



Joint Authorities for Rulemaking of Unmanned Systems

JARUS OPS

Recommendations for Unmanned Aircraft Systems (UAS) Category B Operations

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Abstract			
<p>This JARUS OPS/B contains recommended rules for UAS operations in Category B (i.e. medium risk). The JARUS recommended proposed regulations support as necessary Competent Authorities harmonised UAS regulatory requirements and administrative procedures.</p> <p>The recommendations presented serve as a culmination of best practices and procedures used in JARUS Member States. Developed by experts in JARUS WG 2 and consolidated through internal and external consultation, JARUS WG 2 intends to continue developing proposals for Category C (i.e. high risk) and the present structure allows for ease of integration to this end.</p>			
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EXECUTIVE SUMMARY

Recommended requirements and administrative procedures for UAS Category B operations

The Joint Authorities for Rulemaking on Unmanned Systems, recommend the requirements contained in this JARUS-OPS/B for global harmonisation of rules concerning operations of Unmanned Aircraft Systems (UAS) in Category B ('Specific').

The scope provides material Competent Authorities may use to regulate the design, operation and maintenance of unmanned aircraft (UA) in this category, either remotely piloted or autonomous.

JARUS-OPS/B propose technical requirements and administrative procedures for civil use of UA covering three processes:

1. Registration and identification of UAS intended for civil use, having a mass of 250 grams or more;
2. Rules for operation and maintenance of UAS not included with ICAO SARPS:
Category B - UA (remotely piloted or autonomous) subject to a process of declaration or authorisation, based on a risk assessment;
3. Rules for UA to access airspace.

Category B always requires a risk assessment, either carried out by the Authority (i.e. 'standard scenario') or submitted by the operator, but neither mandatory certificate of airworthiness nor mandatory licence for the remote pilot.

Conversely, Category C is always subject to airworthiness certification, licensing of remote pilots and certification of the operator.

JARUS-ORG covers organisational requirements such as safety management, security, training requirements, subcontractor requirements and is not addressed within the scope of this document.

The UAS Operator may need to comply by these recommended rules in conjunction with other regulations (such as data protection and privacy laws) implemented by each Sovereign State.

The recommended rules may face urgent safety and security challenges, imposed by the proliferation of small UAS for civil applications. Regulation of small UAS also ensures compliance

with Article 8 of Chicago Convention, while improving harmonisation, enhancing the safety of the UAS industry at globally.

International UAS operations in Category B may be allowed through bilateral or regional agreements not included with ICAO SARPS.

The recommended rules in this document are in support of national & regional aviation authorities where they intend to establish technical requirements and administrative procedures relating to UAS operations.

1. Explanatory Note

1.1 Introduction

The Joint Authorities for Rulemaking on Unmanned Systems (JARUS) has established a working group, WG2, to develop recommended rules for operations (JARUS-OPS) of Unmanned Aircraft Systems (UAS) and related organisations (JARUS-ORG) involved in design, production, operations, maintenance and service provision. WG2 consists of representatives from JARUS 'Member States'.

This document, JARUS-OPS, from WG2 contains the recommended safety regulations for Category B operations (specific).

In March 2017, the JARUS Plenary agreed to launch a formal internal consultation of all JARUS members on draft Technical Requirements and Administrative Procedures for UAS Category A and B (JARUS-OPS/AB).

Any member of JARUS or the public may comment on this document. All received comments will be analysed and responded to by WG 2. WG 2 will report to the JARUS Plenary for final publication consideration.

This first draft of this JARUS-OPS Category B is based on the:

- a) progress of JARUS WG 7 for developing a categorization document and its Appendix A , whose details are not yet consolidated, but which:
 - I. Provide sufficient basis to create such document using Specific Operation Risk Assessment (SORA) methodology developed by JARUS WG 6.

In addition, emerging regulatory or relevant documents from JARUS Members or international organisations have been considered, such as:

- a) USA FAA Part 48 [3] which requires registration above 250 g;
- b) USA FAA Part 107 [4] which, although not using the JARUS semantics, establishes a limit of 55 lbs (i.e. 25 kg) for the equivalent of the JARUS A category;
- c) Communication 613 [5] of the European Commission of 07 December 2015 which proposes the regimes of declaration, authorisation and certification;
- d) EASA NPA 2017-05(a) on UAS Operations in the open and specific category [6];
- e) EUROCONTROL RPAS ATM concept v4.0 [7]; and
- f) EASA Opinion 01/2018 [17].

WG 2 reached a unanimous consensus on this draft JARUS-OPS Cat B which is submitted for public external consultation which will then be followed by the official release of the first edition of this JARUS-OPS Cat B, currently expected in 2019.

This document ultimately aims at providing recommendations for competent aviation authorities to adopt, in whole or part, as their own regulations, concerning harmonised technical requirements and administrative procedures for UAS in Category B. The recommendations presented in this JARUS-OPS Cat B document (with input from JARUS WG's 1,2,6 and 7) represent the culmination of best practices and procedures used prior to UAS rules at national level.

