



EASA

European Aviation Safety Agency

The development of the future European Rules for UAS – A risk based and proportional approach

ICAS Meeting – September 11-12 2017, Winterthur

The EASA Team

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TE.GEN.00409-001



EU legislation – Present and Future

- With regard to unmanned aircrafts, the scope of the EU regulation has been limited, up to now, to aircrafts with a mass higher than 150 kg and not used for “state” operations
- As a consequence EASA MS(*)’s legislation covering the vast majority of UA is not harmonized
- The European Commission’s **Basic Regulation change** included in the “aviation strategy” **published on 7 December 2015 proposes to change this situation with common EU rules for all unmanned aircraft**



(*) Acronyms not explained in text are defined in last slide



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The Present EU Legislation for Civil UAS (a very short overview)

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The Future EU Legislation for Civil UAS

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Main tenets of the new basic regulation with regard to unmanned aircraft

1. Common EU rules for all unmanned Civil aircraft **irrespective of the MTOM:**
 - state operations still excluded but can **Opt-in**
2. Rules should be **proportionate to the risk** of the particular operation(s) and *strive, as far as possible, to ensure the continuation of existing activities*
3. *A degree of **flexibility** should be provided for the Member States ...taking into account local characteristics*
4. *For some types of unmanned aircraft, certification ... will not be necessary for the purpose of reaching adequate levels of safety. Market surveillance mechanisms provided by Union **product harmonization legislation** should be made applicable to those cases” (CE Marking)*
5. UA share the same airspace with other aircraft, the safety of their operations must remain **coherent with the overall aviation safety policy**
6. Art. 46 provides the **tool box** to ensure **compliance**
 - **Certification:** traditional aviation approach
 - **Declaration:** innovative and more flexible approach
 - Community harmonization legislation (**CE marking**)



NPA 2017-05 on the Open and Specific UAS Categories

CATEGORIES



- Published on May 4, 2017
- Provides the basis for EASA future Opinion on unmanned aircrafts system operation in the “open” and “specific “ categories of operation
- Integrates both Aviation and Product legislation (CE marking)
- Includes elements to take Security into account
- Clarify the role of and flexibility for Member States



Overview of NPA open and specific: General



European Aviation Safety Agency

Notice of Proposed Amendment 2017-05 (A)

Introduction of a regulatory framework for the operation of drones

Unmanned aircraft system operations in the open and specific category
RMT.0230

EXECUTIVE SUMMARY

In accordance with Regulation (EC) No 216/2008 (hereinafter referred to as the 'Basic Regulation'), the regulation of unmanned aircraft systems (UAS) with a maximum take-off mass (MTOM) of less than 150 kg falls within the competence of the European Union (EU) Member States (MSs). This leads to a fragmented regulatory system hampering the development of a single EU market for UAS and cross-border UAS operations. A new proposed Basic Regulation (hereinafter referred to as 'the new Basic Regulation'), currently under discussion between the Council, the European Commission, and the European Parliament, aims to

Cover regulation:

Article 1 Subject matter and scope

Article 2: Definitions

Article 3: principles applicable to all UAS operations

Article 4: Open category UAS operations

Article 5: Specific category UAS operations

Article 6: Designation of the competent authority (Aviation)

Article 7: Responsibilities of the competent authority (Aviation)

Article 8: Designation and responsibilities of the market surveillance authority

Article 9: Exchange of Safety Information

Article 10: Third Country UAS operators

Article 11: Means of Compliance

Article 12: Airspace Areas and Special Zones for UAS Operations

Article 13: Exchange of information and safety measures

Article 14: UAS operations conducted in the framework of model clubs and associations

Article 15: Applicability

Article 16: Entry into Force and application

Plus two annexes 1. UAS and 2.MKR

Some key points:

- Responsibilities of operator and pilots defined,
- Registration of operators and UAS with some exceptions,
- e-identification on some UAS
- geo-fencing on some UAS
- Use of product legislation (making available on the market) for technical requirements for the UAS (CE marking)
- Concept of zones
- Contribute to security and privacy
- Several authorities involved in UAS in Member States
- Cover also model aircraft
- Does not apply to in-door operations



Overview of NPA: The “open” and “specific” categories



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Article 1 and 2: Scope and definition

