



Joint Authorities for Rulemaking of Unmanned Systems

JARUS OPS/A

Recommendations for Unmanned Aircraft Systems (UAS) Category A Operations

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Abstract		
<p>This JARUS OPS/A contains recommended rules for UAS operations in (low risk) category A. In this category no administrative procedures involving the competent aviation authority are envisaged, beyond registration, identification and safety data collection and analysis.</p> <p>The recommended rules ultimately aim at providing recommendations for States to voluntarily harmonise their own national legislation, concerning operation of unmanned aircraft systems (UAS) in category A. The recommendations presented in this JARUS-OPS/A represent the culmination of best practices and procedures used in JARUS Member States. They have been developed by experts in JARUS WG 2 and consolidated through internal and external consultation. The structure of this document allows to easily integrate material for category B, as soon as available.</p>		
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CONTENTS

DOCUMENT CHARACTERISTICS	2
DOCUMENT APPROVAL	4
DOCUMENT CHANGE RECORD	5
CONTENTS	8
EXECUTIVE SUMMARY	10
1. Explanatory Note	12
1.1 Introduction.....	12
1.2 General assumptions.....	14
1.3 Assumptions for category A.....	15
1.4 Assumptions for category B.....	18
1.5 References.....	19
1.6 Recommended JARUS-OPS A.....	21
Article 1 – Subject matter and scope	23
Article 2 Definitions.....	24
Article 3 –Categories of UA operations	28
Article 4 – Principles for UA operations.....	28
Article 5 – Registrations and identification	29
Article 6 – UAS operations in Category A	29
Article 7 – UA operations in Category B.....	30
Article 8 – Operations conducted in the framework of model clubs and associations	30
Article 9 –Other UA operations	30
Article 10 – Safety-critical services for categories A and B	30
Article 11 – Means of compliance	31

Article 12 – Access to airspace	32
Article 13 – Operations of foreign UAS in the [State]	33
Article 14 – Immediate reaction to a safety problem	33
Article 15 – Applicability	33
Article 16 – Entry into force and application	33
1.7 ANNEX I - Categorization of UAS operations	34
1.8 ANNEX II - Part UAS- Operation of UA in the A and B categories	35
SUBPART A	37
A CATEGORY	37
UAS.OPA.10 Subcategories of operations.....	37
UAS.OPA.20 Responsibilities of the operator	38
UAS.OPA.30 Registration of UA.....	38
UAS.OPA.40 Requirements applicable to all UA operations in the A category.....	39
UAS.OPA.50 Requirements applicable to UA operations in subcategory A1	40
UAS.OPA.60 Requirements applicable to UA operations in subcategory A2	40
UAS.OPA.70 Requirements applicable to UA operations in subcategory A3	41
UAS.OPA.80 Occurrence reporting	42
APPENDICES to PART UAS	43
Appendix II.1 - Technical requirements for operations in subcategory A1 UASs	43
Appendix II.2 - Awareness leaflet	44

EXECUTIVE SUMMARY

Recommended requirements for UAS Category A operations

The Joint Authorities for Rulemaking on Unmanned Systems, recommend the requirements contained in this JARUS-OPS/A for global harmonisation of rules concerning operations of Unmanned Aircraft Systems (UAS) in category A ('open'), although the proposed structure may later accommodate also provisions on category B ('specific').

In particular these JARUS-OPS/A cover three processes:

- a) Registration and identification of UAS intended for civil use, having a mass of 250 grams or more;
- b) Rules for operation of UAS not in the scope of ICAO standards, in two categories:
 - Category A (present in this edition): uncertified remotely piloted aircraft, of less than 25 kg maximum take-off mass (MTOM), subject to proportionate operational limitations and requirements, in which the NAA is involved only for registration process;
 - Category B (to be added in a subsequent edition): UA (remotely piloted or autonomous) subject to a process of either a declaration or authorisation, based on a risk assessment (e.g. SORA);
- c) Rules for UA to access airspace.

