the system to meet operational requirements? |
| | Is there staff to maintain the facility, system, or equipment? |
| | What is the lead time required for recruitment and training? |
| | What qualifications or licenses are required to operate or maintain the facility, equipment, or system? |
| | Are the staff appropriately qualified? |
| | Are the staff trained and familiarised with the facility, equipment, or system to be operated and maintained? |
| | Are ongoing competency checks or refresher training required, and if so, has this schedule been established? |
| **Documentation** | Are changes required to the operational manuals and do they require prior approval from the Competent Authority before implementation? |
| | Are standard operating, operational contingency, and O & M procedures available? |
| | Are there any changes required to Letters of Agreement, or Service Level Agreements? |
| | Has appropriate information been disseminated to all relevant parties? |
| | Are changes required to the Aeronautical Information Publications? |
| | Is training documentation and materials available? |
| | Are any other regulatory approvals or permits required? |

## AMC1 U-SPACE.ORG.420(b) Change coordination & consultation

**CHANGES AFFECTING MULTIPLE USSP**

(a) A change may involve more than one USSP changing their functional systems. In this case, the change will consist of a set of changes to different USSP functional systems or their context. However, no matter how many individual changes to USSP' functional systems are part of the change, they should be coordinated. An overarching safety argument, coherent with the arguments of the individual changes, that claims the complete change is safe should be provided.

(b) Where a change requires approval(s) from the Competent Authority, these should be requested by the affected stakeholders in a logical order to ensure any dependencies are satisfied.

## U-SPACE.ORG.420 Functional system changes - Technical & operational approvals

(a) USSP shall obtain approval from the Competent Authority prior to initiating the implementation of technical changes to operational facilities, services, equipment or systems of the functional system.

(b) USSP shall obtain approval from the Competent Authority prior to initiating the implementation of operational changes, such as procedures or otherwise, in the functional system.

## AMC1 U-SPACE.ORG.420 Functional system changes - Technical & operational Submissions

(a) Submissions should be made via the E-Service system on the GCAA website.

## AMC1 U-SPACE.ORG.420 Functional system changes - Technical & operational approvals

**TECHNICAL APPROVAL**

(a) USSP shall obtain a 'Technical Approval' from the Competent Authority via the GCAA website.

(b) Technical changes include changes to the equipment or systems supporting the functional system, including existing facilities.

# SECTION 5 – INFRASTRUCTURE

## U-SPACE.ORG.510 Facility requirements

(a) A USSP shall ensure that there are adequate and appropriate facilities to perform and manage all tasks and activities in accordance with the applicable requirements.

(b) The facilities shall conform to applicable health & safety requirements, including the availability of suitable evacuation routes.

(c) The facilities shall include appropriate and clean rest facilities.

(d) The facilities shall be maintained in a suitable environment with regard to noise, temperature, lighting, and state of repair.

## U-SPACE.ORG.520 Security & Cybersecurity

(a) USSP shall, as an integral part of their management system as required in U-SPACE.ORG.110, ensure:

(1) the security of their facilities and personnel so as to prevent unlawful interference with the provision of services;

(2) the security of operational data they receive, produce, or otherwise employ so that access to it is restricted only to those authorised.

(b) The USSP shall define:

(1) the procedures relating to security risk assessment and mitigation, security monitoring and improvement, security reviews and lesson dissemination;

(2) the means designed to detect security breaches and to alert personnel with appropriate security warnings;

(3) the means of controlling the effects of security breaches and identifying recovery action and mitigation procedures to prevent re-occurrence.

(c) USSP shall ensure the security clearance of their personnel, if appropriate, and coordinate with the relevant civil and State authorities to ensure the security of their facilities, personnel and data.

(d) USSP shall take the necessary measures to protect their systems, constituents in use and data and prevent compromising the network against information and cyber security threats which may have an unlawful interference with the provision of their service.

# SECTION 6 – FINANCE & PLANNING

## U-SPACE.ORG.610 Liability and insurance cover

(a) USSP shall have in place arrangements to cover liabilities related to the execution of their tasks in accordance with the applicable law.

(b) The method employed to provide the cover shall be appropriate to the potential loss and damage in question, taking into account the legal status of the providers concerned and the level of commercial insurance cover available.

(c) USSP which avail themselves of services of another USSP shall ensure that the agreements that they conclude to that effect specify the allocation of liability.

# SUBPART – OPS (USP.OPS)
# GENERAL OPERATIONAL REQUIREMENTS

## SECTION 1 – SCOPE AND APPLICABILITY

### USP.OPS.GEN.101 Scope & applicability

(a) This part of the Regulation lays down rules and procedures for the safe operations of UAS in the U-SPACE airspace, for the safe integration of UAS into the aviation system and for the provision of U-SPACE services.

(b) This part of the Regulation shall apply, within the UAS geographical zones established as U-SPACE airspace by the Competent Authority, to:

(1) UAS operators;

(2) USSP;

(3) Organisations of common information services.

(c) This Regulation shall not apply to operations of UAS conducted:

(1) in the framework of model aircraft clubs and associations;

(2) State UAS Operations.

### GM1 USP.OPS.GEN.101 Scope & applicability

**STATE AIRCRAFT**

(a) Although State UAS operations are in principle excluded from the scope of this Regulation, the safety of such operations is paramount when conducted in airspace that is subject to the competent authority regulations. In this context, the safe separation between State UAS also in the U-SPACE airspace is always expected during all stages of flight.

(b) UAS geographical zones should also consider other aspects than safety, such as security aspects.

(c) The competent authority in conjunction with State Authorities could designate a U-SPACE airspace in critical areas for security and/or defense reasons, including State aircraft operations.

(d) In this context, State aircraft authorities are partners in the decision-making process of the coordination mechanism for the designation of U-SPACE to cover the safety and security aspects in a U-SPACE airspace, from the initial 'airspace risk assessment' until the U-SPACE is implemented and monitored.

(e) The involvement of State authorities in relation to U-SPACE is considered key to guaranteeing the level of safety and security in the U-SPACE airspace from both a ground and an air risk perspective.

(f) For example, State aircraft that conduct short-notice off-airfield landings while carrying out their assigned operations may require portions of the U-SPACE airspace to be adjusted or possibly deactivated. In this case, air traffic control units should apply the dynamic reconfiguration of the U-SPACE airspace at short notice, if/when required by State aircraft.

## GM2 USP.OPS.GEN.101 Passenger and cargo Operations

(a) The U-SPACE system is intended to ensure the segregation of manned aircraft subject to air traffic control service or the remain-well-clear spacing of manned aircraft not subject to air traffic control service, including manned VTOL-capable aircraft. The integration of UAS passenger-carrying operations will require focus on:

(1) the acceptable level of safety (ALS) that will have to be strengthened in maintaining appropriate safety levels for manned aviation (i.e., to mitigate the risk of human casualties);

(2) complementary enablers/prerequisites that may be required to support the safety of such operations (e.g., additional mandatory U-SPACE services and on-board functionalities).

## GM3 USP.OPS.GEN.101 Applicability

(a) The scope of this Regulation is limited to unmanned aircraft, as well as to natural and legal persons involved in their operation; in the context of this Regulation: UAS operators, U- space service providers (USSP), and common information services (CIS) and U-SPACE Coordinator.

(b) The requirements on ATS providers or the requirements related to manned aircraft operations are not included in this Regulation. Instead, the provisions pertaining to ATS providers are included in a dedicated amendment to Regulation CAR-ANS and through CAR ASP PART-ASM on Regulations as regards air operations as well as the use of airspace and the design of airspace structures respectively.

(c) This Regulation does not apply to the following UAS operations for the following reasons:

(1) model aircraft operating in the framework of model aircraft clubs and associations that have received an authorization and have demonstrated a good level of safety in clubs and associations;

(2) UAS flying according to instrument flight rules (IFR) in accordance with the current CAR-ROA as they benefit from the provision of air traffic service (ATS).

(d) This Regulation does not apply to UAS that carry out State, search and rescue, firefighting, border control and coastguard or similar activities and services undertaken in the public interest.

## GM4 USP.OPS.GEN.101 Maximum ceiling of U-SPACE

(a) To ensure an additional strategic layer of mitigation as regards separation between manned and unmanned aircraft, the U-SPACE airspace is limited to a 122 m (400 ft) height above the ground or water, in particular when the U-SPACE airspace is designated in uncontrolled airspace.

(b) Considering the novelty of the U-SPACE and the lack of experience with its implementation, this limitation is deemed desirable to ensure safety of operations in the U-SPACE airspace across the UAE.

(c) The competent authority may nevertheless decide to designate U-SPACE airspace with a height greater than 122 m (400 ft) above the ground or water in controlled or uncontrolled airspace provided that there are additional services and means available to ensure a common reference altitude system between UAS and manned traffic, as well as additional U-SPACE services and performance requirements for the services derived from the airspace risk assessment.

## USP.OPS.210 USSP

(a) U-SPACE services shall be provided by an organisation certified as USSP in accordance with this regulation.

(b) USSP shall be responsible for providing the UAS operators with the U-SPACE services during all phases of operations in that U-SPACE airspace.

(c) USSP shall establish arrangements with the relevant ANSP to ensure adequate coordination of activities, as well as the exchange of relevant operational data and information in accordance with this regulation.

(d) USSP shall handle air traffic data without discrimination, restriction or interference, irrespective of their sender or receiver, content, application or service, or terminal equipment.

(e) USSP shall provide at least the following mandatory U-SPACE services:

(1) a network identification service,

(2) a geo-awareness service,

(3) a UAS flight authorization service

(4) and a traffic information service

(f) USSP shall:

(1) exchange any information that is relevant for the safe provision of U-SPACE services amongst themselves;

(2) adhere to a common secure interoperable open communication protocol and use the latest information made available;

(3) ensure that the information is exchanged in accordance with the data quality, latency and protection requirements;

(4) ensure the access to and the necessary protection of the information exchanged.

(g) USSP shall report the following to the Competent Authority:

(1) the starting of operations after receiving the certificate;

(2) the ceasing and subsequent restart of operations, if applicable.

### GM1 USSP.OPS.210 General Requirements

(a) A U-SPACE service provider (USSP) is a new entity established by this Regulation. It refers to an organisation that is certified by the competent authority to provide a U-SPACE services in the U-SPACE airspace.

(b) USSPs are responsible for implementing and providing the bundle of U-SPACE services required by the U-SPACE airspace.

(c) Entities that are not willing to deliver all required U-SPACE services may act as subcontractors to a USSP that provides all required U-SPACE services.

(d) A USSP may subcontract the provision of some or all U-SPACE services to other entities if they remain under its management control. There can also be associations between USSP or equivalent mechanisms, if it is clear that there is a single certified entity responsible for providing the required bundle of U-SPACE services to UAS operators. When required, the USSP should ensure that the competent authority is given access to any subcontracted organisation and data relevant to support the USSP certification.

(e) USSP ensure coordination with other USSP or the Contracted CIS organisation.

(f) USSP ensure operational coordination with relevant ANSP. Only some specific information is expected to be sent back to the relevant ANSP.

(g) USSP support the dissemination and acknowledgment of notification on dynamic airspace reconfiguration.

(h) USSP support the competent authority in recording and making operational data available to support the conduct of safe operations in the U-SPACE airspace.

## SECTION 2 – U-SPACE AIRSPACE

### USP.OPS.GEN.201 U-SPACE Airspace

(a) Approval from the Competent Authority shall be obtained for any airspace change that includes, but are not limited to, the following:

(1) Establishment of, or changes to, the lateral or vertical dimensions of UAS Airspace (U-SPACE), whether temporary or permanent in Nature and whether for civil or state purposes

(2) Establishment of or change to UAS routes;

(b) The Establishment of or changes to, the lateral or vertical dimensions of UAS Airspace (U-SPACE) shall be in accordance with the provisions listed in CAR ASP Part ASM ASM.ASC.110 Airspace change requirements

(c) The establishment of UAS routes shall be in accordance with the provisions listed in CAR ASP Part ASM ASM.ASC.110

(d) The Establishment of UAS Airspace (U-SPACE) and UAS routes shall be designed by FPD organisations certified by the Competent Authority in accordance with CAR-ASP PART FPD.

(e) The following U-SPACE services are mandatory for UAS operations in the U-SPACE airspace:

(1) the network identification service;

(2) the geo-awareness service;

(3) the UAS flight authorization service;

(4) and traffic information service.

(f) For each U-SPACE airspace designed in the UAE, a risk assessment is required for safety, security, privacy or environmental reasons.

(g) The airspace risk assessment shall comply with the AMC1 USP.OPS.GEN.201(a) Airspace Risk Assessment provisions.

(h) For each U-SPACE airspace designed the USSP shall determine the following:

(1) The UAS Operational Category referred to in GM5 USP.OPS.GEN.101

(2) the UAS capabilities and performance requirements;

(3) the U-SPACE services performance requirements;

(4) the applicable operational conditions and airspace constraints.

## AMC1 USP.OPS.GEN.201(a) U-SPACE Airspace

**Airspace Risk management**

(a) The designation of the U-SPACE airspace should enable the safe management of a large number of UAS operations, while ensuring safety continuum as regards manned aviation:

(b) The airspace risk assessment should primarily consider the air risk and the related ground risk as a collateral effect of UAS mid-air collisions, and should ensure that the related hazards and resulted risk are adequately addressed and properly managed.

(c) The airspace risk assessment should include at least, but not limited to:

(1) hazard identification, including safety, security, privacy and environmental hazards;

(2) risk analysis, meaning the evaluation of the likelihood and severity of harmful effects induced by the identified hazards;

(3) based on the previous analysis, the definition of mitigation actions that should be taken when necessary to ensure an acceptable risk level.