1.2 General Assumptions

1. The recommended rules are expected to face an urgent safety and security challenge, as imposed by proliferation of small UAS for civil applications in many States. Regulation of small UAS also ensures compliance with the second sentence of Article 8 of Chicago Convention (i.e. regulate UAS, even small and including model aircraft, to safeguard safety of international civil aviation), as well as improving harmonisation with a view of enhancing industry at global level, while maintaining adequate level of safety.
2. It is expected that UAS operators will be mandated to comply with three regulatory processes:
 - (1) Registration and identification;
 - (2) Declaration, authorisation or certification, as applicable, by NAA; and
 - (3) Rules and procedures, applicable in the State of the intended operation, for access to airspace, or coordination with the relevant service provider to enter international airspace.
3. In general, the UAS Operator will have to comply with rules applicable to safety of UAS operations in the State of the Operator and in the State where operations are planned and/or executed. In addition, the operator shall comply with applicable rules related to security, privacy, data protection, liability, insurance, traffic rights and environmental protection.
4. JARUS-ORG covers organisational requirements. These are not addressed within the scope of this document.
5. Recommended rules on the competence of remote pilots and other personnel are contained in JARUS-FCL.

6. Recommended rules for operations in UAS Category C, subject to airworthiness certification, licensing of remote pilots and certification of the operator, are addressed within the scope of JARUS-ORG and may be incorporated into future editions of this document.
7. Associations or clubs should continue operation of model aircraft, according to their long-established practices.
8. These recommended rules are performance-based and therefore technologically agnostic. Standards making bodies may develop new technical standards or recommend use of non-aviation standards applied in other segments of industry.

1.3 Assumption for Category A

These JARUS-OPS are based on the following main assumptions for Category A:

- a) Category A: remotely piloted aircraft not accompanied by a mandatory certificate of airworthiness of less than 25 kg maximum take-off mass (MTOM) and subject to proportionate operational limitations and requirements, but only to the administrative process of registration (if above 250 g);
- b) JARUS WG 7 [1] highlighted that States, if so wished, could further split Category A into subcategories. While this further split is not considered mandatory in [1], WG 7 is nevertheless developing a methodology which States wishing to adopt subcategories may use to define the thresholds between them;
- c) Today in the world there are different examples, among which:
 - (1) Category A in the USA based on Part 107 [4], relatively large but not further subdivided and subject to stringent limitations;
 - (2) 'Narrow' Category A as e.g. in South Africa [16], not further subdivided, but several Subcategories in category B;
 - (3) 'Wide' Category A, split into three Subcategories and five Classes, not yet adopted, but proposed by EASA in [17];
- d) In the absence of explicit guidance from WG 7, this document proposes to NAAs and stakeholders the table (3 Subcategories), in Annex I to the proposed rules, extensively discussed during the internal and external consultation, where:
 - (1) A1 Subcategory allows to fly over people;
 - (2) A2 Subcategory allows to fly close to people; and
 - (3) A3 Subcategory is limited to operations far from people.

- e) No mandatory direct involvement of aviation authorities to certify, licence or approve products, equipment, personnel or organisations in category A;
- f) Paragraph e) above does not exclude the possible involvement of the competent aviation authority for registration, assignment of identification codes, collection and analysis of safety information, information of personnel of enforcement agencies, education of the public and safety promotion;
- g) Airworthiness and information to consumers:
 - (1) No requirements on design and production organisations (which does not exclude voluntary accreditation according to industry standards; e.g. ISO 9000 for quality or else or ISO 21384-2);
 - (2) No mandatory requirements on initial or continuing airworthiness;
 - (3) Voluntary type certification or CofA at UAS level or E/TSO Authorisations [8] of equipment possible; in either case, continuing airworthiness requirements would apply to maintain validity of the approvals;
 - (4) In case of subparagraph (3) above, Certification Specifications (CS) developed by JARUS WG 3 could be used [9], [10];
 - (5) Possible requirements on safety of industrial products out of scope of WG 2, but possibly in the scope of WG 3;
 - (6) AMC to facilitate compliance with the rules, to be developed by standards making bodies, including Minimum Performance Specification for equipment [11].
 - (7) Mandatory information to consumer (e.g. through a leaflet accompanying the product or through electronic means) for any UAS.
- h) Operator, operations and maintenance:
 - (1) In Subcategories A2 and A3 the UAS is subject to a registration and identification process;
 - (2) Operational limitations are established by competent authorities;
 - (3) No declaration, authorisation or other form of permission is issued by competent authorities operators of Category A
 - (4) Operations Manual required when determined by competent authorities;
 - (5) Industry standards for design [12], production and maintenance possible;

- (6) Geo-awareness may be used as an advisory tool for supporting the UA to not trespass geographical limitations defined inside the airspace.
- i) Safety Management:
 - (1) Mandatory (MOR) and Voluntary Occurrence Reporting (VOR) [13] for Category B
 - (2) Mandatory (MOR) reporting in Category A only in certain instances.
 - j) Remote Pilot:
 - (1) No Remote Pilot Licence (RPL) issued by a competent authority for Category A;
 - (2) Remote Pilot awareness requirements for Subcategory A1, through the awareness leaflet provided by the manufacturer;
 - (3) Demonstration of theoretical knowledge required in Subcategories A2 and A3;
 - (4) Requirements for Remote Pilot Competence (RPC) or awareness requirements to be revised, as soon as additional guidance on the subject will have been developed by JARUS WG 1;
 - k) Airspace and ATM:
 - (1) “No Drone” (N), “Limited Drone (L)” zones and “Dedicated Routes” [7] possible;
 - (2) The geographical limits of such zones and other airspace structures to be defined by the State;
 - (3) No air traffic control services for VLOS operations in uncontrolled airspace;
 - (4) Special procedures to be coordinated between ATC and UAS operator for operations in controlled airspace when the UA is unable to follow routine ATM procedures due to insufficient equipment or insufficient performance;
 - (5) mandatory CNS functionality may be required depending on applicable airspace requirements;
 - (6) Appropriate geographical information available to the operator.
 - l) Service providers:
 - (1) Requirements on link performance, radio-frequency characteristics and spectrum for C2 link systems out of scope of WG 2 (ref. WG 5); and
 - (2) Responsibility of AIS providers (e.g. for “No Drone Zone”, operational data and information) and other UTM service providers, to be defined in JARUS-ORG.