Recommended rules for category A apply to toy aircraft, model aircraft, recreational flights, private operations, non-commercial air transport as well as commercial or non-commercial aerial work.

Autonomous operations, dropping of objects, spraying of products, transport of dangerous goods and commercial air transport are prohibited in category A operations, unless under conditions prescribed by the NAA.

A State may wish to further subdivide Category A into subcategories and this document provides guidance in that respect, applicable when a State decides to do so.

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.

Out of scope are recommended rules on the organisation of the operator (e.g. for safety management and for security), on the organisation of training organisations for remote pilots, on other service providers and on maintenance organisations, since these matters are covered by JARUS-ORG, currently under development.

In general, the UA operator will have to comply with the rules applicable to safety of UAS operations in the State of the Operator and in the State where operations are planned or executed. In addition, the operator shall comply also with relevant applicable rules related to security, privacy, data protection, liability, insurance, traffic rights and environmental protection.

Finally, the recommended requirements suggest that associations or clubs should continue operation of model aircraft according to their long-established practices, which does not exclude individuals to fly toy aircraft or model aircraft in category A without being affiliated to any club or association.

The recommended requirements are expected to face an urgent safety and security challenge, as imposed by proliferation of small UAS for civil applications in several States. Regulation of small UAS also ensures compliance with 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.

On the basis of agreements, national or regional law, international operations in categories A and B may be allowed, even if not compliant with ICAO standards.

1. Explanatory Note

1.1 Introduction

The Joint Authorities for Rulemaking on Unmanned Systems (JARUS) has established a working group, WG 2, 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. The WG holds representatives from several JARUS Member States.

This document JARUS-OPS/A is one of the deliverables of WG2 on UAS operations and it is limited to category A (alias 'open'), although the proposed structure is ready to easily accommodate provisions also on category B (alias 'specific'). Subsequent deliverables by JARUS WG 2 are expected to include recommendations for operations in the C ('certified') category as well as on organisations (JARUS-ORG) involved in any category.

In March 2017, the JARUS Plenary agreed to launch a formal internal consultation of all JARUS members on the draft JARUS OPS Recommendations for UAS Category A Operations. 245 received comments have been analysed and individually responded by WG 2.

Subsequently, based on decision by the JARUS Plenary, an external consultation has been launched on 25 October 2017 and closed on 31 December of the same year.

All the 108 comments received during the external consultation have been considered and individually responded.

WG 2 reached unanimous consensus on this final draft of JARUS-OPS/A which was proposed for publication to the JARUS Plenary Team on 27 April 2018.

This resulting text of this first edition of JARUS-OPS/A is based also on the:

- a) progress of JARUS WG 7 for developing a categorisation document and its Appendix A [1], whose details are not yet consolidated, but which:
 - (1) does not mandate subcategorisation in category A;
 - (2) provides a methodology to define the thresholds between such subcategories, where States want to establish them; and
 - (3) does not provide any specific recommended numerical parameters, for said thresholds, for which reason, this document contains in its Annex I possible thresholds for subcategorisation, whose format is based on EASA [6] and whose content derives from the internal and external consultation mentioned above.

- b) Specific Operation Risk Assessment (SORA) methodology developed by JARUS WG 6 [2];
- c) Result of the formal written voting procedure at the level of JARUS Plenary team, carried out in May 2018.

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

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

This JARUS-OPS/A ultimately aims at providing recommendations for competent aviation authorities to use for their own regulations, concerning harmonised technical requirements and administrative procedures for UAS operations in category A. The recommendations presented in this JARUS-OPS/A document represent the culmination of best practices and procedures used in prior UAS rules at national level, as well as input from JARUS WG 1, 2, 3 and 7 expert members.