(d) The airspace risk assessment should further allow to derive the U-SPACE airspace design, performance requirements, constraints, etc., required to enable safe operations.

(e) The reassessment of the U-SPACE airspace risk should be conducted to:

(1) support the introduction of major changes to the designated U-SPACE airspace; and

(2) dynamically evaluate its adequacy and adjust its definition based on the experience gained from operations and major evolutions that may occur in its environment (e.g., emergence of critical ground infrastructures, extension of populated areas).

## GM1 USP.OPS.GEN.201 U-SPACE Airspace

**GENRAL**

(a) The designation of the U-SPACE airspace is driven by safety, security, privacy or environmental considerations.

(b) The following relevant aspects should be considered by the USSP for the designation of the U-SPACE airspace:

(1) the type, density, and complexity of existing and planned unmanned traffic, including UAS operations taking place in the context of authorized model aircraft clubs and associations;

(2) the type, density, and complexity of existing and planned manned traffic, including air sports activities;

(3) the operational capacity of the designated ANSP to interface with the Common Information Service organisation and USSP in the designated U-SPACE airspace;

(4) the operational capacity of USSP and, when relevant, the Common Information Service organisation;

(5) the complexity of the airspace structure;

(6) the availability of safe and secure communication mechanisms to enable UAS operators and USSP to exchange digital information;

(7) the classification of the airspace and the services provided to instrument flight rule (IFR) and visual flight rule (VFR) aircraft;

(8) existing UAS geographical zones; and

(9) the topographical environment and prevalent meteorological conditions.

(c) Initial designations of U-SPACE airspace are expected to take place at low-level altitude, e.g., below 120 m (400 ft), and where there is very little expected manned traffic.

(d) Besides the four mandatory U-SPACE services as prescribed in point (e) of USP.OPS.210 USSP, The Competent Authority may decide that additional U- space services are needed to support the safe, secure, and efficient conduct of UAS operations in specific volumes of U-SPACE airspace.

(e) The regular reassessment of the U-SPACE airspace is expected to be conducted by the USSP to evaluate its effectiveness in supporting the safe, secure, and efficient conduct of UAS operations.

## GM2 USP.OPS.GEN.201 U-SPACE Airspace Reasons for The Designation Of U-SPACE Airspace

(a) Safety

(1) Having the need to share a common volume of airspace between manned and unmanned aircraft;

(2) To improve the visibility (e.g., by means of electronic conspicuity) of (un)manned aircraft, thus enabling a known traffic environment;

(3) To decrease the risk on ground in the case of multiple UAS flying over an assembly of people in urban areas or over highly populated areas (in combination with other means such as the certification of unmanned aircraft, UAS operators, etc.); and

(4) In the case of high UAS density, there could be a specific need to reduce the risk of UAS mid-air collision by organizing the traffic through the introduction of certain UAS route structures. U-SPACE services, such as geo-awareness, may provide support in that respect.

(b) Economy

(1) To ensure a fair and efficient sharing of the airspace volume between manned and unmanned aircraft, and between manned aircraft;

(2) To enable more complex and denser UAS operations; and

(3) To support the development of the UAS sector and the provision of associated services to the public.

(c) Security

(1) To improve the visibility of unmanned aircraft by having most of the airspace users identified;

(2) To support the enforcement of National regulations and rules (e.g., prohibition of flights over sensitive sites, limited schedules, specific performance requirements) where there are too frequent violations, if the availability of the related UAS

geographical zones is not sufficient to ensure the effective application of flight constraints to support UAS operations. This may notably concern the protection of critical infrastructures and no-fly zones;

(3) To support The Competent Authority and relevant authorities in identifying, responding to, and investigating the use of UAS for malicious or unlawful purposes; and

(4) To support the protection of services that are critical to the proper functioning of the UAE, the UAE economy and society from the use of UAS for malicious or unlawful purposes.

(d) Privacy

(1) To support the enforcement of particular conditions for certain or all UAS operations for privacy reasons. Flying over some specific areas could be restricted to some users or to some slots (as it is the case for restricted areas for manned aviation.

(e) Environment

(1) To define environmental requirements for UAS operations (noise could be limited, a minimum height could be required);

(2) To distribute traffic density to an acceptable level of disturbance over environmentally sensitive sites;

(3) Enabling a diverse set of UAS operations (e.g., commercial and residential areas etc.), while respecting environmentally protected areas.

(4) To minimize CO2 emissions, especially in urban environments.

## GM1 USP.OPS.GEN.201(a) Airspace Risk Assessment – General

(a) The airspace risk assessment involves making use of information to determine possible relevant air and ground risks posed by unmanned aircraft flying in the airspace volume assessed, and regulate the conditions on privacy, security and environmental protection for all parties involved, including the citizens.

(b) An airspace risk assessment is a combination of qualitative and quantitative analysis ensuring that safety and performance criteria are defined, and that assumptions and enablers are consistent with the current airspace design and procedures. The methodology used in this process needs to contain a clear set of objectives and a realistic view of the operations conducted in a given airspace volume.

(c) Different formats are recognized (formal to less formal) for the approach to the analytical aspects of an airspace risk assessment. For some hazards, the number of variables and the availability of both suitable data and mathematical models may lead to credible results with sole quantitative methods (requiring mathematical analysis of specific data). However, few

hazards in aviation lend themselves to credible analysis solely through quantitative methods. Typically, these analyses are supplemented qualitatively through critical and logical analysis of the known facts and their relationships.

(d) When available, appropriate tools for the quantitative analysis of the ground and air risk assessment may be used for the substantiation of the airspace risk assessment.

(e) In the case of UAS operators that intend to operate within the specific operations category, the risk assessment should consider the outputs of an airspace risk assessment.

(f) The objective of the methodology applied should be to define a means for providing assurance that the U-SPACE is acceptably safe, secure, and that privacy and environmental concerns are duly considered, covering at least the definition phase of the life cycle, and leading to the designation of the U-SPACE airspace. Furthermore, the deployment of an operational U-SPACE airspace requires an iterative process, through its development life cycle, from initial system definition to transition into service and finally to operations. The iterative process could make use of different tools and methods, such as fault-tree analyses, event-tree analyses, common-cause analyses, data collection, tests and validations, or documentation of the evidence, among others. During this process, the original airspace risk assessment could be modified through a feedback loop if necessary.

(g) An airspace risk assessment should be revised when the operational, regulatory and technology deployment context significantly evolves, or when the criteria too upon which the airspace has been designed significantly evolve. The operational context includes incident and accident reports, traffic density, new procedures, and new stakeholders. The frequency of the reassessment depends on local conditions.

## GM2 USP.OPS.GEN.201(a) Airspace Risk Assessment – Process Phases

(a) An airspace risk assessment is a process composed of different phases that can be represented as detailed below:

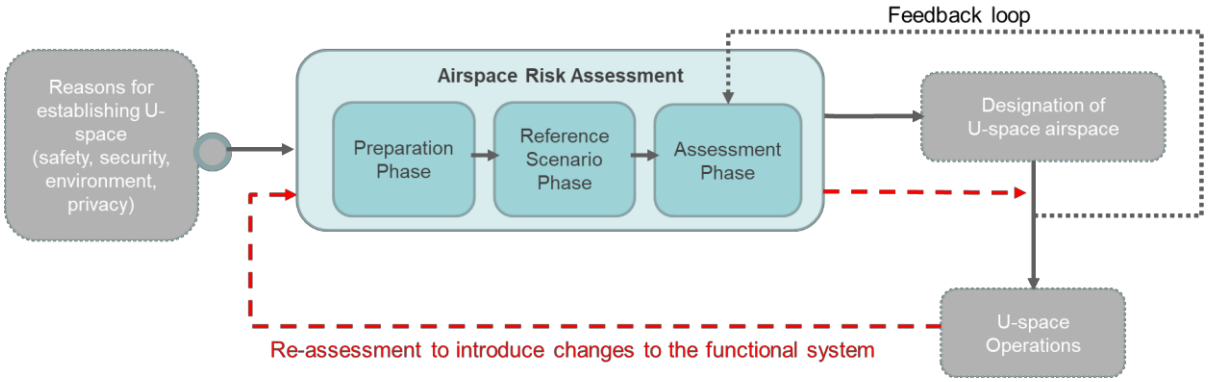


***Figure 1: Airspace risk assessment process***

(1) ***The preparation phase*** begins with defining the airspace in the scope of the assessment, including operational, procedural and infrastructure design requirements from all

involved stakeholders, as well as defining any assumptions and constraints. An assessment team needs to be created to ensure that no area is left unexamined.

(2) ***The reference scenario phase*** concerns only the analysis of the use of the airspace assessed before changes are introduced. An important step in this phase is conducting interviews with stakeholders (including non-aviation entities), assessing ground infrastructure, identifying technical support infrastructure, and collecting the necessary data in a common data format. This would ensure a harmonized approach for all entities involved.

(3) ***The assessment phase*** includes hazard identification, risk analysis and mitigation planning. These processes should be applied separately to safety, security, privacy, and environmental hazards, and their associated risks. As the nature of hazards, risks, and mitigation measures are specific to each of these four areas, the methodologies employed by USSP to identify hazards, assess risks, and plan appropriate mitigation measures should fit the specific needs of the area assessed. Nevertheless, the assessment should guarantee that the risk is acceptable or tolerable while identifying the requirements that are to be met in that perspective. Ultimately, the appropriate mitigation measures from each assessment should be compatible with each other and they should not adversely impact on the other areas.

## GM3 USP.OPS.GEN.201(a) Airspace Risk Assessment – Safety Part

(a) The assessment phase considers the following items when approaching safety:

(1) Important aspects to include in the assessment are related to traffic density, mapping information related to population density and obstacles, in-depth assessment of encounters with manned aviation, consequences of mid-air collision between unmanned aircraft, and meteorological information, among others.

(2) It is expected that the assessment phase includes a description of the safety activities to be conducted during its life cycle (e.g., in a safety plan). The aim is to specify the detailed safety assessment activities to be undertaken for a given airspace. This preparatory process identifies the main safety issues associated with the airspace under assessment as soon as possible.

(3) It is recommended that the following safety assessment activities, at a minimum, be performed at safety planning level:

(A) Description of the key properties of the operational environment that are relevant to the safety assessment.

(B) Initial identification of the hazards in the airspace under assessment.

(C) Derivation of suitable safety criteria for the airspace under assessment.

(D) Determination of the operational activities relevant to the airspace under assessment.

(4) The safety assessment methodology describes the following elements:

(A) Identification of hazards and definition of the safety criteria.

(B) To satisfy the safety criteria, definition of the airspace safety specification at operational level in normal, abnormal, and emergency conditions.

(C) Definition of the airspace safety requirements describing the high-level design characteristics of the functional system to ensure that the system operates as specified.

(5) Such requirements may be allocated to different stakeholders (e.g., USSP, UAS operators, etc.)

(b) Safety hazards

(1) The term 'hazard' means 'any condition, event, or circumstance which could induce a harmful effect'. This definition is maintained in the context of the U-SPACE airspace risk assessment.

(2) This definition relates to a broader understanding of what a hazard is. It addresses two types of hazards:

(A) hazards inherent to aviation, which the functional system will have to mitigate; and

(B) 'System-generated' hazards, which are created by the potential failure of the functional system.

(3) In an airspace risk assessment associated to UAS operations, both types of hazards (i.e., existing and system-generated hazards) need to be considered, analyzed and mitigated.

(4) By definition, hazards inherent to aviation are hazards which exist in the operational environment before any form of deconfliction has taken place. These hazards are the base for the definition of the safety criteria. Two examples of these hazards inherent to aviation, regarding air risk and ground risk respectively, could be:

(A) a situation where the intended trajectories of two or more aircraft are in conflict;

(B) a situation where the intended trajectory of an aircraft conflicts with the terrain or an obstacle.

(5) System-generated hazards are hazards generated by the possible failure/malfunction of the functional system. Possible examples of system-generated hazards may be:

(A) unmanned aircraft entering controlled airspace;

(B) failure in separating two aircraft.

(6) For the identified system-generated hazards, there is a need to provide:

(A) the assessed immediate operational effect(s);

(B) the possible mitigation means in terms of measures to be implemented to protect against the risk-bearing hazards;

(C) the assessed severity of the mitigated effect(s), in accordance with a severity classification scheme defined for the U-SPACE airspace;

(D) the airspace safety specification elements, to limit the tolerable frequency with which the system-generated hazard could be allowed to occur.

(c) It is recommended that safety assurance activities be documented to present sufficient evidence that the actions taken have been adequate and complete in identifying and mitigating the risks (e.g., safety assessment report).

## GM4 USP.OPS.GEN.201(a) Airspace Risk Assessment – Checklist Template

(a) For the purpose of conducting an airspace risk assessment, USSP may wish to use a checklist for different types of environments for which hazards and impacts may be considered when performing an airspace risk assessment.

(b) An Airspace Risk Assessment – Checklist Template is provided in Appendix-2

## GM5 USP.OPS.GEN.201(a) Airspace Risk Assessment – Other Risks

(a) During the assessment phase, the following guidance regarding the associated security, privacy, and environmental risks may support the USSP.

(1) The protection of critical infrastructure as well as cybersecurity may lead to risk assessments that are relevant to the airspace considered. These risk assessments may be considered as components of the airspace risk assessment if they are reviewed to take into consideration the possible designation of a U- space airspace.

(2) It is recommended that a security risk assessment be conducted to assess the security risks of an organisation which emerge from intentional, unauthorized electronic interaction. The necessary process steps and methodologies to conduct the security risk assessment will vary depending on the particular security risk assessment process that has been adopted.