m) Enforcement:

(1) Enforcement by local authorities (e.g. police) empowered by the State.

n) Insurance & Liability:

(1) Third party liability insurance under the responsibility of the operator may be required for Subcategory A2 and A3 operations in some States [14];

(2) Voluntary additional insurance (e.g. Loss of the Own Drone), as desired.

o) Privacy and Data Protection:

(1) Privacy and Data Protection requirements in States may vary, however operators must comply with requirements of the State of the Operator and the State where operations are planned or executed [15];

(2) No additional rules for Privacy and Data Protection are recommended by this JARUS-OPS document;

(3) States should inform users on Privacy and Data Protection through awareness campaigns or any other means;

(4) A Privacy Impact Assessment should be carried out when required by applicable rules.

p) Security:

(1) National security requirements in States may vary, however operators must comply with requirements of the State of the Operator and the State where operations are planned and/or executed;

(2) This JARUS-OPS contains specific rules for geo-limitation and electronic identification, which also contribute to security;

(3) Except as indicated in paragraph (2) there are no other recommendations for security of operations and of operators for Category A.

q) Promotion and Awareness:

(1) Promotion & awareness campaigns (e.g. web sites) are recommended, but out of scope of these JARUS recommended regulations which relate to regulation of operations;

(2) States or Regional Organisations may take voluntary initiatives.

1.4 Assumptions for Category B

- a) The scope and concept of JARUS-OPS contains recommended requirements for operations in Category B, which represents medium safety risk for society and therefore requires an operational risk assessment before being conducted.
- b) All UAS operating as Category B shall be registered including the Operator or Owner.
- c) Each operation in Category B will have a certain level of NAA involvement, based on either:
 - I. Self-declaration with standard scenarios; or
 - II. Authorization for one or a series of operations; or
 - III. Remote Operator Certificate (ROC).
- d) The operational risk assessment will identify the required mitigation measures, and associated level of robustness with any applicable operational limitations.
- e) An operation manual may be required by the outcome of the risk assessment.
- f) Based on paragraph 3.2.2 of ICAO Doc.10019, international operations in Category B may occur based on bilateral or multilateral agreements or common rules applicable on a regional level.

1.5 References

- [1] JARUS, JAR doc 09, RPAS Operational Categorization, Appendix A (under development on 31 July 2017)
- [2] JARUS, JAR doc 06, Specific Operations Risk Assessment (SORA) <http://jarus-rpas.org/content/jar-doc-06-sora-package>
- [3] Federal Aviation Administration (FAA), Registration and Marking Requirements for Small Unmanned Aircraft, Interim final rule of 14 December 2015, 14 CFR Parts 1, 45, 47, 48, 91, and 375
- [4] Federal Aviation Administration (FAA), 14 CFR Parts 21, 43, 45, 47, 61, 91, 101, 107, and 183
- [5] Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91
- [6] EASA Opinion 01/2018 of 06 February 2018: Introduction of a regulatory framework for the operation of drones — Unmanned aircraft system operations in the open and specific category
- [7] EUROCONTROL RPAS ATM concept v4.0
<http://www.eurocontrol.int/sites/default/files/publication/files/rpas-atm-cocept-of-operations-2017.pdf>
- [8] Subpart K in Commission Regulation (EU) No 748/2012 of 3 August 2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations
- [9] JARUS, JAR doc 01, Certification Specification for Light Unmanned Rotorcraft Systems
- [10] JARUS, JAR doc 05, Certification Specification for Light Unmanned Aeroplane Systems
- [11] Eurocae, Terms of Reference WG 105 on Unmanned Aircraft Systems (UAS), approved 29 September 2016
- [12] ASTM standard F2910 on design, construction, and test of small UAS

- [13] Regulation (EU) No 376/2014 of the European Parliament and of the Council of 3 April 2014 on the reporting, analysis and follow-up of occurrences in civil aviation, amending Regulation (EU) No 996/2010 of the European Parliament and of the Council and repealing Directive 2003/42/EC of the European Parliament and of the Council and Commission Regulations (EC) No 1321/2007 and (EC) No 1330/2007
- [14] Regulation (EC) No 785/2004 of the European Parliament and of the Council of 21 April 2004 on insurance requirements for air carriers and aircraft operators
- [15] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)
- [16] South Africa Civil Aviation Regulation (2011) Part 101 RPAS
- [17] EASA Opinion 01/2018, Unmanned aircraft system (UAS) operations in the 'open' and 'specific' categories, <https://www.easa.europa.eu/document-library/opinions/opinion-012018>

1.6 Recommended JARUS-OPS Category B

[State] CIVIL AVIATION REGULATION No .../..