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 several 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 aviation rules concerning three regulatory processes:
 - a) Registration and identification;
 - b) Declaration, authorisation or certification, as applicable, by competent aviation authority; and
 - c) 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 UA operator will have to comply with the rules on UAS operations applicable in the State of the Operator and in the State where operations are planned or executed. Furthermore, the operator shall comply also with additional relevant applicable rules related to security, privacy, data protection, liability, insurance, traffic rights, licensing for commercial operations and environmental protection.
4. Recommended rules on the organisation of the operator (e.g. for safety management and for security), on the organisation of training organisations for remote pilots and on design, production and maintenance organisations, are out of scope of the JARUS-OPS, since these matters are covered by JARUS-ORG.
5. Recommended rules for operations in UAS Category C, subject to airworthiness certification, licensing of remote pilots and certification of the operator, are also out of scope of this first edition of JARUS-OPS.
6. Associations or clubs should continue operation of model aircraft, according to their long-established practices, which does not prevent individuals to fly toy aircraft or model aircraft in category A without being affiliated to any club or association.
7. These recommended requirements are performance-based and therefore technology agnostic. Standard making bodies may develop new technical standards or recommend use of non-aviation standards applied in other segments of industry.

1.3 Assumptions for category A

This 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 allows to fly close to people; and
 - (3) A3 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) Letter 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] at 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 (CSs) 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 standard 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 drone is subject to a registration and identification process;
 - (2) Operational limitations are established by competent aviation authorities;
 - (3) Neither declaration nor authorisation or other form of permission issued by the aviation authority to the operator in category A;
 - (4) OPS Manual possible, but not mandatory;
 - (5) Industry standards for design [12], production and maintenance possible;
 - (6) Geofencing 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] also in A category; and
 - (2) No mandatory safety management system in A category.
- j) Remote pilot
- (1) No formal Remote Pilot Licence (RPL) issued by an NAA in category A;
 - (2) Awareness of the remote pilot required for the A1 subcategory, through the awareness leaflet provided by the manufacturer;

- (3) Demonstration of theoretical knowledge required in A2 and in 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 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 forces (e.g. police or similar) empowered by the State.

n) **Liability and insurance**

- (1) Third party liability insurance under responsibility of the operator may be required for A2 and A3 subcategory operations in some JARUS Member States [14];
- (2) Voluntary additional insurance (e.g. loss of the own drone) if so wished.

o) **Privacy and data protection**

- (1) Privacy and data protection requirements in JARUS Member 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) Privacy Impact Assessment should be carried out when required by applicable rules.

p) Security

- (1) National security requirements in JARUS Member States may vary, however operators must comply with requirements of the State of the Operator and the State where operations are planned or executed;
- (2) This JARIS-OPS contains specific rules for geo-limitation and electronic identification, which also contribute to security;
- (3) No security requirements, beyond those in (2), for security of operations and of operators are recommended by JARUS for operations in category A.

q) Promotion and awareness

- (1) Awareness campaigns (e.g. web sites) are laudable, but out of scope of these JARUS recommended requirements which relate to regulation of operations;
- (2) States or regional organisations may take voluntary initiatives.

1.4 Assumptions for category B

[reserved]

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] European Commission (EC), Proposal for a Regulation of the European Parliament and of the Council on common rules in the field of civil aviation and establishing a EU Aviation Safety Agency, and repealing Regulation (EC) No 216/2008 of the European Parliament and of the Council, COM(2015) 613 final of 7 December 2015
- [6] EASA NPA 2017-05 of 04 May 2017: 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 A

[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 the 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 overflown.
- (5) Rules should be based on risk assessment and be performance-based, with Acceptable Means of Compliance (AMC) developed as far as possible by 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 the Joint Authorities for Rulemaking on Unmanned Systems (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' (C category) 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, simpler in comparison to administrative procedures applicable to manned aviation. For these operations, which are subdivided into two categories (the A and the B category), proportionate requirements should be applicable and adapted to the level of risks inherent to the category of operation.
- (10) Consequently, it is necessary to establish rules for the registration and identification of unmanned aircraft, not only for safety, but also for security reasons.
- (11) 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.
- (12) 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.
- (13) Operators of UAS registered in a State other than [State] in the B category, 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).
- (14) Annex 2 (Rules of the Air; 10th edition including amendment 44) to the Chicago Convention contains different minimum flight heights above surface level, the lowest of which is 500 ft (150 m) for normal VFR flights outside urban areas. The

ICAO standards however allow States to establish specific procedures to authorise flights below standard heights.