(b) The methodology used to assess cybersecurity risks is very similar to the one used for physical security risks and, therefore, recommended to use it during the assessment phase. The process for the risk assessment and for the sharing of information security risks is illustrated in Figure 2 on the next page. This comprises several activities that need to be performed for each risk assessment.

(c) There are fixed inputs (marked with the letters A, B, C, D) that should be common to all risk assessments conducted by an organisation. These would be established as part of the overall corporate risk management process. The activities described may be conducted in a different order depending on the particular methodology used, and the activities and fixed inputs may have different names as well. Risk sharing can happen at any life cycle stage and should be

dependent on agreed thresholds for reporting.

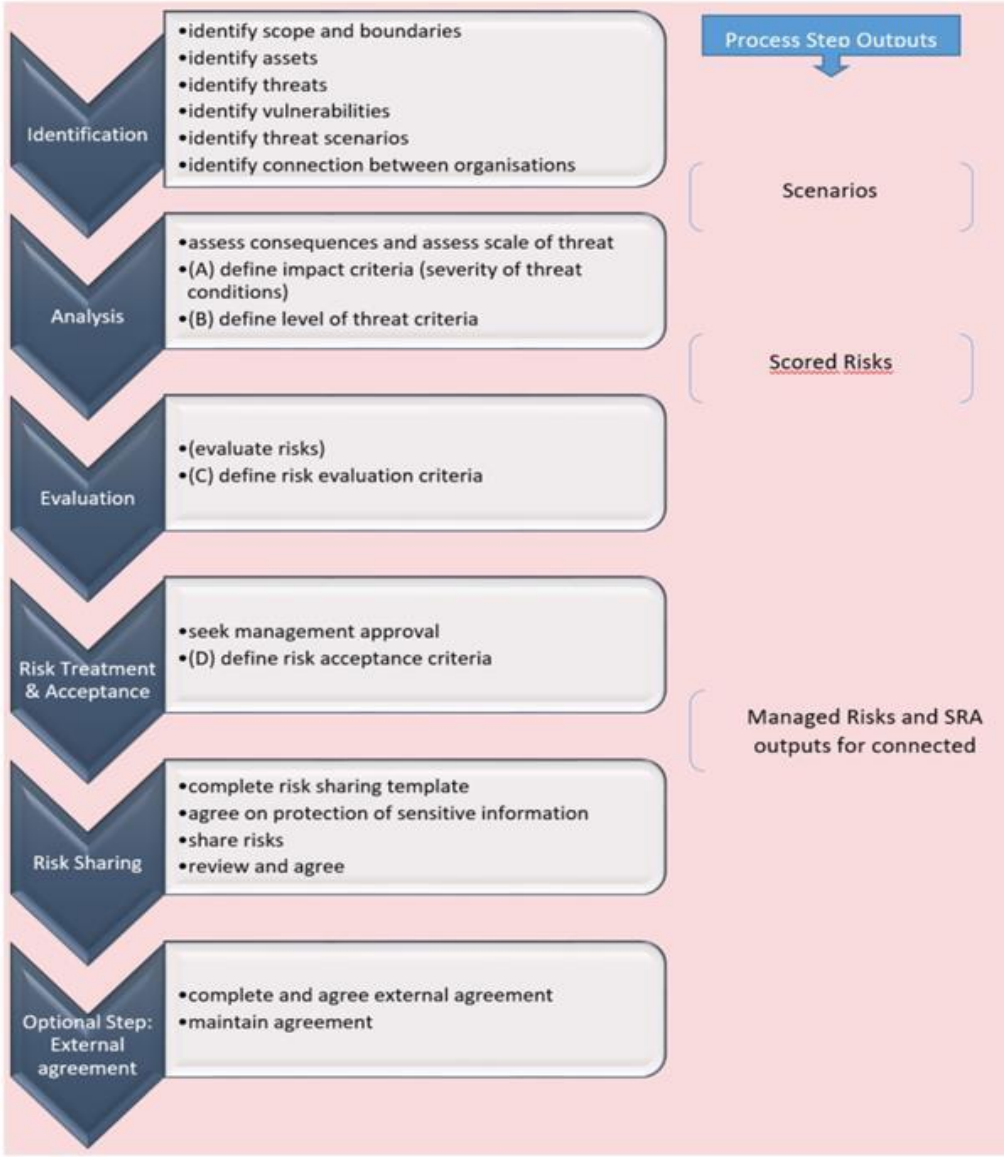


***Figure 2: Risk assessment and sharing of information***

(d) To ensure comparability and compatibility between the different security assessment methodologies and definitions of risk, it is recommended that the parties involved should have a common method for categorizing risks and different classes of risks. The use of different methods may produce incomparable outputs that are unusable between the parties involved.

(e) The following principles may be used for risk sharing outputs where there is a safety impact identified between connected organisations and ecosystems using the same risk assessment method:

(1) Assurance that the outputs of the assessments produce results which are comparable internally and externally.

(2) Agreement upon common definitions for the connected interfaces (e.g., risk classes, vulnerabilities).

(3) Sharing information on assessed risks that have a potential safety impact on their partners, which relate to connecting networks, to sharing information, and to using third-party products.

(4) The use of different risk assessment matrices should be used according to the type of impact that is being assessed and shared (e.g., safety, capacity).

(5) An organisation may only compare and use the severity of same-type impacts, i.e., a safety impact with a safety impact; a safety impact cannot be compared with an organisational impact.

(6) Security protection

(i) The general type of protection (e.g., type of encryption standard).

(ii) The attribute being protected is important as it may be the case that one organisation protects availability, but the receiving organisation is concerned with protecting integrity.

(iii) The assurance of security protection which represents the quality it has been designed to operate. If the assurance level of the protection measures of the connected organisation is not broadly equivalent, then each connected system will either have to agree to share and manage the risk to an acceptable level for both organisations or individually manage the risk to an acceptable level.

(f) A risk assessment on privacy is aimed at assessing the privacy risks to third parties emerging from intentional or accidental visualization, capture and/or retention of personal images or information through (close) overflight or hovering. The necessary process steps and methodologies to conduct the privacy risk assessment will vary depending on the particular privacy risk assessment process that has been adopted.

(g) An environmental risk assessment should assess the risks to people, wildlife and the natural environment which emerge from flights near built-up areas, especially schools and hospitals, protected landscape, natural reserves, along known wildlife migratory routes, or over lakes, rivers, and other bodies of water. The necessary process steps and methodologies to conduct an environmental risk assessment will vary depending on the particular environmental risk assessment process that has been adopted.

(h) Environmental risk assessments for UAS operations should ensure compliance with plans and programs for which such environmental assessments have been carried out.

(i) Concerns regarding aviation and wildlife generally focus on strikes against aircraft, mostly by birds. This is also a problem for unmanned aircraft. Such strikes could cause the unmanned aircraft to become uncontrollable, presenting a danger to people and property on the ground. Assessments should ensure that UAS operations avoid known wildlife migratory routes.

## GM6 USP.OPS.GEN.201(a) Airspace Risk Assessment – Coordination with the U-SPACE Stakeholders

(a) USSP are to ensure a viable and effective designation of the U-SPACE airspace, it is recommended as best practice to:

(1) exchange on best practices with other USSP to ensure consistency and interoperability across the UAE — for instance, in seeking harmonization on safety criteria and performance requirements;

(2) coordinate with the contracted common information services organisation, and USSP to evaluate:

(i) the availability of the required capabilities and performance requirements;

(ii) the operational capacity according to the volume of operations expected in the U-SPACE airspace;

(iii) the operational capacity to interface with ANSP;

(iv) the procedures supporting the dynamic airspace reconfiguration in controlled airspace;

(v) the availability of a common secure interoperable open communication protocol to enable digital information exchange between the U-SPACE airspace actors;

(3) coordinate with the relevant ANSP to evaluate the particularities or constraints of the controlled airspace to be considered during the designation of the U-SPACE airspace;

(4) coordinate with UAS manufacturers to evaluate that UAS satisfy the required capabilities and performance requirements;

(5) coordinate with UAS operators to gain understanding of the intended operations and evaluate the service performance required, the practicability of the operational constraints, as well as the planned contingency and emergency procedures.

## AMC1 USP.OPS.GEN.201(b) U-SPACE Airspace – Design, Operational Conditions and Constraints

(a) USSP should establish and provide the U- space airspace definition, encompassing:

(1) the geographical limits of the area where the U-SPACE airspace is designated;

(2) the internal airspace structure (e.g., airspace blocks with their maximum and minimum size, subject to activation/deactivation);

(3) the UAS geographical zones, which could be encompassed within the U-SPACE airspace.

(b) Furthermore, USSP should define the U-SPACE airspace operational conditions and constraints:

(1) for U-SPACE designated in controlled airspace, the means and procedures to disseminate information regarding dynamic airspace reconfiguration;

(2) the potential pre-established contingency or emergency procedures;

(3) the weather limitations, in terms of maxima or minima for important meteorological parameters (e.g., maximum gust, and visibility minimum, temperature minimum);

(4) the maximum simultaneous UAS operations, and the maximum density of UAS flights allowed within the designated U-SPACE airspace;

(5) the minimum safety distance (spacing) to be maintained between manned and unmanned aircraft in airspace where manned aircraft operations are not subject to air traffic control;

(6) any other operational conditions and constraints derived from the airspace risk assessment (e.g., mitigation of specific hazards identified during the assessment).

## AMC2 USP.OPS.GEN.201(c) U-SPACE Airspace – Performance Requirements

(a) USSP should establish the following:

(1) The U-SPACE services' performance requirements and operational constraints:

(i) the 'geographic proximity' to UAS operators at which the UAS remote identification has to be acquired and provided to support the network information service;

(ii) the maximum data 'latency' and 'frequency' at which the traffic information needs to be provided to UAS operators to ensure the proper functioning of the traffic information service;

(iii) the 'proximity' to the UAS position, and the associated definition of the surveillance volume at/within which the traffic information should be provided to UAS operators;

(iv) the 'deviation thresholds', meant to be the maximum acceptable deviation from the intended UAS flight path, to be considered by the USSP when processing a flight authorization or to generate a non-conformance alert to the UAS operator;

(v) flight authorization constraints that may be defined to ensure fair and efficient access to the U-SPACE airspace;

(vi) the data quality requirements for weather data, when relevant;

(vii) the minimum coverage (e.g., horizontal and vertical range within and, when

required, also outside the U-SPACE airspace) for the receipt of information from electronically conspicuous manned aircraft that are not subject to air traffic control, and complementary information about manned aircraft traffic potentially shared by the relevant air traffic service units.

(b) The required UAS capabilities and performance requirements.

(1) For the determination of the performance requirements, the contribution of the U-SPACE actors (layers) should be taken into account including, when relevant, the contracted CIS organisation, the USSP, and UAS operators (e.g., reaction time).

## GM1 USP.OPS.GEN.201(c) U-SPACE Airspace – Results of The Airspace Risk Assessment

(a) The acceptable level of safety is supported by a comprehensive set of performance requirements, operational constraints and limitations that are to be subsequently considered and/or satisfied by the U-SPACE actors (e.g., USSP, UAS operators, UAS manufacturers). These performance requirements and operational constraints and limitations are intended to be established throughout the risk assessment, be performance based, and commensurate with the level of risk that needs to be mitigated in the U- space airspace.

## GM2 USP.OPS.GEN.201(c) U-Space Airspace – Structure

(a) The design of the U-SPACE airspace could be organized into a set of airspace components that can be a basic set of airspace blocks which can be combined/deactivated in changing combinations/configurations to meet the actual manned aviation requirements. It can also be a more sophisticated mathematical grid, the geometry of which can vary depending on the complexity and density of the operations (e.g. triangles to allow for straight 'areas' boundaries). An efficient strategic approach to the design of the U-SPACE airspace is therefore important, also taking into account the need to manage the complexity of the dynamic airspace reconfiguration procedure, which might be progressively increased at the later stage of the U-SPACE implementation.

## GM3 USP.OPS.GEN.201(c) U-Space Airspace – Internal Geographical Zones

(a) The U-SPACE airspace may encompass sub-geographical zones:

(1) zones limited in place and time (e.g., operations allowed only at certain periods and in certain areas);

(2) zones restricted to UAS operations that fulfil a specific set of conditions and specific authorizations;

(3) zones of exclusion where UAS operations are prohibited (e.g., no-fly zones).

## GM4 USP.OPS.GEN.201(c) U-SPACE Airspace – Safety and Security Objectives

(a) To ensure that the acceptable level of safety is achieved, safety objectives may be specified in

terms of required levels of integrity and reliability, and be allocated to the U-SPACE actors. Similarly, security objectives aligned with the safety objectives, type of operation and level of threats may be also defined to ensure assurance in the security measures.

(b) While the objectives are meant to be commensurate with those existing today for manned aviation, the practicality of the implementation may limit the approach (e.g., difficulty in applying a relevant software assurance level (SWAL) approach).

## GM5 USP.OPS.GEN.201(c) U-SPACE Airspace – Flight Authorisation Constraints

(a) Linked to specific airspace, and to ensure efficiency as well as fairness as regards access to the U-SPACE airspace, USSP may constrain:

(1) the minimum and maximum time (size of time window) before scheduled take-off time at which flight activation is requested;

(2) the maximum time a flight authorization request may be sent in advance to ensure the effective implementation of the 'first in, first serve' principle and prevent undue occupation of the U- space airspace.

## GM6 USP.OPS.GEN.201(c) U-SPACE Airspace – Flight Authorisation Deviation Thresholds

(a) It is expected that the acceptable level of safety may be achieved by having UAS flight authorization for 4D trajectories that do not intersect and contain their flights for 95 % of the time.