of XXX

Laying down rules for Unmanned Aircraft Systems (UAS)

The Civil Aviation Administration of the State of,

Having regard to Civil Aviation Law No. Xx of dd/mm/yyyy, and in particular to Articles XX, YY and ZZ, thereof,

Whereas:

- (1) Pursuant to the Civil Aviation Law No. xx of dd/mm/yyyy, the Civil Aviation Authority of [State] (hereinafter referred to as the 'NAA'), is empowered to adopt the necessary implementing regulations for the design, production, maintenance and operation of unmanned aircraft, their engines, propellers, parts and appliances, as well as the equipment to control unmanned aircraft remotely, where such aircraft are operated within the [State] airspace.
- (2) The definition of aircraft includes manned and unmanned aircraft, according to paragraph 2.2 of Annex 7 (6th edition including amendment 6) to the Chicago Convention.
- (3) Civil Aviation Law identifies the Operator as a legal or natural person operating or proposing to operate one or more aircraft, whether manned or unmanned.
- (4) Measures taken in the framework of this Regulation should be proportionate to the nature and risk of the type of unmanned aircraft operation and should mitigate the risk for persons and property on the surface, other airspace users and critical infrastructures on the territory overflow.
- (5) Rules should be based on risk assessment and be performance-based, with Acceptable Means of Compliance (AMC) developed as far as possible with industry.
- (6) In accordance with the ICAO RPAS Manual (Doc 10019; 1st edition; par. 2.3.5) the distinction between commercial and private flights is not considered relevant for UAS. Regulatory distinctions should be based on scale and complexity of operation, rather than on the traditional types of operation or only on mass or kinetic energy of aircraft.

- (7) The State of [.....] is member of JARUS and JARUS has recommended to regulate three Categories of UAS operations: A (low risk; open), B (medium risk; specific) and C (high risk; certified).
- (8) The high-risk operations of unmanned aircraft should be regulated by similar rules as for manned aircraft, which include the certification of the aircraft, the licensing of the remote pilot and the certification of the operator, in compliance with applicable ICAO standards. The introduction of the regulatory framework to accommodate operations in such 'certified' (Category C) will be considered in future editions of these rules.
- (9) The lower risk operations, subject to the present regulation, should be regulated by specific risk-based requirements leading to proportionate administrative procedures. Consequently, it is necessary to establish rules for the registration and identification of unmanned aircraft, not only for safety, but also for security reasons.
- (10) Rules for the management, safety and security of the organisations responsible for operations of UAS, training of remote pilots, maintenance of UAS or service provision for UAS will be covered in separate regulations.
- (11) NAA may itself conduct or delegate to accredited delegated entities independent from operators and their associations, as well as from training organisations and manufacturers, all necessary inspections of unmanned aircraft, including assessment of persons and organisations involved in their design, production, maintenance, operations and service provision.
- (12) Operators of UAS registered in a State other than [State] in Category B should be eligible to apply for the special authorisation to enter the [State] airspace, subject to procedures covered by bilateral or multilateral intergovernmental agreements or arrangements, as suggested by paragraph 3.2.2 of the ICAO RPAS Manual (Doc 10019; first edition; 2015).
- (13) Annex 2 (Rules of the Air; 10th edition including amendment 44) to the Chicago Convention contains different minimum altitudes above surface level, the lowest of which is 500 ft (150 m) for normal VFR flights outside urban areas. ICAO SARP's allow States to establish specific procedures to authorise flights below the standard altitudes where necessary.
- (14) The regulatory framework for civil UAS, as well as related technologies and industry standards are rapidly evolving and hence this regulation should be subject to future amendments.

Article 1 – Subject Matter & Scope

1. This Regulation lays down:

- a) risk-based rules for the operation of civil unmanned aircraft systems (UAS), and more specifically in Categories A and B, within the [State] airspace;
- b) technical requirements and administrative procedures for the design, production and maintenance of UAS in Categories A and B within [State], including their engines, propellers, parts and appliances, as well as the equipment to control unmanned aircraft remotely;
- c) technical requirements and administrative procedures for the implementation of the concepts of registration, electronic identification, and geo-awareness ;
- d) requirements for subcategories in Category A;
- e) conditions to issue a declaration or to obtain an authorisation, as appropriate for Category B; and
- f) requirements for the introduction of the concept of standard scenarios in Category B.

2. Design, production, maintenance and operation of UAS, their engines, propellers, parts, appliances and equipment to control them remotely shall comply with this Regulation.
3. Out of scope of this Regulation are State aircraft mentioned in Article 3 of the Chicago Convention and 'Indoor Operations'.