- (15) To ensure a smooth transition and to avoid disruptions, appropriate transitional measures should be provided.
- (16) The evolution of the regulatory framework for civil unmanned aircraft, 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 and 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 geofencing;
- d) requirements for subcategories in category A;
- e) conditions to issue a declaration or to obtain an authorisation, as appropriate, in 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 the 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 the 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 NAA, to illustrate means to establish compliance with the Civil Aviation Law and its implementing acts. If no AMC is promulgated by an NAA, in alternative AMC adopted by JARUS or guidance developed by industry 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 visual 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 mode' means a use of technology (goggles, display, etc.) 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 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) 'geofencing' 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 UA 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 recreational flights, air displays, sport or competition activities;
- t) 'National Aviation Authority' (NAA) means any authority designated by a State or group of States and competent for rulemaking 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 UA falling into the A or B category, as laid down in Annex II to this Regulation;
- w) 'remote pilot' (RP) is a natural person who manipulates the flight controls of a UA, as appropriate, during a flight and is responsible for safely conducting the flight;
- x) 'remote pilot competency' means a combination of skills, knowledge and attitudes required to perform a task to the prescribed standard, as listed in paragraph 6.4.2 of the ICAO RPAS Manual (Doc 10019; first edition; 2015);
- y) 'remote pilot in command' (RPIC) means the remote pilot designated by the operator, or the owner piloting its own UA, as being in command and charged with the safe conduct of a flight;
- z) 'remote pilot station' (RPS) means a component of the UAS containing the equipment used to pilot the UA;
- aa) 'remotely piloted aircraft' (RPA) means a UA, under normal operation, managed by a pilot who is not on-board;
- bb) '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;
- cc) 'RPAS operator certificate' (ROC) means a certificate authorising an operator to carry out specified RPAS operations;
- dd) '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 third party property;

- ee) 'special UA routes' means ATS routes at very low level, accessible civil UA, subject to mandatory equipment functionality and performance and other conditions in this regulation;
- ff) 'standard scenario' means a description of a UAS operation in the B category, for which mitigation measures have been determined based on a specific operations risk assessment (SORA) and which is issued by a NAA in its AMC;
- gg) '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;
- hh) 'technical specification' means a non-binding technical standard that prescribes technical requirements to be fulfilled by a product or process;
- ii) 'toy aircraft' means a UA designed or intended, whether or not exclusively, for use in play by children under 14 years of age;
- 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) 'visual observer' means a natural person who, by visual observation of the UA, assists the remote pilot in safely conducting the flight.

Article 3 –Categories of UA operations

UA operations shall fall into one of the following three risk-based categories:

1. A ('open') is a category of UA operation that, considering the risks involved:
 - a) requires, except when operating in subcategory A1, registration using the method prescribed by the State before the operation takes place;
 - b) does neither require a prior authorisation by NAA before the operation takes place, nor a pilot licence or certificate of airworthiness;
 - c) is carried out with an UA whose maximum take-off mass is less than 25 kg;
 - d) may be subject to technical requirements for the eligible UAS;
 - e) is subject to operational limitations according to this Regulation; and
 - f) is carried out using a remotely piloted UA.
2. B ('specific') is a category of UA operation, that, considering the risks involved:
(reserved)
3. C ('certified') is a category of UA operation other than A or B.