(b) The UAS flight authorization describes the flight trajectory as a series of one or more 4D volumes expressed in height (base, ceiling), longitudinal and lateral limits, and duration (entry and exit times). Each dimension includes the uncertainty of the flight, considering the UAS operational performance, and the assumptions on the operator proficiency and weather conditions.

(c) It is recommended as best practice that these uncertainties be capped in the given probability of 95 %. The resulting deviation threshold defines an additional 4D volume around each planned 4D volume for a flight. The dimensions may be specified to balance the needs of safety with the efficient use of the airspace, and refine them over time for the U-SPACE airspace under consideration based on the observed usage of the U-SPACE airspace, the performance (and conformance) of the UAS flights in the airspace, and other factors.

## GM7 USP.OPS.GEN.201(c) U-SPACE – Traffic Information and Surveillance Volume

(a) Proximity is understood as the distance between two aircraft. In the context of traffic information service, its value should be determined in such a way to allow UAS operators enough time to take appropriate action to avoid collision hazards. Proximity values may vary depending on the geography of the U-SPACE airspace and the type of expected operations (e.g., BVLOS/VLOS), and also on the type and performance of manned aircraft that operate in or cross through the U-SPACE airspace.

(b) The constraints in terms of situational awareness, and thus the proximity values, may differ for manned and unmanned aircraft. Manned aircraft are usually much faster than unmanned aircraft. Due to their higher velocity, and due to the fact that manned aircraft induce wake turbulence, UAS operators may need to ensure situational awareness at a much wider scale to effectively assess incoming traffic and take appropriate action to maintain sufficient spacing.

(c) For instance, to enable a 10-minute reaction time for the UAS operator, and considering a manned traffic velocity of 120 kt (≈240 km), a wider volume of 20 NM (≈37 km) and 5 000 ft (≈1 500 m) may be taken as reference to adequately monitor manned traffic patterns.

(d) These factors are to be considered by USSP to ultimately specify the appropriate 'surveillance volume'. In addition, considering such constraints, and to safely enable operations close to the geographical borders of the U-SPACE airspace, the 'surveillance volume' should include the adjacent airspace beyond the strict geographical limit of the U-SPACE airspace.

(e) Traffic information may be complemented by information about manned aircraft traffic shared by the relevant air traffic service units. This may include information from primary and secondary surveillance radars, multilateration surveillance systems and other surveillance or tracking systems already used by air traffic service units.

(f) The complementary traffic information about manned aircraft traffic should be considered as one of the inputs to the airspace risk assessment.

## GM8 USP.OPS.GEN.201(c) UAS Capabilities and Performance Requirements

(a) Depending on the U-SPACE airspace design and constraints, not all UAS types are capable of being safely operated within the U-SPACE airspace. The UAS capabilities and performance requirements may be expressed in terms of expected:

(1) climb/descent rates or vertical speed, horizontal speed, autonomy/range/endurance,

(2) noise levels,

(3) connectivity,

(4) required navigation equipment,

(5) flight data accuracy, integrity and latencies (refresh rate),

(6) availability and integrity of the command-and-control link,

(7) resilience to environmental conditions (e.g., as applicable: wind, icing, electrical interference),

(8) resilience to cyberthreats and related security measures.

# SECTION 3 – COMMON INFORMATION SERVICES

## USP.OPS.GEN.220 Common Information Services

(a) Common information services play a crucial role in the U-SPACE structure. It acts as a data exchange platform where real-time and non-real-time aeronautical, airspace, and meteorological data can be shared among stakeholders. The common information services shall be provided by the USSP of each U-SPACE airspace.

(b) The competent Authority may allow, subject to prior approval, a USSP to contract a common information service organisation (CIS organisations) on a partial or temporary basis to supply the common information services on an exclusive basis in all or some of the U-SPACE airspaces under their responsibility if the contracting USSP can demonstrate to the satisfaction of the competent authority the ability to ensure that the contracted organisation can:

(1) work under the oversight system of the service certificate holder, and

(2) comply with the terms of the contracting organisation's service certificate.

(c) The Contracted CIS organisation shall not be permitted to conduct its contracted services without the acceptance of the competent Authority.

(d) The Authority may, at any time, restrict, suspend, or revoke, the acceptance of a contracted CIS organisation

(e) USSP or contracted CIS organisations shall make the following data available as part of the common information services of each U-SPACE airspace:

(1) horizontal and vertical limits of the U-SPACE airspace;

(2) the requirements determined pursuant USP.OPS.GEN.201;

(3) any adjacent U-SPACE airspace (s);

(4) UAS geographical zones relevant to the U-SPACE airspace;

(5) static and dynamic airspace restrictions defined by the relevant authorities and permanently or temporarily limiting the volume of airspace within the U-SPACE airspace where UAS operations can take place.

(f) The USSP or contracted CIS organisations shall ensure that the relevant operational data are made available.

(g) The USSP or contracted CIS organisations shall make the terms and conditions of their services available as part of the common information services of each U-SPACE airspace in which they offer their services.

(h) Access to common information services shall be granted to relevant authorities, air traffic service providers, USSP and UAS operators on a non-discriminatory basis, including with the same data quality, latency and protection levels.

(i) USSP who contract a common information service organisation shall inform the Authority, and other USSP without delay of any concerns regarding the contracted common information service organisation.

## GM1 USP.OPS.GEN.220 STAKEHOLDERS

(a) As regards information and data provided to or by the USSP or the contracted CIS organisation, a variety of different stakeholders may be involved. USSP or the contracted CIS organisation may consider taking the needs and requirements of the stakeholders listed below into consideration.

(b) Stakeholders to provide information to, and retrieve information from, the CIS organisation:

(1) The competent authority;

(2) ANSP;

(3) State authorities;

(4) USSP;

(5) other relevant authorities or organisations (e.g., State agencies, municipalities, nature protection authorities, law enforcement authorities, rescue coordination centers, GNSS services, aerodrome/heliport/vertiport operators, meteorological authorities).

## GM2 USP.OPS.GEN.220 Arrangement Between the CIS Stakeholders

(a) The USSP or the contracted CIS organisation may need to make a formal arrangement with multiple USSP and/or contracted CIS organisations. To allow for flexibility, the formal form of the arrangement is left to the discretion of the parties involved, but may encompass the following items:

(1) The arrangement may make reference to service ownership, accountability, roles and responsibilities;

(2) contain a description of the provision of data, information or services;

(3) match the expected service provision with the actual service support and delivery.

(b) The arrangement may establish:

(1) the subject matter, which may cover:

(i) the U-SPACE airspace service (one arrangement may cover several U-SPACE airspace volumes);

(ii) the coordination between stakeholders (may be covered in the same arrangement);

(c) the governance model, which may contain:

(1) points of contact for process coordination and system maintenance contacts;

(2) a coordination process involving representatives from the stakeholders involved; the arrangement may cover procedures to organize meetings;

(3) provision on dispute resolution;

(d) the data- and information-sharing attributes and constraints:

(1) the scope of data and information to be shared will depend on whether the U-SPACE is designed in controlled or uncontrolled airspace, or in airspace where both controlled and uncontrolled manned aircraft may operate simultaneously (i.e., ICAO airspace class E);

(2) a data- and information-sharing plan may cover the following:

(i) the data and information shared;

(ii) compliance with applicable data protection legislation;

(iii) data processing;

(iv) data quality;

(v) data subjects' rights;

(vi) data retention and deletion;

(vii) security and training;

(viii) security breaches and reporting procedures;

(ix) responsibilities for providing data and services.

# SECTION 4 – GENERAL REQUIREMENTS FOR UAS OPERATORS AND U-SPACE SERVICE PROVIDERS

## USP.OPS.201 UAS Operators

(a) When operating in the U-SPACE airspace, UAS operators shall:

(1) ensure that the UAS to be operated in the U-SPACE airspace comply with the capabilities and performance requirements determined by the USSP;

(2) ensure that during their operations, the necessary U-SPACE services are used, and their requirements complied with;

(3) comply with the applicable operational conditions and airspace constraints referred to in USP.OPS.GEN 210 and USP.OPS.GEN.220.

(b) Before operating in the U-SPACE airspace, UAS operators shall comply with the requirements of the U-SPACE including, where relevant, hold an operational authorization or a certificate issued by the Competent Authority and to comply with the operational limitations set by a USSP in any UAS geographical zone.

(c) Before each individual flight, the UAS operator shall submit an UAS flight authorization request to its U-SPACE service provider, through the UAS flight authorization service.

(d) When ready to start the flight, the UAS operator shall request the USSP for the activation of the UAS flight authorization. Upon receiving the confirmation of the activation for the UAS flight authorization from the U-SPACE service provider, the UAS operator shall be entitled to start its flight.

(e) UAS operators shall comply with the UAS flight authorization, as well as with any changes thereto. The U-SPACE service provider may introduce changes to the authorization during any phase of the flight and, in such case, shall inform UAS operators about them.

(f) Where UAS operators are not able to comply with the UAS flight authorization, they shall request a new UAS flight authorization.

(g) UAS operators shall have contingency measures and procedures. They shall make their contingency measures and procedures available to the USSP.

(h) The UAS operations conducted within areas that are not designated as U-SPACE shall be approved by the Competent Authority

## GM1 USP.OPS.201 Obligations When Operating In U-SPACE Airspace

(a) Apart from making use of the required U-SPACE services, UAS operators would need to ensure in advance that the UAS intended to be operated comply with the applicable capabilities and performance requirements, as well as with the relevant operational conditions and airspace constraints.

(b) To adequately make use of the U-SPACE services, UAS operators may conclude a contract with an active certified USSP of their choice that provides the required set of U-SPACE services in a given U-SPACE airspace.

(c) UAS operators should submit their UAS flight authorization request to the USSP and comply with the terms and conditions of the UAS flight authorization once it is granted by the USSP. Certain conditions need to be met prior to the flight. UAS operators are not allowed to commence a flight until they have sent an activation request of the UAS flight authorization to the USSP. They should ensure compliance with the terms and conditions associated with the UAS operation in the particular U-SPACE airspace. In case they cannot comply with the UAS flight authorization, UAS operators should amend their original request.

## AMC1 USP.OPS.201

(a) UAS operators should select UAS of a type that is appropriate to satisfy the UAS capabilities and performance requirements specified for the U-SPACE airspace.

(b) In accepting the 'terms and conditions' of the flight authorization provided by their USSP, UAS operators confirm that they have selected the appropriate UAS type that satisfies the required U- space performance requirements.

## GM2 USP.OPS.201 UAS Capabilities and Performance Requirements

(a) Depending on the UAS capabilities and performance requirements specified for the U-SPACE airspace, not all UAS types are eligible to be operated. Technical support (e.g., providing technical characteristics of their products) provided by UAS manufacturers may be necessary in the evaluation of the UAS capabilities and performance requirements.

**MONITORING OF U-SPACE SERVICES**

(b) UAS operators should monitor, through a UAS flight, the availability of U-SPACE services, and the information that may affect safety, such as:

(1) changes in the U-SPACE airspace (e.g., dynamic airspace restriction or reconfiguration);

(2) changes to the flight authorization (e.g., withdrawal, modification);

(3) traffic information, and especially traffic which may represent a collision hazard;

(4) non-conformance, when provided.

(c) Accordingly, UAS operators should take appropriate action according to operational procedures and planned contingency measures.

**COMPLIANCE OF THE UAS FLIGHT**

(d) UAS operators should ensure consistency of the UAS configuration with the accepted flight authorization, and should conduct the UAS flight to stay within the authorized planned 4D volume for 95 % of the time.

**ACKNOWLEDGEMENT OF NON-CONFORMANCE**

(e) When relevant, UAS operators should acknowledge receipt of the notification that they are non-conforming by using the means provided by their USSP.

**U-SPACE SERVICES — UAS OPERATORS' INTERFACE**

(f) When UAS operators intend to develop their own user interface upon the technical means that may be provided by the USSP (e.g., application programming interface (API)), they should ensure that the implementation of the proprietary user interface continues to satisfy the U-SPACE performance requirements to which they contribute.

(g) In such case, UAS operators should liaise with their competent authority to ensure that the overall acceptable level of safety (ALS) is not compromised by the complementary development activities.

## GM3 USP.OPS.201 Guarantee as Regards the Level of Performance

(a) It is necessary for the UAS operator to be able to demonstrate that the required level of U-SPACE service performance can be achieved for the entire duration of the flight. This may take the form of a service level agreement (SLA) or any formal arrangement made between a service provider and the applicant on the relevant aspects of the U-SPACE services to be provided (including quality, availability, and responsibilities).

**USE OF U-SPACE SERVICES**

(b) Except for compensating for unavailability or degradation of U-SPACE services, for the purpose of data consistency and the provision of safe support to operations, it is recommended as best practice that UAS operators keep using the bundle of services of the same USSP throughout an activated UAS flight.

**MONITORING OF U-SPACE SERVICES**

(c) While it is assumed that the priority for UAS operators is to ensure the safe conduct of a flight, safety of operations relies on the capability of UAS operators to maintain their situational awareness. The information provided by U-SPACE services is meant to reach an acceptable level of safety within the U- space airspace, and needs to be adequately integrated throughout the operations.

(d) A loss of link with the USSP is a safety issue per se as it disconnects the UAS operator from the U-SPACE airspace, prevents it from maintaining situational awareness and eventually negatively impacts on the necessary decision-making to safely react to events that may dynamically happen.

(e) The necessary monitoring procedure (e.g., degree, regularity, etc.) may vary depending on the operational constraints, and the roles and responsibilities of UAS operators (e.g., 'hands-on', 'hands- off'), controls mock-up, etc.).