Article 2 Definitions

1. For the purposes of this Regulation, the definitions of Article NN of Civil Aviation Law shall apply.
2. For the purposes of this Regulation, the following definitions shall also apply:
 - a) 'Acceptable Means of Compliance' (AMC) means non-binding standards adopted by an NAA, to illustrate means to establish compliance with Civil Aviation Law and its implementing acts. If AMC have not been promulgated by an NAA, an alternative AMC adopted by JARUS or guidance developed by industry and accepted by NAA may be used;
 - b) 'Aeronautical Information Publication' (AIP) means a publication issued by an authorised AIS Provider containing aeronautical information of a lasting character essential to air navigation;
 - c) 'Automatic Operation' means a phase of flight following pre-programmed instructions that the UA executes while pilot intervention remains possible at all times, under normal conditions;
 - d) 'Autonomous Operation' means a phase of a UA flight, during which a remotely-piloted aircraft is operating, by design and under normal conditions, without possibility of immediate pilot intervention in the control of the flight;
 - e) 'Beyond Visual Line Of Sight' (BVLOS) means a type of UA operation in which the remote crew, including the remote pilot and possible observers, is unable to maintain continuous unobstructed and unaided visual contact with the UA;

- f) 'Certification Specifications' (CS) means standards adopted by NAA indicating means to show compliance with the Civil Aviation Law and Regulations and which can be used by an organisation for the purpose of certification. If no such applicable standards have been adopted by NAA then Certification Standards adopted by other aviation authorities or JARUS CS or standards developed by industry could apply;
- g) 'Delegated Entity' means a legal or natural person accredited and under continuous assessment by a competent aviation authority, which may conduct certain certification or oversight tasks under this Regulation;
- h) 'Electronic Identification' means the capability to identify a UA in flight without direct physical access to that aircraft;
- i) 'Extended Visual Line Of Sight' (E-VLOS) means a type of operation in which the remote pilot does not maintain continuous unobstructed and unaided visual contact with the UA, however one or more visual observers do, allowing monitoring the flight path of the UA in relation to other aircraft, persons, and obstacles, for the purpose of maintaining separation from them and avoiding collisions;
- j) 'First-Person-View (FPV) mode' means a use of technology (e.g. goggles, display) in the operation of a UA where the remote pilot manoeuvres the UA through a forward looking camera installed on the aircraft, which offers a field of view comparable to a manned aircraft operation pilot sitting in a cockpit;
- k) 'Follow-Me (FM) mode' means an automatic mode of operation of a UAS where the UA constantly follows a person or device at a pre-determined radius;
- l) 'Geo-awareness' means an automatic function which may be used as an advisory tool for supporting the UA to not trespass geographical limitations in the airspace;
- m) 'Geographical Limitation' means a restricted airspace volume defined through electronic map data;
- n) 'Hazard' means a condition or an object with the potential to cause injuries, damage, loss of material or a reduction of the ability to perform a prescribed function;
- o) 'Indoor Operation' means an UA operation in which the hazard of the UA flying away is minimised by walls, ceiling, net or other physical limitation of the volume;

- p) 'Limited UA zones' means restricted airspace volumes where civil UAS operations are allowed under specific conditions;
- q) 'Manufacturer' means any natural or legal person who manufactures a product or has a product designed or manufactured under his name or trademark;
- r) 'Model Aircraft' means an UA that is capable of sustained flight in the atmosphere and that is used for recreational flights;
- s) 'Model Aircraft Club or Association' means an organisation legally established in a Member State for the purpose of conducting leisure flights, air displays, sport or competition activities with UAS;
- t) 'National Aviation Authority' (NAA) means any authority designated by a State or group of States and competent for rulemaking and/or oversight tasks;
- u) 'UAS operator' means any natural or legal person who operates or intends to operate a UAS for recreational or other than recreational purposes, including commercial purposes;
- v) 'Part-UAS' means the rules applicable to the operation of a UAS falling into Category A and B, as laid down in Annex II to this Regulation;
- w) 'Remote Pilot' (RP) is a natural person who manipulates the flight controls of a UAS, as appropriate, during a flight;
- x) 'Remote Pilot In Command' (RPIC) means the remote pilot designated by the operator, or owner piloting their own UA, as being in command and charged with the safe conduct of a flight;
- y) 'Remote Pilot Station' (RPS) means a component of the UAS containing the equipment used to pilot the UA;
- z) 'Remotely Piloted Aircraft' (RPA) means a UA, under normal operation, managed by a pilot who is not on-board;
- aa) 'Remotely Piloted Aircraft System' (RPAS) means an RPA, the associated RPS, the command control link between the two and any additional equipment, apparatus, appurtenance, software or accessory that is necessary for the safe operation of the RPA;
- bb) 'UAS Operator Certificate' (ROC) means a certificate authorising an operator to carry out specified UAS operations;
- cc) 'Safety-Critical service' means a service whose failure or malfunction may result in serious injuries to people or serious incident with other airspace user or damage to property;

- dd) 'Special UA routes' means ATS routes at very low level, accessible to civil UA, subject to mandatory equipment functionality and performance and other conditions in this regulation;
- ee) 'Standard Scenario' means a description of a UAS operation in the Category B, for which mitigation measures have been determined based on a specific operations risk assessment (e.g. SORA) and which is issued by a NAA in its AMC;
- ff) 'Swarm' means two or more UA whose motion is mutually and automatically coordinated, while the remote pilot controls the entire swarm through a single remote pilot station;
- gg) 'Technical Specification' means a non-binding technical standard that prescribes technical requirements to be fulfilled by a product or process;
- hh) 'Toy Aircraft' means a UA designed or intended, whether or not exclusively, for use in play by children under 14 years of age;
- ii) 'Visual Observer' means a natural person who, by visual observation of the UA, assists the remote pilot in safely conducting the flight;
- jj) 'UA System' (UAS) means the UA and any equipment, apparatus, appurtenance, software or accessory that is necessary for the safe operation of the UA;
- kk) 'Unmanned Aircraft' (UA) means an aircraft which is operated with no pilot on board;
- ll) 'Unmanned Free Balloons' means a non-power-driven, unmanned, lighter-than-air aircraft in free flight;
- mm) 'Visual Line Of Sight' (VLOS) means a type of operation in which the remote pilot maintains continuous unobstructed and unaided visual contact with the UA, allowing the remote pilot to monitor the flight path of the UA in relation to other aircraft, persons, and obstacles, for the purpose of maintaining separation from them and avoiding collisions;
- nn) 'Remote Crew' (RC) means the crew under RPIC authority, actively participating and assisting with the safe conduct of flight.