Article 4 – Principles for UA operations

1. The UAS operator shall be responsible for the safety of its operation.
2. The remote pilot shall be responsible for the safe conduct of each individual UA flight.
3. The operator shall ensure that UA are equipped with a geofencing 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 UA 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 the UA in the manner established by the NAA and identify all the UA it operates, as required by UAS.OPA.30.
2. The UAS operator shall ensure that UA are equipped with electronic identification means, when required by UAS.OPA.60 or UAS.OPA.70.

Article 6 – UAS operations in Category A

1. Category A includes remotely piloted unmanned aircraft (UA), of less than 25 kg maximum take-off mass (MTOM), subject to proportionate operational limitations and requirements, as detailed in Subpart A of Annex II to this Regulation.
2. Operations in category A may be executed by a model aircraft, by a toy aircraft or in general by UAS used for civil commercial or non-commercial purposes.
3. Considering the different levels of risk within category A operation, States may wish to further divide this category into subcategories of operations. Each subcategory of operation may be characterised by:
 - a) the use of UA defined by the technical requirements provided Appendix II.1 to Annex II for the A1 subcategory and technical limitations in the other subcategories;
 - b) operational limitations; and
 - c) requirements for the remote pilot and operator, as appropriate.
4. NAAs shall ensure that easily understandable information is provided to consumer through an awareness leaflet accompanying any UAS, or equivalent electronic means, as detailed in Appendix II.2;
5. An operation of a UA conducted in the A category within the [State] airspace shall comply with the requirements of Subpart A of Annex II to this Regulation.
6. Installation and use of image and/or video capturing devices and of any other sensor which can potentially be used for collecting data or information, are subject to applicable security, privacy and data protection legislation, whether the UA operation is private, recreational, commercial or non-commercial aerial work.
7. Autonomous operations, dropping of objects, spraying of products, transport of dangerous goods and commercial air transport are prohibited in category A operations, unless under conditions prescribed by the NAA.

Article 7 – UA operations in Category B

[reserved]

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 by the UAS operator, 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 UA operations

[reserved]

Article 10 – Safety-critical services for categories 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:
 - a) establishing and maintaining a registry of UAS and UAS operators;
 - b) maintenance of UAS,
 - c) providing geographical data and limitations;
 - d) the training of remote pilots;
 - e) communication services supporting command and control data link;
 - f) provisions of services through remote pilot stations located anywhere in the world.
3. The service provider shall have a suitable organisational structure, appropriate documented procedures, and adequate resources and personnel.
4. The service provider shall either be under oversight by the NAA or under oversight through the operator's safety management system.

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 complied with, 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 consistently evaluate, that 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:
 - a) notify the proponent that the means of compliance may be implemented and, if applicable, amend the operational authorisation or certificate of the applicant accordingly;
 - b) publicly inform all other potentially 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 the Civil Aviation Law and this Regulation, it shall make them available through electronic means, to all organisations and persons under its oversight.

Article 12 – Access to airspace

1. Based on the categories of operation [State] may identify airspace areas or special zones:
 - a) where UA operations are allowed;
 - b) where UA 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;
 - c) where UA shall comply with defined technical or performance specifications, including mandatory equipment or functions; and
 - d) 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 UA 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 UA operations below 400 ft (120 m) 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 UA operations may be established by the State and disseminated to UA 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. ATSP permit is not required for operations in subcategory A1;
6. 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 with 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 UA operations in their competence in accordance with the Civil Aviation Law and this Regulation.
2. Upon receiving the information referred to in 1. above, the NAA shall take adequate measures to address safety problems.
3. Measures taken under 2. above shall immediately be notified to all persons or organisations which need to comply with such measures under the 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 and 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 - Categorisation of UAS operations