(f) U-SPACE services and information to the operator in charge of controlling or monitoring the UAS.

**U-SPACE SERVICES — UAS OPERATORS' INTERFACE**

(g) The inadequate implementation of the interfaces with, or the improper use of, the U-SPACE services may impair (e.g., by introducing latencies) the overall performance to an extent which may ultimately compromise the safety of operations within the U-SPACE airspace. It is expected that the user interface that could be privately developed by UAS operators guarantee the satisfaction of the performance requirements defined for the U-SPACE airspace (i.e., do not alter the performance) and the provision of U-SPACE service information, down to the human operator in charge of operating the UAS.

(h) Nevertheless, the responsibility of UAS operators is:

(1) limited to the continued satisfaction of the U-SPACE performance requirements to which they contribute, according to the intended system and UAS operators' user interface implementation;

(2) commensurate with the level of risk that may be introduced locally.

(i) The technical assessment could be conducted and completed through the specified activities.

## AMC2 USP-OPS.201 OPERATING INSTRUCTIONS

(a) UAS operators should handle the operation of the UAS flight as per the operating instructions established for the U-SPACE airspace and provided by the USSP.

(b) UAS operators should use the means at their disposal (e.g., built in the UAS and/or provided by the USSP) to declare an emergency when the UAS flight becomes non-compliant with the applicable U- space airspace operational conditions or constraints, or facing an event, to an extent which may result in hazards to other operations performed in the U-SPACE airspace.

(c) The operating instructions originate from the operational conditions and airspace constraints specified for the U-SPACE airspace, and further refined and complemented by the procedures elaborated by the other U-SPACE stakeholders (USSP, ANSP, etc.).

## USP.OPS.205 Contingency Measures and Procedures

(a) The UAS operators' contingency measures and procedures implemented when operating within U-SPACE Airspace Shall address at least the following conditions:

(1) sudden, total or partial unavailability of the U-SPACE airspace,

(2) restriction or revocation of the UAS flight authorization,

(3) unlawful interference,

(4) engine failure,

(5) loss of signal,

(6) loss of control,

(7) loss of payload,

(8) loss of power,

(9) loss of energy reserves,

(10) adverse weather conditions,

(11) foreign object debris (FOD),

(12) unidentified aircraft entering protected volume around the UAS,

(13) unavailability of landing area.

## GM5 USP.OPS.201 Contingency in Case of Degradation or A Loss of Services

(a) UAS operators may evaluate the degradation or the loss of the USSP services in the context of their operations in the U-SPACE airspace and establish appropriate contingency measures against the resulting hazards.

(b) A hazard assessment should consider:

(1) the impact and severity of the hazards on own operations;

(2) the impact and severity of the hazards on other nearby operations;

(3) the operational environment;

(4) other additional operational mitigation measures, if applicable.

(c) UAS operators should provide USSP with actions to be taken in the event of a loss or degradation of the U-SPACE services which could result in an overall reduction of safety or pose a risk to nearby U- space operations, and action would be required to be taken by another UAS operator. These actions may be contained within an operator's contingency plan. UAS operators should ensure the effective coverage of the contingency measures in case of degradation or loss of USSP services, especially for services used in flight such as:

(1) the inability to receive information on dynamic airspace reconfiguration and/or modifications to the UAS flight authorization;

(2) a loss of availability of traffic information data;

(3) sharing of contingencies (as applicable).

## AMC1 USP.OPS.210 USSP–UAS OPERATOR INTERFACES

(a) The USSP should provide UAS operators with interfaces, together with the U-SPACE services. The interfaces and functionalities should at least allow UAS operators to:

(1) properly use the U-SPACE services;

(2) be provided with the operational instructions applying to the U-SPACE airspace;

(3) get access to the UAS operator's operational records;

(4) declare a contingency or an emergency;

(5) acknowledge any non-conformance, when the conformance monitoring service is required.

(b) The USSP should ensure that the information that may affect safety is efficiently conveyed transmitted to UAS operators, allowing them to take the necessary, appropriate actions to ensure safety in a timely manner.

(c) Accordingly, the USSP should:

(1) identify the information that supports safety, and requires immediate UAS operator awareness;

(2) reduce the risk of missing the information that supports safety by deploying means to ensure that the attention of UAS operators will be appropriately attracted.

(d) The USSP should inform without undue delay its UAS operators, other USSP within the same U-SPACE airspace, and ANSP when necessary, about the degradation of its services (including degradation that results from the unavailability of CIS organisations or ANSP).

(e) The degradation of USSP services should be supported by procedures or contingency measures to be jointly established with UAS operators.

(f) The USSP should develop and provide UAS operators with instructions on how to conduct operations within the U-SPACE airspace. The operating instructions should encompass:

(1) the transcription of the operational conditions and airspace constraints that originate from the U-SPACE airspace risk assessment;

(2) a user guide documenting how UAS operators should configure and use USSP services;

(3) when the services are provided through an API, the user guide should also contain the technical instructions and requirements to the UAS operators to ensure the continued satisfaction of the performance requirements and overall safety;

(4) recommendations ensuring the security of the exchange;

(5) the normal, contingency, and emergency procedures related to U-SPACE services, to be applied by UAS operators.

## GM2 USP.OPS.210 Connectivity

(a) The U-SPACE is a connected environment. A connected environment refers to any digital connection that meets the requirements established by the USSP for the provision of the U-SPACE services in question. A connected environment is not restricted to internet-based connectivity, although the vast majority of connections between a USSP and a UAS operator are expected to be internet based.

(b) Therefore:

(1) U-SPACE information is exchanged in a machine-readable format to support the necessary exchange of data among the U-SPACE actors concerned; and

(2) operations in the U-SPACE airspace require the UAS operator to establish a connection to a USSP.

(c) The USSP may have various means to develop and provide UAS interfaces, such as interfaces relying on mobile, web or PC applications, and/or application programming interfaces (API). The solution retained is expected to ensure that the performance requirements are met, and the availability of the services is ensured.

(d) The UAS operator should establish a digital connection to the USSP whenever the provision of U-SPACE services is required to support operations in U-SPACE airspace.

## GM3 USP.OPS.210 Conditions That Require Immediate Awareness

(a) Safety-critical information, which may require the UAS operators' immediate awareness, may concern the following:

(1) degradation of services;

(2) changes in the configuration of the U-SPACE airspace (e.g., dynamic airspace restriction or reconfiguration);

(3) changes in the flight authorization;

(4) new emergency in the proximity of the UAS flight;

(5) non-conformance, when relevant for the U-SPACE airspace;

(6) incoming manned traffic which may eventually result in a conflict with the UAS flight trajectory;

(7) infringement of the UAS flight authorization;

(8) detection of rogue traffic in the proximity or within the volume where the UAS flight is performed.

## GM4 USP.OPS.210 Alerting Means

(a) Safety relies on the timely reaction of UAS operators to situational changes that may dynamically occur in the U-SPACE airspace throughout the UAS flight. Inappropriate UAS operator reaction due to a lack of sufficient awareness may ultimately compromise safety. Moreover, UAS operations require UAS operators to additionally manage operational information than just strict UAS flight data. In some conditions, especially where high workload is involved, UAS operators may have limited capability to focus their attention on monitoring U-SPACE services in order to detect new relevant information.

(b) Regardless of being served by the USSP through a separate user interface/application or through direct application programming interface (API), UAS operators need to be clearly alerted to new, safety-critical information during all phases of flight (flight preparation, preflight, in flight and postflight).

(c) To effectively attract the attention of UAS operators, the USSP may either implement or provide the supporting means of various techniques such as:

(1) visual annunciations (e.g., flashing red),

(2) aural annunciations (e.g., sounds or voice),

(3) telephony voice messages,

(4) telephony text messages, coupled with haptic sense.

(d) It is recommended as best practice that the USSP disseminate the information on the degradation of its services within 30 seconds.

(e) It is recommended as best practice that USSP provide UAS operators with a method to access a copy of their data related to the U-SPACE services (e.g., history of the flight authorizations as well as non-normal conditions). Any requested piece or set of data should be electronically exported and provided to the UAS operators in a machine-readable format.

## AMC 2 UAS-OPS.210 DATA INTEGRITY AND QUALITY

(a) USSP should ensure for the data they are required to collect and distribute that:

(1) they do not alter the information, and preserve the integrity of the information received;

(2) they take appropriate measures to maintain the completeness, accuracy, resolution, traceability, timeliness, and logical consistency of the data.

(b) USSP should inform the contracted CIS organisation (if designated) and other USSP that operate in the same U-SPACE airspace as soon as practically possible of any detected availability or quality issues with the data received.

## AMC 3 UAS-OPS.210 DATA EXCHANGE AMONG USSP

(a) A USSP should exchange and consolidate the following information with other USSP that share the same U-SPACE airspace:

(1) UAS remote identification, through the network information service, to support the continuous consolidation of traffic information.

(2) The status of the UAS flight authorizations to ensure the continuous synchronization of the authorizations within the U-SPACE airspace and adequate deconfliction.

(3) Traffic information, including e-conspicuous manned aircraft, when duly agreed among the USSP.

(4) Non-conformance alerts trigged by their UAS operators.

(5) Notification of the degradation of their services.

(6) Contingencies and emergencies of their UAS operators.

(7) Other information as required by and/or as agreed among the USSP, which may be necessary to ensure interoperability in the U-SPACE airspace.

(b) The exchange of information among the USSP should conform to the requirements of Annex A to EUROCONTROL 'Specification for SWIM Technical Infrastructure (TI) Yellow Profile', edition 1.1, published on 5 July 2020.

(c) USSP should document the services that facilitate the exchange of information, as well as the related services regarding the safe provision of services, and should adhere to EUROCONTROL 'Specification for SWIM Service Description (SD)', edition 2.0, published on 15 March 2022.

## USP.OPS.220 Network Identification Service

(a) USSP shall provide the UAS network remote identification in the geographic proximity of UAS operations that are supported by the provision of their services.

(b) The network identification service shall allow for the authorized users to receive messages with the following content:

(1) the UAS operator registration number;

(2) the unique serial number of the unmanned aircraft or, if the unmanned aircraft is privately built, the unique serial number of the add-on;

(3) the geographical position of the UAS, its altitude above mean sea level and its height above the surface or take-off point;

(4) the route course measured clockwise from true north and the ground speed of the UAS;

(5) the geographical position of the remote pilot or, if not available, the take-off point;

(6) the emergency status of the UAS;

(7) the time at which the messages were generated.

(c) The information provided by the network identification services shall be updated at a frequency that the competent authority has determined.

(d) The authorized users shall be:

(1) The Competent Authority;

(2) other USSP in order to ensure the safety of operations in the U-SPACE airspace;

(3) the ANSP concerned;

(4) when contracted by the USSP, the common information service organisations;

(5) The state authorities.

(e) USSP shall exchange network remote identification data with all the service providers that share the same U-SPACE airspace. The resulting aggregated data shall cover all available network remote identification data in the U-SPACE airspace concerned.

(f) USSP shall demonstrate a response time for distributing data received from the UAS, or from other service providers, which is smaller than the latency necessary for the proper functioning of the traffic information service, for at least 99 % of the time.

(g) The network identification service shall:

(1) be available throughout the duration of the flight, starting as soon as the flight authorization is activated;

(2) not be required when the operator ceases the flight, independently of the time limit approved in the flight authorization.

## GM1 USP.OPS.220

(a) The network identification service provides the registration number of a UAS operator, the serial number of an unmanned aircraft, and live flight data of the UAS. It enables the sharing of information with any of the authorized users. Authorized users will be made aware of the geographical position, route course and emergency status, flight level, and type of the UAS, among other data elements. Based on the information provided by the UAS operators, USSP share and consolidate UAS flight data among themselves and can, therefore, support traffic information when needed.

(b) The network identification service supports operational needs and the traceability of unmanned aircraft during flight.

(c) Detailed and accurate information about the latency necessary for the proper functioning of the traffic information service may be assessed and defined during the U-SPACE airspace risk assessment.

(d) USSP should provide the authorized users with access to aggregated network remote identification data using the communication protocol defined in ***Annex 4 to ASTM F3411-22A 'Standard Specification for Remote ID and Tracking'***.

(e) USSP should convert the heights above the WGS 84 ellipsoid exchanged with the ***ASTM F-3411-22A*** standard to height above mean sea level (MSL) before providing it to the UAS operators.

## AMC1 USP.OPS.220 ALTITUDE ABOVE MEAN SEA LEVEL

(a) Due to the fact that the altitude above mean sea level (AMSL) calculated from the measured value of the barometric sensor and the QNH, cannot be compared to the calculated value of the altitude AMSL using the GNSS systems, it is recommended to exchange the altitude values in relation to the WGS 84 ellipsoid between U-SPACE systems.

(b) Wherever the flight altitude above sea level is required to be determined with the use of GNSS systems, it is recommended to use the EGM2008 or at least the EGM96 geoid models as the definition of mean sea level, as agreed with the competent authority.

## AMC2 USP.OPS.220 UAS EMERGENCY STATUS

(a) Certain UAS capabilities may not be available from the date on which this Regulation will become applicable. Regarding the identification of the UAS emergency status, and to compensate for the potential lack of automatic transmission of the information, it is considered an acceptable alternative for UAS operators to:

(1) continuously monitor the UAS behavior, and when implemented, the built-in safety parameters or emergency status;

(2) Manually trigger the UAS emergency status toward the USSP.