Article 3 –Categories of UAS operations

UAS operations shall fall into one of the following three risk-based Categories:

1. A ('Open') (refer to JARUS-OPS for Category A)
2. B ('Specific') is a Category of UAS operation that, considering the risks involved:
 1. requires registration using the method prescribed by the State before the operation takes place;
 2. includes remotely piloted or autonomous operations;
 3. implements the mitigation measures identified through an operational risk assessment;
 4. requires the operator to have an authorisation by NAA before the operation takes place, unless the operator enjoys the privilege of authorizing operations without prior approval by NAA;
 5. permits for certain standard scenarios involving remotely piloted UA, a declaration by the operator instead of authorisation.
3. C ('Certified') is a Category of UAS operation other than A or B.

Article 4 – Principles for UAS Operations

1. The UAS operator shall be responsible for the safety of its operation.
2. The Remote Pilot In Command (RPIC) shall be responsible for the safe conduct of flight.
3. The operator shall ensure that UA are equipped with a geo-awareness function, when required by UAS.OPA.60 and UAS.OPA.70 and with all other technical functionalities required by applicable rules.
4. States may designate zones, airspace volumes or areas where UAS operations are permitted, prohibited or restricted, in accordance with Article 12, as well as procedures for UA to access airspace.

Article 5 – Registrations and Identification

1. The UAS Operator shall register and identify the UA in the manner established by the NAA as required by UAS.OPB.20.
2. The UAS Operator shall ensure that UA are equipped with electronic identification means, when required by UAS.OPB.20.

Article 6 – UAS Operations in Category A

(Refer to JARUS OPS Cat A Document)

Article 7 – UAS operations in Category B

1. The operator shall implement the mitigation measures identified through an operational risk assessment procedure acceptable to the NAA.
2. The mitigation measures may be contained in a standard scenario published or accepted by the NAA.
3. Model aircraft and toy aircraft operations conducted in the framework of clubs or associations shall comply with article 8.
4. In order to be able to operate in Category B, the operator, without prejudice to Articles 5 and 12, shall comply with the conditions specified in:
 - I. an operational authorisation issued by the NAA or a delegated entity; or
 - II. a standard scenario; or
 - III. an operational authorisation issued by the holder of a UAS Operator Certificate (ROC) with privileges to authorise such operation.
5. An operation of an UA conducted in Category B within the [State] airspace shall comply with the requirements of Subpart B of Annex II to this Regulation.

Article 8 – Operations conducted in the framework of Model Clubs and Associations

For UAS operations conducted in the framework of model clubs or associations, the following applies:

1. the NAA may issue an organisational authorisation to a model club or association without further demonstration of compliance, based on the model club's or association's established procedures, organisational structure, and management system; and
2. Operational authorisations granted under this Article shall include the conditions and limitations of, as well as the deviations from, the requirements of Annex II to this Regulation.

Article 9 –Other UAS operations

[reserved]

Article 10 – Safety-Critical Services for Category A and B

1. The provider of any safety-critical services is responsible for the accuracy and integrity of the provided information and data, and for the quality of the services.
2. Services may include but are not limited to:
 - I. establishing and maintaining a registry of UAS and UAS operators ;
 - II. maintenance of UAS,
 - III. providing geographical data and limitations;
 - IV. the training of remote pilots;
 - V. communication services supporting command and control data link;
 - VI. provisions of services through remote pilot stations located anywhere in the world.
 - VII. Air Navigation Services (ANS).
3. The service provider shall have a suitable organisational structure, appropriately documented procedures, and adequate resources and personnel.
4. The service provider shall have oversight by the NAA or oversight through the operator's Safety Management System (SMS).

Article 11 – Means of Compliance

1. Acceptable means of compliance (AMC) and certification specifications (CSs) published by NAA or, when acceptable to the NAA, published by JARUS, other aviation authorities or standard making bodies may be used to establish compliance with the Civil Aviation Law and this Regulation. When AMC or CS are compliant the related requirements of this Regulation are presumed to be met.
2. Alternative means of compliance or technical specifications may be proposed by the applicant to establish compliance with the Civil Aviation Law and this Regulation.
3. The NAA shall establish a system to evaluate all proposed means of compliance or specifications used by itself, or proposed by organisations and persons under its oversight allow the establishment of compliance with the Civil Aviation Law and this Regulation.
4. The NAA shall evaluate all proposed means of compliance or specifications, analysing the documentation provided and, if considered necessary, conducting an inspection of the proponent organisation.
5. When the NAA finds that the proposed means of compliance are in accordance with the Civil Aviation Law and this Regulation, it shall, without undue delay:
 - I. notify the proponent that the means of compliance may be implemented and, if applicable, amend the operational authorisation or certificate of the applicant accordingly;
 - II. inform interested stakeholders about the means of compliance that were accepted.
6. When the NAA itself uses acceptable means of compliance or certification specifications to achieve compliance with Civil Aviation Law and this Regulation, it shall make them available through electronic means, to all organisations and persons under its oversight.