1. States wishing to establish subcategories A1, A2 or A3, shall consider the following characteristics:

UAS sub-category	UAS MTOM	Distance from people	Maximum height of the operation	Remote-pilot competence	Age of the remote pilot	Electronic identification/geofencing	Technical requirements
A1 Fly over people <i>Note (a)</i>	Not more than 250 g	Not directly above crowds	Not specified providing that the operation remains VLOS	None beyond availability of information from manufacturer	No requirement	Not mandatory	Yes <i>Note (b)</i>
A2 Fly close to people <i>Note (a)</i>	250 g to 4 kg <i>Note (b)</i>	Not directly above people	See UAS.OPA.60	Online training and testing of theoretical knowledge <i>Note (c)</i>	See UAS.OPA.60	Yes	No <i>Note (b)</i>
A3 Fly far from people <i>Note (a)</i>	250 g to 25 kg	Not endangering people not involved in the operation and at a safe distance from the boundaries of congested areas	See UAS.OPA.70	Online training and testing of theoretical knowledge <i>Note (c)</i>	See UAS.OPA.70		

Table 1: Subcategories of operation

NOTES:

(a) It applies to any UAS operation, from recreational private model aircraft to commercial UAS aerial work.

(b) Following the example of US Code of Federal Regulations (CFR) 14, Part 107 which does not address the safety of the UAS as a product for operations that are not conducted directly over people, technical requirements are only applicable in A1, to confirm that a UAS can be operated safely directly over people. See Appendix II.1 for such technical requirements. Emergency recovery systems may be excluded in A1. Conversely no technical requirements are proposed for A2 and A3, which does not exclude that States may establish rules for putting such products on the consumer market.

(c) Online training approved by NAA or delegated entity: theoretical remote-pilot competence is an essential element to ensure safety in subcategories A2 and A3.

2. if all the above conditions are not met, the operation is either category B or C, or in the frame of a model club or association.

1.8 ANNEX II - Part UAS- Operation of UA in the A and B categories

Table of contents

SUBPART A

A CATEGORY

UAS.OPA.10 Subcategories of operations

UAS.OPA.20 Responsibilities of the operator

UAS.OPA.30 Registration of UA

UAS.OPA.40 Requirements applicable to all UA operations in the A category

UAS.OPA.50 Requirements applicable to UA operations in subcategory A1

UAS.OPA.60 Requirements applicable to UA operations in subcategory A2

UAS.OPA.70 Requirements applicable to UA operations in subcategory A3

- a) having demonstrated sufficient theoretical knowledge by completing training and passing a test in a manner and format established by the NAA;
- b) having demonstrated sufficient theoretical knowledge and practical skill to coordinate with one or more observers, when applicable; and
- c) being at least 16 years old or supervised by a person complying with (a) and (b).

UAS.OPA.80 Occurrence reporting

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(reserved)

Appendix II.1 Product requirements for UASs eligible in subcategory A1

Appendix II.2 Awareness leaflet

SUBPART A

A CATEGORY

UAS.OPA.10 Subcategories of operations

1. When States elect to introduce subcategories, operation of UA in category A shall fall into one of the following subcategories, based on the potential level of risk that shall be mitigated to an acceptable level:
 - a) subcategory A1: operation of UA posing a negligible risk of serious injury to people on the ground or damage to manned aircraft, and requiring neither specific remote pilot competence nor age limitations;
 - b) subcategory A2: operation of UA with an increased risk that requires compliance with requirements ensuring that they pose an acceptable risk of serious injury to people on the ground or damage to manned aircraft, when operated according to this Regulation;
 - c) subcategory A3: operation of UA with an even higher risk that requires compliance with additional requirements ensuring that they pose an acceptable risk of serious injuries to people on the ground or damage to manned aircraft and operated by registered operators.
2. Classification in the subcategories shall be based on Annex I.

UAS.OPA.20 Responsibilities of the operator

The UAS operator shall:

1. comply with the regulations applicable in [State] of the operation, in particular those related to safety, privacy, data protection, liability, insurance, security and environmental protection;
2. ensure that personnel involved in the operation and maintenance are available in sufficient quantity, managed, adequately trained and checked to verify that competence is maintained;
3. use an UA only in the category or sub-category of operations for which the aircraft is eligible; and
4. establish procedures to ensure that operations are carried out in a safe manner so as not to endanger life or property of others.