## USP.OPS.230 Geo-Awareness Service

(a) A geo-awareness service consisting of the following geo-awareness information shall be provided to UAS operators:

(1) information on the applicable operational conditions and airspace constraints within the U-SPACE airspace;

(2) UAS geographical zones, relevant to the U-SPACE airspace;

(3) temporary restrictions applicable to airspace use within the U-SPACE airspace.

(b) USSP shall dispatch the geo-awareness information in a timely manner to allow contingencies and emergencies to be addressed by UAS operators, and shall include its time of update together with a version number or a valid time, or both.

## GM1 USP.OPS.230

(a) This service aims to support UAS operators in fulfilling their obligations, as it provides the necessary information on applicable operational conditions and airspace constraints with the level of accuracy and other performance requirements for which it has been certified.

(b) The geo-awareness service is used by the UAS flight authorization service as a source of data to inform UAS operators of relevant operational constraints and changes both prior to and during the flight.

## AMC1 UAS.OPS.230 INFORMATION TIMELINESS

(a) USSP should ensure the timeliness and availability of the geo-awareness information provided to UAS operators.

(b) USSP should process and make geo-awareness data available to UAS operators based on the data's update cycle and criticality level, but no later than its applicability dates and times.

(c) The table below illustrates the scenarios and values USSP may consider for the implementation of the geo-awareness service:

| Data type | CIS update cycle | Geo-awareness service update |
|---|---|---|
| Static geographical zone | Based on the aeronautical information regulation and control (AIRAC) cycle | Daily |
| Planned dynamic airspace restriction or limitation | Several times a day | Every 30 minutes |
| Unplanned dynamic airspace reconfiguration | Upon ANSP request | Within 5 seconds |

## USP.OPS.240 UAS Flight Authorisation service

(a) The USSP shall provide UAS operators with the UAS flight authorization for each individual flight within the area of responsibility of the USSP setting the terms and conditions of that flight, through a UAS flight authorization service.

(b) For areas that are not designated as U-SPACE airspace, UAS operators shall obtain an operational approval from the competent authority in accordance with CAR UAC – UAC.025

(c) In the event where the USSP requires request a NOTAM for UAS operations within their area of responsibility, the USSP Shall provide the relevant ANSP with the flight authorization number of the UAS operation to issue the NOTAM via the UAE international NOTAM office

(d) The relevant ANSP when requesting NOTAMS for UAS operations outside of U-SPACE airspace, shall provide the UAE international NOTAM office with the GCAA UAS airspace approval issued for the intended UAS operation

(e) Where USSP receive from the UAS operator an UAS flight authorization request, they shall:

(1) check if the UAS flight authorization request is complete and correct and submitted;

(2) accept the UAS flight authorization request if the flight under the UAS flight authorization is free of intersection in space and time with any other notified UAS flight authorizations within the same U-SPACE airspace in accordance with the priority rules set out in paragraph (h);

(3) notify the UAS operator about the acceptance or rejection of the UAS flight authorization request;

(4) when notifying the UAS operator about the acceptance of the UAS flight authorization request, indicate the allowed UAS flight authorization deviation thresholds.

(f) When issuing a UAS flight authorization, the USSP shall use, where applicable, weather information provided by the weather information service.

(g) Where USSP are unable to grant an UAS flight authorization in accordance with the UAS operator's request, USSP may propose an alternative UAS flight authorization to the UAS operator.

(h) Upon receiving the request for an UAS flight authorization activation, the USSP shall confirm the activation of the UAS flight authorization without unjustified delay.

(i) USSP shall establish proper arrangements to resolve conflicting UAS flight authorization requests received from UAS operators by different U-SPACE services providers.

(j) USSP shall check the request for UAS flight authorizations against U-SPACE airspace restrictions and temporary airspace limitations.

(k) When processing UAS flight authorization requests, the USSP shall give priority to UAS conducting special operations:

(1) police and customs missions;

(2) traffic surveillance and pursuit missions;

(3) environmental control missions conducted by, or on behalf of public authorities;

(4) search and rescue;

(5) medical flights;

(6) evacuations;

(7) firefighting;

(8) exemptions required to ensure the security of state aircrafts.

(l) When two UAS flight authorizations requests have the same priority, they shall be processed on a first come first served basis.

(m) USSP shall continuously check existing flight authorizations against new dynamic airspace restrictions and limitations, and information about manned aircraft traffic shared by relevant air traffic service units, in particular regarding manned aircraft known or believed to be in a state of emergency, including being subjected to unlawful interference, and update or withdraw authorizations as may be necessitated by the circumstances.

(n) USSP shall issue a unique authorization number for each UAS flight authorization. This number shall enable the identification of the authorized flight, the UAS operator and the U-SPACE service provider issuing the UAS flight authorization.

## GM 1 UAS.OPS.240 General

(a) The UAS flight authorization service provides authorizations to UAS operators for each individual flight based on other notified flight requests that may conflict with other unmanned operations within the same U-SPACE airspace. It is a strategic deconfliction tool. The UAS flight authorization service is provided to a UAS operator under the condition that it has submitted the UAS flight authorization request before the flight.

(b) The UAS flight authorization service should be able to handle flight authorization requests by UAS operators for single flights and for a number of repetitive flights that are conducted consecutively on the same route.

(c) The service informs operators of overlaps with any airspace restrictions provided by the geo-awareness service. UAS flight authorizations in 4D volume may be used by the conformance monitoring service.

(d) This service is also a way for UAS operators to announce their intent to start their operations by activating their UAS flight authorization. The activation of a flight initiates the provision of tactical services (like traffic information, network and remote identification or conformance monitoring) when required. The subsequent ending of the flight stops the provision of these services.

(e) This service is mandatory in U-SPACE airspace designated in any airspace (controlled or not) and applies to UAS operators. This service enforces the prioritization rules. When there is more than one USSP providing U-SPACE services in a U-SPACE airspace, all USSP should exchange the UAS flight authorization requests among themselves as well as state the changes to those requests — i.e., 'Accepted', 'Activated', 'Withdrawn', 'Ended'.

(f) The information required to process a flight authorization is provided by the UAS operators (flight authorization request), other USSP (other accepted flight authorizations, traffic information), and the CIS (e.g., temporary restrictions, manned traffic information). The contracted CIS organisation has no coordination role and no other responsibilities than to ensure the provision of a subset of information that supports the flight authorization process.

## AMC 1 UAS.OPS.240 UAS Flight Authorisation Records

(a) USSP should keep records of:

(1) all UAS flight authorizations, including:

(i) the data submitted by the UAS operator;

(ii) the time of receipt of the requests;

(iii) when accepted, the unique authorization number, and the associated terms and conditions;

(2) UAS flight authorization requests that are rejected, including the reason for rejection.

(b) The USSP should keep the records for a period of 5 years.

## AMC 2 UAS.OPS.240 UAS Terms and Conditions

(a) The USSP should include in the terms and conditions of a flight authorization:

(1) a reminder clause about the applicable conditions and airspace constraints;

(2) the technical requirements, such as the necessary UAS performance requirements;

(3) when relevant, a list of any permissions that are required for a flight to enter restricted airspace (e.g., limited-access geographical zones);

(4) instructions detailing how to handle the flight authorization and activation requests and constraints, such as the time frame for flight activation or deactivation.

## GM 2 UAS.OPS.240 UAS Flight Authorisation Process

(a) The UAS flight authorization service is a conflict resolution mechanism and authorizes flights that are free of intersection with other flight authorizations.

(b) The UAS flight authorization request describes the flight trajectory as a series of one or more 4D volumes expressed in height (base, ceiling), longitudinal and lateral limits, and duration (entry and exit times). Each dimension includes the uncertainties of the flight, e.g., earliest possible entry, latest possible exit.

(c) The detection of conflict is performed considering the planned 4D trajectories of the flights with the deviation thresholds added.

(d) The flight authorization service ensures that the trajectory does not conflict with a no-fly zone and warns if the flight enters a restricted area.

(e) The UAS flight authorization service describes a 4D trajectory typically in terms of height, length, width, and duration, and ensures that the trajectory does not conflict with a no-fly zone.

(f) The performance required is primarily driven by considering separation assurance and collision avoidance.

## AMC 3 USP.OPS.240 UAS FLIGHT AUTHORISATION REQUEST

(a) The USSP should verify that the UAS flight authorization is complete, correct, and free of intersection, and only accept the UAS flight authorization request when all the following conditions are satisfied:

(b) When the flight authorization request is made within the allowed time frame.

(c) The maximum capacity and density of UAS flights in the U-SPACE airspace is not yet

reached.

(d) The UAS registration number provided by the UAS operator can be retrieved and validated from the operator's information provided by the Competent Authority (UAS Operator Registration).

(e) The UAS flight is compatible with the U-SPACE airspace restrictions and temporary airspace limitations.

(f) The UAS flight does not intersect with a prohibited (no-fly) geographical zone.

(g) The 4D trajectory of the UAS flight, with the deviation threshold added, is free of any intersection with a previously authorized request.

(h) The contingency/emergency measures detailed in the flight authorization request is free of any intersection with a previously authorized request.

(i) When a UAS flight is planned outside the boundaries of the U-SPACE airspace or in a restricted access geographical zone, the USSP may accept the flight authorization but should provide beforehand a clear notification to the UAS operator, and should list in the terms and conditions the related airspace restrictions, specific entry permissions and requirements.

(j) Once the UAS operator confirms it has been granted the relevant permissions to perform its flight, the USSP should accept the flight authorization request.

(k) A USSP that rejects a UAS flight authorization request should indicate the reason(s) for the rejection to the UAS operator concerned.

## AMC 4 USP.OPS.240 ACTIVATION OF UAS FLIGHT AUTHORISATION

(a) The USSP should make a final check of the flight authorization and should confirm the UAS flight authorization activation without delay when the following conditions are satisfied:

(1) The UAS operator has accepted the terms and conditions associated to the flight authorization.

(2) The UAS flight authorization is activated within the allowed time frame, when specified.

(3) The U-SPACE airspace is not subject to dynamic airspace reconfiguration, and the UAS flight remains compatible with the U-SPACE airspace restrictions and temporary airspace limitations.

(4) The planned UAS flight is compatible with the current weather maxima or minima, when relevant.

(5) The UAS flight authorization does not intersect with another UAS flight authorization that has a higher priority (e.g., UAS conducting special operations).

(6) In the proximity of the UAS flight, there are no:

(i) manned aircraft in a state of emergency;

(ii) cooperative but non-conforming drones, or non-cooperative drones (when their detection is possible);

(iii) e-conspicuous manned aircraft intersecting the planned UAS trajectory.

(b) When the UAS flight authorization cannot be activated, the USSP should indicate the reason(s) to the UAS operator and may propose an alternative.

## GM 4 USP.OPS.240 Activation Request

(a) It is acknowledged that depending on the implementation of the flight authorization service and the situation in the U-SPACE airspace, the flight authorization may have been withdrawn. Nevertheless, a final consolidation and check of the accepted flight authorization against the U-space airspace constraints, conditions, and environment are expected to be performed to ensure the safety of operations.

(b) The activation request is expected close to the start of the flight mentioned in the UAS flight authorization.

(c) The activation of the flight authorization triggers the provision of the network identification and traffic information services and, when applicable, the conformance monitoring service. The activation request should enable the provision of these services.

(d) When the USSP receives the activation request, it rechecks the flight authorization request. If the flight authorization request has been withdrawn because it has been found to be in conflict with a higher-priority flight authorization request or a manned aircraft known or believed to be in a state of emergency, then the USSP should respond negatively to the activation request.

(e) If no activation request is received for a flight, the USSP should withdraw the flight authorization after the time indicated in the flight authorization request as the latest possible start time of the flight plus any deviation threshold with units of time. The USSP may warn the UAS operator before doing this.

## AMC 5 USP.OPS.240 UAS FLIGHT AUTHORISATION EXCHANGE AND CONFLICT REQUESTS

(a) To prevent conflicting UAS flights, the USSP should:

(1) make the necessary arrangements with other USSP to allow for the rapid, reliable, robust and unequivocal identification of conflicts between any UAS flight authorization requests;

(2) ensure constant synchronization of the flight authorizations within the U-SPACE they share, in exchanging the UAS flight authorization requests among themselves as well as stating changes to those requests — ‘Accepted’, ‘Activated’, ‘Withdrawn’, ‘Ended’.

## AMC 6 USP.OPS.240 AIRSPACE RESTRICTIONS AND LIMITATIONS

(a) The USSP should:

(1) when authorizing a flight request, use the set of current airspace restriction data coming from the CIS (and the associated geo-awareness service);

(2) check whether there are any entry permission or technical requirements due to any airspace restrictions relevant to the flight, taking into account the flight's 4D trajectory including any deviation thresholds;

(3) list the airspace restrictions as well as the specific entry permission and technical requirements in the terms and conditions provided with the flight authorization request.

## GM 6 USP.OPS.240 (a) UAS Flight Priority

(a) A new flight authorization request cannot override a previously approved flight authorization of the same priority. To reduce the number of cases where two conflicting flights authorization requests arrive before the approval of either of them has finished, the time required to approve a flight authorization request by means of 'proper arrangements' should be as short as practically possible. When two or more conflicting flight authorization requests are received so close in time that their processing has not finished when the other(s) is (are) received, then there should be no systematic advantage to a given USSP or a given UAS operator.

(b) The result should be one of the following:

(1) the first flight authorization request received by any USSP is approved;

(2) neither/none flight authorization request is approved;

(3) any one flight authorization request at random is approved.

(c) It is not possible to change an already authorized flight so that it conflicts with another authorized flight of the same priority or higher. Any change causing a conflict will be rejected, and the original, unchanged flight authorization should remain valid.