Article 12 – Airspace Access

1. Based on the categories of operation the State]may identify airspace areas or special zones:
 - I. where UAS operations are allowed;
 - II. where UAS operations are not allowed without prior permit by the Air Traffic Service Provider or Organisation (ATSP/O) in coordination with other authorities, or are not permitted at all;
 - III. where UA shall comply with defined technical or performance specifications, including mandatory equipment or functions; and
 - IV. where operations of model aircraft under oversight by respective associations or clubs, or operations of other UA are permitted.
2. The information on prohibited, restricted, danger and special zones for UAS operations and for operations of clubs or associations for model aircraft, as well as on required ATSP/O permits and related procedures shall be made available by the NAA, by other State entity or by a service provider accepted by the State for this purpose.
3. Special Zones for UAS operations below 120m (400') above surface level include special UA routes, UA test ranges or zones for activity by model clubs or associations.
4. Temporary prohibited, restricted or special zones for UAS operations may be established by the State and disseminated to UAS Operators and remote pilots through means ensuring appropriate timeliness, through providers of geographical data and limitations, including areas affected by public emergencies or accidents.
5. The UAS operator is responsible to comply with the information provided according to paragraphs 1 to 5, with the Rules of the Air, with the Airspace Classification, and Air Traffic Management rules and procedures.

Article 13 – Operations of Foreign UAS in the [State]

1. Any person may operate an UA in Category A in the airspace of [State], subject to the rules and limitations contained in this Regulation.
2. The NAA, according to paragraph 3.2.2 of the first edition of ICAO Doc 10019, may agree upon procedures to allow cross-border flights in UA Category B, through bilateral or multilateral agreements with aviation authorities of other ICAO contracting States.

Article 14 – Immediate reaction to a safety problem

1. The NAA shall collect, analyse and disseminate safety information concerning UAS operations in their competence in accordance with the Civil Aviation Law and this Regulation.
2. Upon receiving the information referred to in paragraph 1 above, the NAA shall take adequate measures to address safety problems.
3. Measures taken in paragraph 2 above shall immediately be notified to all persons or organisations which need to comply with such measures under Civil Aviation Law and this Regulation.
4. NAA shall also notify those measures to the other concerned ICAO Contracting States, when combined action is required.

Article 15 – Applicability

As from [*to be defined by State or regional authority*], all UA in Category A & B shall be operated in accordance with this Regulation.

Article 16 – Entry into Force and Application

This Regulation shall enter into force on [*date to be defined by State*].

It shall apply from the dates established in Article 15.

This Regulation shall be binding in its entirety and directly applicable by [TBD by State].

Done at PLACE, dd/mm/yyyy

Signed by.....

1.7 ANNEX I - Categorization of UAS Operations
(Refer to JARUS OPS Category A Document)

1.8 ANNEX II - Operation of UAS in Category A & B

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JARUS OPS Cat B

SUBPART C [Reserved]

SECURITY REQUIREMENTS FOR UAS OPERATIONS IN CATEGORY B

SUBPART B

CATEGORY B

UAS.OPB.10 Responsibilities of the operator

- (a) The operator shall be responsible for remotely piloted or autonomous operation.
- (b) The UAS operator shall designate a remote pilot and/or crew for each remotely piloted operation or a competent person responsible for each autonomous operation.
- (c) The operator shall:
 - I. comply with the regulations applicable in the State affected by the operation, in particular those related to safety, privacy, data protection, liability, insurance, security and environmental protection;
 - II. ensure that prior to conducting operations, remote pilots and all other personnel are competent for the performance of their task and are familiar with the operator's manual, policies and procedures;
 - III. comply with the 'standard scenarios' requirements when applicable;
 - IV. carry out an operation within the limitations and conditions specified in the operational authorisation or operational declaration.

UAS.OPB.20 Registration and Identification of UA

The UAS operator shall:

- (a) Unless when already registered in the Category A , register the UA with the NAA using the process established by the NAA, which includes the responsible operator and, if different, of the owner; and
- (b) Have a means of identification on the UA, including at least a means of visual identification on the airframe containing the identification of the UA and of the operator;
- (c) Retain attestation of such registration;
- (d) Update the registration at the end of the operational life of the UA or when the operator or owner changes or after a significant change to the UAS.

UAS.OPB.30 Requirements applicable to all UAS operations in the Category B

Before undertaking operations in Category B the operator shall ensure that:

- (a) All operated UAs are registered according to UAS.OPB.20;
- (b) The UAS shall be in condition for safe flight;

- (c) All operated UAS types are accompanied by a flight manual issued by the manufacturer, or equivalent information in case of a privately built UAS;
- (d) Procedures are implemented for the maintenance of the UAS, including management of the all systems essential for the safe operation of the UAS;
- (e) All mitigation measures identified through the operational risk assessment in the UAS.OPB.80 are implemented and properly documented.