UAS.OPA.30 Registration of UA

Except when operating in subcategory A1 or when already registered in category B, the UAS operator shall:

1. register UA using the method prescribed by the NAA;
2. in the case of a legal person, include in the registration form the name of the accountable manager and the address; and
3. ensure that the UA has an identification means as prescribed by the NAA.

UAS.OPA.40 Requirements applicable to all UA operations in the A category

1. No person may manipulate the flight controls of a UAS or act as a remote pilot, visual observer, or direct participant in the operation of the UAS if he or she knows or has reason to know) that he or she has a physical or mental condition that would interfere with the safe operation of the UAS.
2. Where the remote pilot is also the operator, he or she shall comply with UAS.OPA.20 and UAS.OPA.30.
3. Before the initiation of any UA operation, the remote pilot shall:
 - a) obtain updated information about any flight restrictions or conditions published by the NAA or made available by a service provider, that may be relevant to the intended operation;
 - b) comply with rules for accessing the airspace and, when applicable, obtain the ATSP permit;
 - c) familiarise themselves with the operating environment, including the locations of people, properties and any other hazards; and
 - d) check that:
 - i. the UAS is in a safe condition to accomplish the intended flight and contains all technical equipment and functionality required by the applicable rules; and
 - ii. the operation will comply with limitation and procedures in the flight manual, user guide or equivalent provided by the manufacturer.
4. During flight, the remote pilot shall:
 - a) comply with the requirements applicable to the UA operational category and subcategory;
 - b) discontinue a flight when continuing the flight would pose a hazard to other aircraft, people, or properties;
 - c) operate the UA within the performance limitations defined in the flight manual, user guide or equivalent provided by the manufacturer;
 - d) not use the UA to drop objects, spray products, transport dangerous goods or passengers; and
 - e) not fly close to areas where an emergency response effort is ongoing as to interfere with the safety and conduct of that operation.

UAS.OPA.50 Requirements applicable to UA operations in subcategory A1

UA operations in subcategory A1 shall:

1. be performed:
 - a) either with a UAS placed on the market:
 - i. complying with the product's requirements defined in Appendix II.1; and
 - ii. not be modified in a way that breaches compliance with the requirements in Appendix II.1; or
 - b) with a privately built UAS with a maximum take-off mass, including payload, of less than 250 g;
2. be conducted:
 - a) up to a ground speed not greater than 19 m/s; and
 - b) within a range such that the remote pilot maintains VLOS and is able to control the UA at all times, or in follow-me mode, only if the remote pilot maintains a safe separation of the UA from people, property, ground vehicles and from other airspace users.

UAS.OPA.60 Requirements applicable to UA operations in subcategory A2

UA operations in subcategory A2 shall:

1. be performed with a UAS:
 - a) with a maximum take-off mass not greater than 4 kg;
 - b) complying with UAS.OPA.030 for registration and identification; and
 - c) with active and up-to-date geofencing and electronic identification systems;
2. be conducted:
 - a) up to a height of 120 m (400 ft) above ground level unless otherwise limited by the NAA for the operation area;
 - b) within a range such that the remote pilot maintains VLOS; and
 - c) at a safe distance from people, property, ground vehicles and from other airspace users and not over open assemblies of persons;

3. be carried out by a remote pilot:

- a) having demonstrated sufficient theoretical knowledge by:
 - (i) completing online training; and
 - (ii) passing an online test in a manner and format established by the NAA;
- b) having familiarised with the UAS to be operated;
and
- c) being at least 16 years old or supervised by a person complying with (a).

UAS.OPA.70 Requirements applicable to UA operations in subcategory A3

UA operations in subcategory A3 shall:

2. be performed with:

- a) a UA having an MTOM, including payload, of less than 25 kg either privately built UA, or placed on the market; and
- b) complying with UAS.OPA.030 for registration and identification; and
- c) with active and up-to-date geofencing and electronic identification systems.