(d) In airspace where the operation of manned aircraft not subject to air traffic control by the ANSP takes place, the USSP should consider the presence of electronically conspicuous manned aircraft and should:

(1) update or withdraw the flight authorizations, as may be necessary, if the manned aircraft is or is believed to be in a state of emergency;

(2) suggest to UAS operators the update of the flight authorization when the manned aircraft trajectory intersects with the planned UAS 4D trajectory to enhance continued separation.

## GM 6 USP.OPS.240 (b) Update or withdrawal of a flight authorisation

(a) USSP may provide an updated, active UAS flight authorization at the request of the UAS operator at any time provided that by doing so no new conflicts are produced. For example, a USSP may update a UAS flight authorization at any point in space to assist in avoiding man oeuvres (e.g., holding or hovering) without the flight being considered non-conforming.

(b) When a USSP becomes aware that an existing flight authorization is impacted by a new dynamic airspace restriction/limitation or that an existing flight authorization is considered to be at risk from manned aircraft traffic due to information shared by the relevant air traffic service units, or information incoming from a (non-cooperative) drone detection system, then the USSP

should either alert the UAS operator and provide it with an updated UAS flight authorization to resolve the conflict or withdraw the existing UAS flight authorization. The USSP should request the UAS operator to acknowledge any change in the UAS flight authorization.

(c) Ending an active flight is a UAS operator action, and it is not expected to be automatically performed by the USSP. Ending an active flight terminates the provision of 'tactical' services, such as network identification, traffic information, and conformance monitoring services. The USSP should warn a UAS operator if it has not ended the flight and the time limit of the flight authorization has passed.

(d) The USSP may withdraw a flight authorization prior to flight activation.

## AMC 7 USP.OPS.240 UNIQUE AUTHORISATION NUMBER

(a) When authorizing a flight, the USSP should issue a flight authorization number that is unique throughout the duration that the authorization is expected to be referred to, including after flight. This period should be at least 2 years.

(b) Each USSP should ensure that the probability of issuing an authorization number that is the same with that issued by another USSP within the geographic scope of the U-SPACE implementation is lower than once in 2 years and preferably lower than once in 10 years.

(c) USSP should agree on, and ensure through dedicated arrangements, the robustness of the mechanism ensuring the uniqueness of flight authorization numbers.

## GM 7 USP.OPS.240 Unique Authorisation Number

(a) The purpose of a unique authorization number is to support the identification of a UAS operation during all its phases, including postflight. It provides an identifier for each UAS flight which is, as far as possible, unique across the U-SPACE implementation and unique in a given time period, for at least 2 years and preferably for more than 10 years.

(b) The UAS operator should refer to the flight by its unique authorization number in any subsequent communication with the USSP regarding that flight. It might include activation, ending, update, or cancellation. The USSP too should refer to the flight by its unique authorization number in any communication with the UAS operator, for example in case of authorization withdrawal.

(c) A Variant 1 Version 4 or Version 5 universally unique identifier (UUID) is considered a sufficiently unique flight authorization number. In case Version 5 is used, the USSP should have a unique identifier and that identifier should be made known to the competent authority as part of the certification process of the USSP.

(1) The **"Universally unique identifier"**, or UUID, was designed to provide a consistent format for any unique ID used for data. UUIDs address the problem of generating a unique ID - either randomly, or using some data as a seed.

(2) A UUID (Universally Unique Identifier) is a 128-bit value used to uniquely identify objects

or entities in computer systems. It is a random number generated using specific algorithms, and it is typically represented as a sequence of alphanumeric characters.

(3) On the other hand, a 24-bit aircraft code, also known as a 24-bit address or Mode S address, is a unique identifier assigned to an aircraft for communication and surveillance purposes. It is a 24-bit binary value that is transmitted by the aircraft's transponder.

(4) The main difference between a UUID and a 24-bit aircraft code is their purpose and format. A UUID is a general-purpose identifier used in various computer systems, while a 24-bit aircraft code is specific to aviation and is used for aircraft identification in air traffic management and surveillance systems.

(d) Updates to a UAS flight authorization should not result in a change to the unique authorization number.

## AMC 8 USP-OPS.240 UAS FLIGHT AUTHORISATION

(a) The UAS operator should activate the UAS flight authorization before the take-off, and end it as soon as possible after landing.

(b) In case of operations that involve multiple take-offs and landings, the UAS flight authorization should be activated once before the first take-off, and should be ended only after the last landing.

(c) UAS operators should plan the UAS flight to stay within a planned 4D volume. Flying outside the planned 4D volume is to be an exceptional event for less than 5 % of the time. The size of the volume should allow for gusts of wind and other likely sources that could cause deviation.

(d) When UAS operators do not consider it possible to appropriately perform the flight within the authorized, planned 4D volume, including the deviation threshold, for 95 % of the time (e.g., based on degraded environmental conditions, or operational constraints), they should replan their flight accordingly (e.g., extended boundaries) and request a new UAS flight authorization.

(e) UAS operators should describe their contingency measures and procedures within the contractual agreement with the USSP.

(f) In addition, UAS operators should detail for each flight in their flight authorization requests the planned contingency measures (e.g., alternative routes, emergency landing sites).

(g) To prevent risking safety in case of degradation or a loss of the USSP services during the operations, UAS operators should safely end any active UAS flight as soon as possible, except when they have duly demonstrated to their competent authority that the continuation of the operation will not pose a hazard to the other operations performed in the U-SPACE airspace.

## USP.OPS.250 U-SPACE Traffic Information service

(a) A traffic information service provided to the UAS operator shall contain information on any other

conspicuous air traffic, that may be in proximity to the position or intended route of the UAS flight.

(b) The traffic information service shall include information about manned aircraft and UAS traffic shared by other USSP and relevant air traffic service units.

(c) The traffic information service shall provide information about other known air traffic and shall:

(1) include the position, time of report as well as speed, heading or direction and emergency status of aircraft, when known;

(2) be updated at a frequency that the competent authority has determined.

(d) Upon receiving the traffic information services from the U-SPACE service provider, UAS operators shall take the relevant action to avoid any collision hazard.

## AMC 1 .OPS.250 U-SPACE Traffic information

(a) Traffic information should be complemented by information about manned aircraft traffic shared by the relevant air traffic service units and UAS traffic shared by USSP. This may include information from primary and secondary surveillance radars, multilateration surveillance systems and other surveillance or tracking systems already used by air traffic service units and USSP.

(b) The USSP should provide traffic information using any of the bellow methods:

(1) Voice communication (e.g., Via communication links between the U-SPACE coordinator and the UAS operator and or U-SPACE coordinator of a USSP to another USSP;

(2) Automated traffic information based on UTM system capabilities (e.g., Artificial intelligence, Detect and avoid deconfliction) and UTM system-based messaging system

(c) To effectively attract the attention of UAS operators, the USSP may either implement or provide the supporting means of various techniques such as:

(1) visual annunciations via the UTM systems (e.g., flashing red);

(2) aural annunciations (e.g., sounds or voice);

(3) telephony voice or text messages.

## GM1 USP.OPS.250 General

(a) The traffic information service provides information to UAS operators about other air traffic that is or may be present in close proximity to the position of their UAS and supports situational awareness.

(b) The traffic information service supports UAS operators in avoiding collisions with manned and unmanned traffic.

(c) The traffic information service supports concurrent access to U-SPACE airspace for a large number of UAS by providing UAS operators with useful information for the safe and efficient

conduct of their flights.

## GM2 USP.OPS.250 Responsibility

(a) UAS operators are ultimately responsible for the safety of their flights, for meeting the U-SPACE airspace operational constraints, and for ensuring separation or spacing from other manned and unmanned traffic.

(b) This responsibility cannot be transferred to USSP nor to ANSP. Neither is authorized to give instructions such as 'climb', 'hold', etc., to UAS operators; neither is charged with the responsibility to provide conflict resolution advisories, and neither is charged with the responsibility to separate unmanned aircraft from other traffic, other than the USSP that provide flight authorization services and ANSP that implement dynamic airspace reconfiguration.

(c) U-SPACE services support the effective decision-making of UAS operators by providing as soon as possible the relevant traffic information to the relevant UAS operators while protecting the integrity and confidentiality of the data originating from manned or unmanned aircraft.

(d) Traffic information is not common information, and the exchange of traffic information does not involve the contracted CIS organisation — except when ANSP provide the relevant traffic information regarding manned aircraft in U-SPACE airspace established in controlled airspace.

## AMC 1 USP.OPS.250 IDENTIFICATION

(a) USSP should:

(1) identify any known traffic in close proximity to the position or intended route of any active UAS flight under their responsibility, and provide in real time that information to the UAS operator; and

(2) report such traffic to the UAS operator in a timely manner.

(b) USSP should demonstrate a latency for distributing traffic information that is lower than 5 seconds for at least 99 % of the time.

## USP.OPS.260 Weather Information service

(a) When providing a weather information service, USSP shall:

(1) Collect weather data, provided by certified organisations by the competent authority, to maintain safety and support operational decisions of other U-SPACE services;

(2) provide the UAS operator with weather forecasts and actual weather information either before or during the flight.

(b) The weather information service shall include, as a minimum:

(1) wind direction measured clockwise through the true north and speed in meters per second,

including gusts;

(2) the height of the lowest broken or overcast layer in hundreds of feet above ground level;

(3) visibility in meters and kilometers;

(4) temperature and dew point;

(5) indicators of convective activity and precipitation;

(6) the location and time of the observation, or the valid times and locations of the forecast;

(7) appropriate QNH with geographical location of its applicability.

(c) USSP shall provide weather information that is up-to-date and reliable to support UAS operation.

## AMC 1 USP.OPS.260 Weather Information

(a) USSP should provide weather information that contains:

(1) the location of the observation or forecast using:

(i) the ICAO designator, where available; or

(ii) the geographic position expressed in the WGS 84 coordinate;

(2) the validity of the observation or forecast by specifying:

(i) the validity area/volume either via the ICAO designator and, where available, the WGS 84 position or WGS 84 area of validity; and

(ii) the time of the observation and/or the validity of the forecast in UTC time.

(b) Upon receipt of updated weather information related to current weather, the USSP should provide it to the UAS operator within maximum 30 seconds.

(c) Upon receipt of an updated weather forecast, the USSP should provide it to the UAS operator within maximum 5 minutes from the time the USSP starts processing the data.

(d) The USSP should inform the end user when the information is not up to date.

(e) The USSP should inform the end user of the source of the data at the request of the UAS operator.

(f) The USSP should provide a confidence level of the data being provided, where available, or indicate that the confidence level is unknown.

## GM1 USP.OPS.260 Weather Information

(a) It is the responsibility of the USSP to ensure that the data being consumed or referred to is the last available data set from the trusted source.

(b) The USSP is not responsible for ensuring that the data being exposed by the trusted source is

effectively the last available data. This responsibility lies with the trusted source.

(c) The reliability of the data pertains mostly to the security, availability, and status reporting to the end user. USSP should ensure that the UAS operator is presented with accurate information that has not been tampered with, and with information regarding the confidence level of the data where this is available at the source.

(d) When MET data is provided using the standard MET products (such as METAR or local aerodrome reports), the confidence levels are contained within the MET standards that define these products, as specified in ICAO Annex 3 'Meteorological Service for International Air Navigation'.

## AMC 2 USP.OPS.260 WEATHER INFORMATION

(a) The USSP may specify weather maxima or minima for important meteorological parameters as part of the U-SPACE airspace operational conditions and constraints. When weather maxima or minima exist, the weather information service is required for the U-SPACE airspace and the USSP should check the adequacy of the weather forecast with the specified weather maxima or minima when processing UAS flight authorization and activation requests.

## GM1 USP.OPS.260 Weather Information

(a) The USSP cross-checks the weather maxima and minima with the 'mode of operation' of the flight authorization request, such as:

(1) visibility requirements for VLOS or BVLOS with aerial observers;

(2) wind and temperature for all operations.

(b) USSP may support the planning of an acceptable alternative in suggesting the start time or change of path.

## AMC 3 UAS.OPS.260 Trusted Sources

(a) USSP should use weather data that comes from certified organisations by the competent authority.

(b) USSP should enable the identification of the source of the weather data in accordance with the contractual arrangements concluded with their UAS operators.

## GM1 UAS.OPS.260 GENERAL

(a) The USSP collects the weather information necessary to support UAS operational decisions in a specific U-SPACE airspace and supports the provision of other U-SPACE services, such as the UAS flight authorization service.

(b) It is recognized that the weather information service intended for UAS operations is different

from that provided by today's meteorological service providers. UAS may fly near buildings and in areas where current aeronautical meteorological information is not always provided. Therefore, AMC 2 UAS.OPS.260 specifies the minimum content of weather information to be available for the purpose of UAS operations. It does not exclude the possibility that current aeronautical meteorological service providers may also provide this service.

## USP.OPS.270 Conformance monitoring service

(a) A conformance monitoring service shall enable the UAS operators to verify whether they comply with the requirements set out in terms of the UAS flight authorization. To this end, this service shall alert the UAS operator when the flight authorization deviation thresholds are violated and when the requirements are not complied with.

(b) Where the conformance monitoring service detects a deviation from the flight authorization, the U-SPACE service provider shall alert the other UAS operators operating in the vicinity of the UAS concerned, other USSP offering services in the same airspace and relevant air traffic services units, which shall acknowledge the alert.

## GM1 USP.OPS.270 General

(a) USP.OPS.270 contains a general description of the objective of the conformance monitoring service, as well as the requirements for the USSP that provide such service. This service checks the current in-flight information of each UAS with respect to the actual progress of the UAS flight as reported by the UAS operator or obtained from the remote identification service. The monitoring is performed per UAS flight.