UAS.OPB.40 Requirements applicable to remote pilots in the Category B

1. In addition to UAS.OPB.30, in case of remotely piloted operations the remote pilot shall:
 - (a) Be in a physical and mental condition that would not put at risk the safe operation of the UA, people, wildlife, public and private property, and from other airspace users.
 - (b) Where the remote pilot is also the operator, comply with UAS.OPB.10 and UAS.OPB.20.
2. Prior to and during UAS operation(s), the remote pilot shall adhere to the conditions, limitations and operational criteria of the safe conduct of flight by:
 - (a) obtaining updated information about any flight restrictions or conditions published by the NAA or by a provider of geographical information, that may be relevant to the intended operation;
 - (b) complying with rules for accessing the airspace and, when applicable, obtain the ATSP permit;
 - (c) inspecting the operating environment, including the locations of people, properties and any other hazards;
 - (d) ensure that the UAS is in a safe condition to conduct flight, and where applicable, is updated with geo-awareness data;
 - (e) checking the launching and recovery procedures are safe and adequate for the intended operation;
 - (f) knowing and applying the operations manual for the intended operation; and
 - (g) ensuring that the operating conditions, including environmental conditions, are compatible with the authorised conditions and limitations.
3. During flight, the remote pilot shall:
 - (a) ensure safe operation with the UAS;
 - (b) comply with the conditions and limitations defined by the NAA for the area or airspace, including possible restrictions for areas where an emergency response effort is ongoing;
 - (c) ensure safe separation of the UA from people, wildlife, public and private property, and from other airspace users;

- (d) discontinue flight if continuing would pose a hazard to other UA, people, wildlife, public and private property, and from other airspace users;
- (e) operate the UA within the performance limitations defined in the flight manual provided by the manufacturer; or equivalent manual for a privately built UAS;
- (f) not use the UA to transport persons;
- (g) operate the UA in a considerate manner minimising impact of nuisance noise emissions.

UAS.OPB.50 Requirements applicable to autonomous operations in Category B

1. In addition to UAS.OPB.30, in case of autonomous operations, the operator shall ensure that during all phases of the operation, responsibilities and tasks are properly allocated in accordance with the procedures established according to paragraph UAS. OPB.10 (c).
2. In particular the operator shall comply with the obligations stated in UAS.OPB.40 (2).
3. Deliver a proper handover to the next responsible person in the following duty period, if applicable.
4. Not use the autonomous operations to transport persons.

UAS.OPB.60 Operational Declaration

- (a) Except when holding a ROC per Subpart C of this Annex, with the appropriate privileges, and where the relevant 'standard scenario' accepted by the NAA so requires, the operator shall submit an operational declaration, including all the information required in the form and manner established by the NAA.
- (b) Upon acknowledgement of receipt of the operational declaration, the operator shall be entitled to start the operation as long as it corresponds to a 'standard scenario' accepted by the NAA.
- (c) The operator shall notify the NAA or delegated entity, without delay, of any changes to the statements and information submitted in the operational declaration.

UAS.OPB.70 Application for an operational authorisation

- (a) Except when holding an ROC per Subpart C of this Annex, with the appropriate privileges, the operator shall submit an application for operational authorisation to the competent authority, according to UAS.OPB.100 in accordance with the form made available by the NAA prior to starting an operation that:

- I. corresponds to a 'standard scenario' requiring an operational authorisation; or
 - II. does not correspond to a 'standard scenario'.
- (b) The application for an operational authorisation shall include all the information required and be in a form and manner established by the NAA.
 - (c) The operator shall only start the proposed operation after having received the operational authorisation issued by the NAA.
 - (d) Any change to the operation not covered by the authorisation shall require a new application.

UAS.OPB.80 Operational Risk Assessment

- (a) If the operation does not correspond to any of the 'standard scenarios' as per UAS.OPB.60, the operator shall submit an operational risk assessment with a sufficient level of robustness, in order to limit the risk to an acceptable level.
- (b) For the operational risk assessment in (a) the operator may refer to 'standard scenarios' published by other NAAs or standard making bodies.

UAS.OPB.90 Operations Manual

- (a) An operation manual may be required by the outcome of the risk assessment.
- (b) The operations manual shall include a statement that the UA will be operated only by listed remote pilots and other relevant personnel with a level of competency appropriate for conducting operations with that UA and appropriate to the category of UA operation.
- (c) The operations manual shall include the organization structure if existing.

UAS.OPB.100 Issuing of an Operational Authorisation

- (a) An operational authorisation may be issued for either a limited or an unlimited duration or for a limited number of flights.
- (b) The conditions under which an operator is authorised to conduct the intended operation shall be specified in the authorisation.
- (c) If there are changes to the operational conditions for which an operator has received an operational authorisation, and a new application has not been submitted according to UAS.OPB.070, the NAA may decide whether the authorisation shall be suspended, revoked or amended.

UAS.OPB.110 UAS Logbook

The operator shall ensure that, as a minimum, records of duration of flight and maintenance

performed with regard to the UAS are retained in the form of a logbook or equivalent, as established by the NAA.

UAS.OPB.120 Certified UAS and the use of Certified Equipment

- (a) UAS accompanied by a valid certificate of Airworthiness maybe used for operations in Category B. In this case the requirements of the Category C requirements for initial and continuing airworthiness apply.
- (b) Certified equipment may be used in UAS for operations in Category B.
- (c) The operator shall ensure continuing airworthiness of the certified equipment according to the instructions delivered by the holder of the equipment type certificate and comply with mandatory directives published by the NAA of the State of Design [in accordance with]

UAS.OPB.130 Occurrence Reporting

The operator shall report in a manner established by the NAA any occurrence of the UA which results in a serious incident or accident.