3. be conducted:

- a) up to a height of 120 m (400 ft) above ground level, unless otherwise determined by the NAA for the operational area based on airspace considerations;
- b) within a range such that the remote pilot, or a visual observer who is situated within the VLOS of the remote pilot, maintains VLOS;
- c) in case of (b) clear and effective communication shall be established between the remote pilot and the visual observers;
- d) in an area where the remote pilot can reasonably expect that non-active participants will not be endangered within the range in which the UA will be operated; and
- e) above sparsely populated areas at a safe distance from the boundaries of congested areas; and

4. be carried out by a remote pilot:
 - a) having demonstrated sufficient theoretical knowledge by completing training and passing a test in a manner and format established by the NAA;
 - b) having demonstrated sufficient theoretical knowledge and practical skill to coordinate with one or more observers, when applicable; and
 - c) being at least 16 years old or supervised by a person complying with (a) and (b).

UAS.OPA.80 Occurrence reporting

1. In the event of fatal or serious injury to a person, or when another aircraft other than the UA is involved, the UAS operator shall report the occurrence and other safety-related information, in compliance with [applicable Regulation on occurrence reporting].
2. The NAA shall establish a system for voluntary reporting of any other safety occurrences, in addition to those in 1.

APPENDICES TO PART UAS

Appendix II.1 - Technical requirements for operations in subcategory A1 UASs

A UAS eligible for operations in subcategory A1, shall:

1. have a maximum take-off mass, including payload, of no more than 250 g;
2. have maximum ground speed limited to less than 68 km/h (19 m/s);
3. no unsafe design characteristics exist (e.g. unprotected high-speed rotating parts, etc.);
4. be safely controllable;
5. the UAS shall not be powered by electricity of a nominal voltage exceeding 24 volts direct current (DC) or the equivalent alternating current (AC) voltage, and its accessible parts shall not exceed 24 volts DC or the equivalent AC voltage;
6. be placed on the market with clear operational instructions and warnings highlighting the risks related to UAS operations, adapted to the age of the user; and
7. include information required to use the UAS in accordance with the applicable regulations on aviation safety, security, privacy and data protection, liability and insurance and the awareness leaflet, or equivalent electronic means, defined in Appendix II.2.

Appendix II.2 - Awareness leaflet

1. States shall ensure that each UAS placed on the market is accompanied by an ‘awareness leaflet’, or equivalent electronic means, to raise the attention of the consumer about the risks related to UA operations and provide information about the applicable legislation on aviation safety, security, privacy and data protection, liability and insurance.
2. The leaflet, or equivalent electronic means, shall include reference to a website, not managed by the economic operators, providing additional information.
3. As a minimum the leaflet, or equivalent electronic means, shall summarise, in a form understandable by consumers, the information referred in the table below:

Mandatory minimum information to be included in the leaflet per A subcategories		
A0	A1	A2
Same aviation safety rules applicable to any operation in category A: private, recreational, toy, model, aerial work, commercial or non-commercial		
Image and/or video capturing devices permitted, if not infringing privacy and data protection and subject to applicable legislation on security		
Dropping of objects, spraying of products, transport of dangerous goods and commercial air transport prohibited		
Art. 12 for access to airspace and contact ATSP		
	Registration (ref. UAS.OPA.30)	
	Responsibilities of remote pilot (ref.UAS.OPA.20)	
	Occurrence reporting (ref. UAS.OPA.80) and contact	
	Liability and insurance	
Limitations (ref. ¹ UAS.OPA.050 (b))	Limitations (ref. UAS.OPA.060 (b))	Limitations (ref. UAS.OPA.070 (b))
	Minimum age 16 years	
	Pilot competence (ref. UAS.OPA.60 (3) and UAS.OPA.70 (3))	

¹ The number and text of the rule does not need to be printed on the leaflet.