(b) When any non-conformance of the UAS flight is detected, the USSP alerts:

(1) the UAS operator of the flight for which the non-conformance is detected;

(2) other air traffic,

(3) other USSP;

(4) the contracted CIS organisation, where applicable; or

(5) other relevant authorities.

(c) The USSP that detects a non-conformance should:

(1) add the information on deviation in the traffic information message if an unmanned aircraft is non-compliant;

(2) alert the UAS operators whose unmanned aircraft fail to comply with their planned operation; and

(3) monitor all current flight operations of their subscribed UAS operators; all USSP have collective responsibility to dispatch relevant information to the UAS operators concerned.

## AMC 1 USP.OPS.270 Determination of Conformance

(a) The USSP should perform the following sequence:

(1) match the unmanned aircraft with a corresponding flight authorization(s);

(2) determine whether the unmanned aircraft is subject to an accepted and activated flight authorization;

(3) determine whether the unmanned aircraft complies with the deviation thresholds of the flight authorization;

(4) when possible, determine whether the unmanned aircraft complies with the requirements laid down in Section III, and the terms and conditions of the UAS flight authorization;

(b) When the UAS is detected to be non-conformant, the USSP should provide the details of the non-conformance in the alert.

(c) The USSP should consolidate the deviation with the flight authorization, and should confirm the non- conformance, when the UAS is outside the authorized 4D volume, including the deviation thresholds, for more than 5 % of the time as validated over time.

(d) The USSP should detect a non-conformance when a UAS flight:

(1) is performed without flight authorization or proper flight activation (i.e., accepted by the USSP);

(2) has not ended, and the time limit of the flight authorization has passed.

(e) To ensure safety of operations through the timely reaction of UAS operators, the USSP should alert UAS operators within 5 seconds, for 99 % of the time, when a non-conformance is detected.

(f) The USSP should issue a non-conformance alert to the relevant ANSP when a non-conformant unmanned aircraft is likely to represent a threat to manned aircraft in controlled airspace, i.e., the unmanned aircraft exits the U-SPACE airspace, or enters an area where the implementation of an airspace restriction or a dynamic reconfiguration is in progress.

## GM2 USP.OPS.270 Infringement

(a) When the UAS flight approaches the boundaries of the authorized 4D volume, a preliminary alert may be generated by the USSP to raise awareness of the UAS operator about the potential for infringement and non-conformance.

(b) A flight which remains airborne after the time limit of its flight authorization has passed may no longer be conflict free, and poses a hazard to other flights which conform with their flight authorizations. Therefore, a flight which has not ended by the time its flight authorization time limit has passed is non-conformant.

(c) The aim of the non-conformance notification is to provide information with regard to the specific position of the unmanned aircraft at the time it became non-conformant with respect to its flight authorization. The information about a non-conformant unmanned aircraft comprises the time, the position, and the number of non-conformant occurrences, each with an indication of deviation when possible.

## APPENDIX 1 – ATS airspace classes and U-SPACE – services provided

The purpose of this Appendix is to show the services related to U-SPACE airspace provided in each specific airspace class in a concise manner. Therefore, it does not provide any specifications additional to those already expressed in this Regulation and CAR-ASP-ASM.

Air traffic services provided by ANSP and requirements for IFR and VFR flights remain those expressed in CAR-ASP- PART – ASM SUBPART CAD Section 1 Airspace classification.

| Class | Type of flight (Aircraft) | Aircraft Allowed in U-SPACE airspace | Services in U-SPACE airspace by USSP |
|---|---|---|---|
| A | Manned IFR | N/A | N/A |
| | UAS (1) | No U-SPACE services – Segregated Operations only | |
| C and D | Manned IFR and VFR | N/A | N/A |
| | UAS (1) | No U-SPACE services – Segregated Operations only | |
| G | Manned IFR | Yes, subject to sharing position with USSP | Traffic information about UAS |
| | Manned VFR | Yes, subject to sharing position with USSP | |
| | UAS | Yes | UAS flight authorization<br>Traffic information about UAS, IFR and VFR |

(1) Except UAS flying according to Instrument Flight Rules.

## APPENDIX 2 – Airspace Risk Assessment – Checklist

(a) The following list is not exhaustive:

| Ground risks | |
|---|---|
| • Critical aerodrome areas<br>o ILS critical and sensitive areas, radar, etc. | |
| Populated areas | |
| • Boundaries of population density areas<br>o cities and suburbs | |
| • Boundaries of dynamic population density areas<br>o Recurring or one-off events and gatherings (concerts, stadiums, beaches, etc.) | |
| • Schools, hospitals, and other public buildings | |
| Physical infrastructure | |
| • Governmental installations | |
| • Prisons | |
| • Bridges and dams | |
| • Telecommunication and data centers | |
| • High-tension power lines and substations | |
| • Nuclear and conventional power stations | |
| • Chemical industry sites | |
| • Laboratories | |
| • Main roads, railway lines | |
| • Ports, harbors and waterways | |

| | |
|---|---|
| • Water treatment plants | |
| • Restricted, prohibited and danger areas | |
| • Summits and VIP protection | |
| Locations that could cause interference to a UAS flight | |
| • Electromagnetic wave emitting sites<br>o mobile phone base stations<br>o ground telecommunication sites<br>o TV and radio broadcast sites<br>o surveillance equipment sites | |
| • Solar panel and wind farms | |
| • Areas prone to inclement weather | |

| **Air risks** | |
|---|---|
| Generic airspace restrictions | |
| • ATS routes<br>o aerodrome traffic zone (ATZ); | |
| • Aerodrome areas<br>o control zones (CTR)<br>o control areas (CTA) | |
| • Manned-aviation restricted areas<br>o Temporary Restricted Area (TRA)<br>o Temporary Segregated Airspace (TSA)<br>o Mandatory Broadcast Zone (RMZ)<br>o Transponder Mandatory Zone (TMZ) | |
| Restricted airspace and no-drone zones | |
| Nature reserves and other noise-sensitive areas or environmentally sensitive areas | |
| Aerodrome operating hours, dimensions, and location | |

| | |
|---|---|
| Manned aircraft operations, locations, and most common routes | |

| | |
|---|---|
| Unmanned aircraft operations locations | |
| Heliports, Vertiports and aerodromes | |
| IFR operations | |
| • Arrival and departure routes | |
| • Transit routes | |
| • Radar vectoring areas | |
| • Altitudes | |
| VFR operations | |
| • VFR common routes and altitudes | |
| • Operations below 122 m (400 ft) | |
| • Low-altitude State operations | |
| Generic operations | |
| • High probability of manned or unmanned traffic | |
| • Gliders, microlights | |
| • Balloons | |
| • Seasonal or permanent recreational activities | |
| • Base jump, wing suits, kitesurfing, parachuting, parasailing, hang-gliders, paragliders, etc. | |

| State-specific operations | |
|---|---|
| • Police | |

| | |
|---|---|
| • Customs, border control | |
| • Firefighting | |
| • Military | |
| • Search and rescue | |
| • Maritime and fisheries surveillance | |
| • Operators of essential services | |

| **Communication, navigation and surveillance (CNS) — the advance identification of specific locations may be helpful to address potential CNS issues on UAS operations** | |
|---|---|
| Communication | |
| • VFR requirements, frequencies, radio, transaction expiration time (TET) | |
| • UAS COM interference, USSP–UAS link, USSP–RP, RP–USSP, e-conspicuity system | |
| • UAS COM and uncontrolled manned aircraft traffic (e-conspicuity) frequency availability, including coverage of 3/4/5G network | |
| Navigation | |
| • Navigation requirements and/or limitations (for U- space) | |
| • GNSS performance including outage reports and augmentation (GBAS, SBAS, etc.) availability | |
| Surveillance | |
| • Critical surveillance areas (coverage, etc.) | |
| • Available means of surveillance (ADS-B Out, SRD 860, mobile telephony (e.g., GNSS-LTE), etc.) | |

Non-exhaustive list of possible stakeholders involved in the airspace risk assessment process (in no restrictive order):

| National/State entities | Organisation | Contact Person |
|---|---|---|
| Competent authorities | | |
| ATM/ANS service providers (ANSP) | | |
| Air traffic controllers (ATCO) | | |
| Police and State security | | |
| Customs | | |
| Aviation entities | Organisation | Contact Person |
| Aerodrome operators | | |
| Airlines | | |
| Pilots (GA, IFR, emergency services) | | |
| Flight schools | | |
| UAS operators/pilots | | |
| USSP (USSP) | | |
| UAS manufacturers | | |
| Model aircraft clubs, airports associations and aviation-related associations | | |
| General aviation representatives (VFR) | | |
| **Non-aviation entities** | Organisation | Contact Person |
| Critical infrastructure (nuclear stations, etc.) | | |
| Industry | | |
| Local government | | |
| Hospitals | | |
| Education/schools | | |
| Road and rail transport | | |
| Ports and the maritime sector | | |
| Telecommunications and others that emit electromagnetic waves | | |
| Forestry and environmental protection (including non-governmental organisations (NGOs) | | |

## APPENDIX 3 – U-SPACE Coordinator Training and Competency Requirements

1. U-SPACE COORDINATOR QUALIFICATION

1.1. A person who wishes to act as a U-SPACE Coordinator in the United Arab Emirates shall be required to hold a valid U-SPACE Coordinator Certificate issued by a certified USSP organisations in the UAE

1.2. To be granted a U-SPACE Coordinator Certificate, the applicant shall satisfy the appropriate requirements for age, linguistic ability, physical and mental fitness and, unless holding an acceptable exempting qualification, meet the appropriate requirements for knowledge, experience, competence, and skill, as detailed in this appendix.

1.3. An applicant for initial issue of a U-SPACE Coordinator Certificate shall meet the following requirements:

1.3.1. Be not less than 18 years of age on application date;
1.3.2. Be assessed as being competent to be a U-SPACE Coordinator.

1.4. The USSP shall require the following evidence for the issue of a U-SPACE Coordinator Certificate:

1.4.1. Confirmation that the applicant has successfully completed the required training; or
1.4.2. A valid Certificate of Competence (CoC) as issued from a suitably Certified USSP where the U-SPACE coordinator was previously employed.

1.5. The USSP shall retain certificates for the period of operational employment plus 1 year.

2. U-SPACE COORDINATOR TRAINEE ELIGIBILITY REQUIREMENTS

2.1. To be eligible for U-SPACE Coordinator training a person shall:

2.1.1. be not less than 17 years of age;
2.1.2. have satisfactorily completed a training course, meeting the requirements of paragraph 1 above.

3. VALIDATION OF AN U- SPACE COORDINATOR CERTIFICATE

3.1. Before the trainee may be granted a U-SPACE Coordinator Certificate, the trainee shall undergo a minimum period of on-the-job validation training at the USSP for which the applicant seeks a U-SPACE Coordinator Certificate
3.2. A minimum of 10 hours of service provision under the supervision of a U-SPACE Coordinator holding a valid CoC shall be completed before the trainee can validate.
3.3. If the U-SPACE Coordinator trainee holds, or has held, validity at another USSP then, in consultation with the Competent Authority, the minimum validation training period may be reduced.

4. REQUIRED KNOWLEDGE, SKILLS AND EXPERIENCE

4.1. The knowledge required to be demonstrated by a U-SPACE Coordinator or trainee shall be at an appropriate standard for a holder of a U-SPACE Coordinator Certificate, and include at least the following subjects:

4.1.1. Air Law;
4.1.2. UAS operations
4.1.3. USSP Equipment;
4.1.4. General Aviation Knowledge;
4.1.5. SMS and Human Factors;
4.1.6. Emergency situations;
4.1.7. English Language Proficiency;
4.1.8. Meteorology;
4.1.9. Navigation.

4.2. The skill and competence required shall be demonstrated by:

4.2.1. Successful completion of an approved U-SPACE Coordinator training course; and
4.2.2. Being assessed as competent to provide a U-SPACE Coordinator at a particular USSP.

4.3. The Head of USSP Training is responsible for the issue of U-SPACE Coordinator Certificates.
4.4. The Head of USSP Training may issue a U-SPACE Coordinator certificate subject to such conditions as deemed appropriate to a person to act as a U-SPACE Coordinator, upon being satisfied that the applicant is a fit person to hold the U-SPACE Coordinator certificate and is qualified by reasons of knowledge, experience, competence, skills, physical and mental fitness, and attitude to so act.

4.5. To remain current the U-SPACE Coordinator shall perform a minimum of 2 operational duty shifts, during the previous 60 days on the U-SPACE Coordinator position appropriate to the CoC.

4.5.1. For U-SPACE Coordinator failing to satisfy the requirement for competence, competency may be ascertained by currency Check of not less than 2 hours under UAS traffic conditions permitting an evaluation of performance, carried out by a U-SPACE Coordinator holding a current U-SPACE Coordinator endorsement.

5. TRAINING RECORDS

5.1. Detailed training records shall be retained by the USSP to show that all training requirements have been met.

USSP shall maintain a system for recording the qualifications, training and assessment of instructional and examining staff. Training records shall be retained by the USSP for a minimum of five years after the U-SPACE Coordinator, Instructor or Examiner ceases employment at an USSP. Training Records shall be signed by the trainee and the instructor.

6. FAILURE TO MAINTAIN COMPETENCY

6.1. If, during the period between annual competence examinations, the Head of USSP Training becomes aware that the competence of a U-SPACE Coordinator is in doubt, the U-SPACE Coordinator shall be removed from duty and his CoC shall be withdrawn.
6.2. U-SPACE Coordinator whose CoC has been withdrawn shall not provide a U-SPACE Coordinator associated with that USSP except under the supervision of a certified U-SPACE Coordinator.