Article 3: Principles

Article 4: Open Category

Article 5: Specific Category

Article 6: Designation of the Competent Authority

Article 7: Responsibility of the Competent Authority

Article 8: Designation and responsibilities of market surveillance authority

Article 9: Exchange of Safety Information

Article 10: Third Country UAS Operators

Article 11: Means of Compliance

Article 12: Airspace Areas and Special Zones of Operations

Article 13: Exchange of information and safety measures

Article 14: Model Clubs and Associations

Article 15: Applicability

Article 16: Entry into Force and Application

1 of 72

Subcategories

No pre authorisation required

Subpart A

Subpart B

Risk Assessment
Standard Scenarios
Mutual Recognition
LUC

Low risk

Declaration

High risk

Authorisation

Light Operator Certificate: Privileges to self authorise operations in specific category (Subpart C)



Overview of NPA: Special Zones defined by MSs



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Article 1 and 2: Scope and definition

Article 3: Categories of Operations

Article 4: Principles

Article 5: Open Category

Article 6: Specific Category

Article 7: Safety Critical Services

Article 8, 9: Competent Authority

Article 10: Exchange of Safety Information

Article 11: Means of Compliance

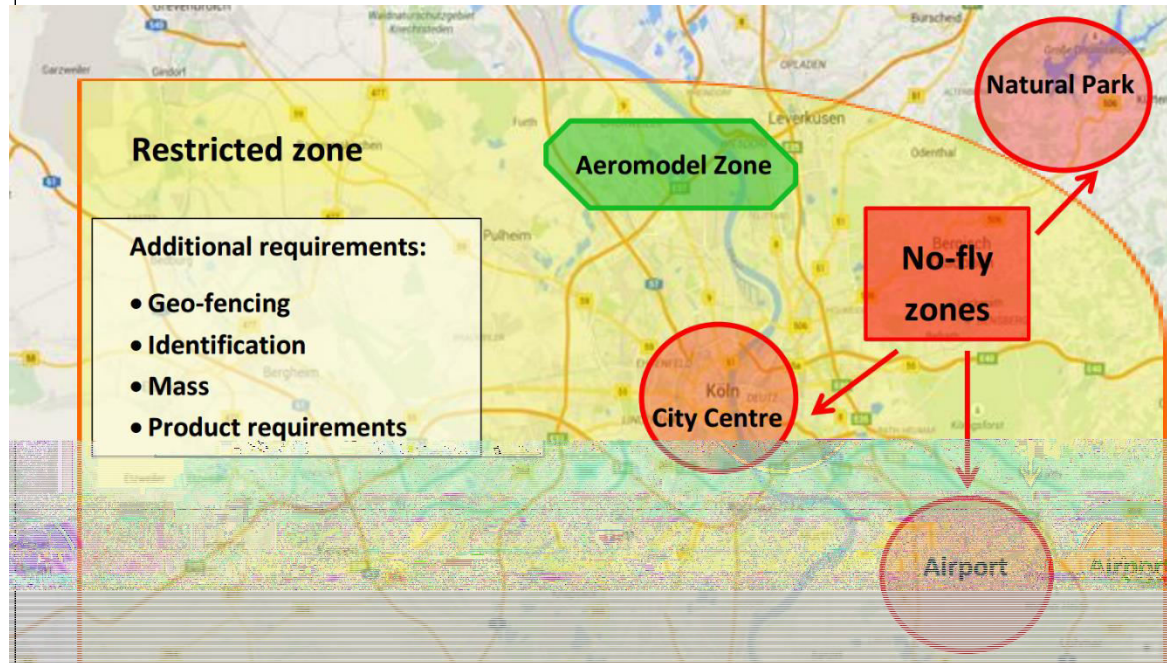
Article 12: Airspace Areas and Special Zones for UA Operations

Article 13: Immediate Reaction to a Safety problem

Article 14: Applicability

Article 15: Transitional Provisions

Article 16: Entry into Force



Defined by Member States



Open Category: NPA Principles

- **Risk / Operation Centric**: the nature of the risk inherent in the operation must be specifically addressed. As there are no people on-board, consequence of an accident depends on the mission environment
- **Proportional**: any mitigation factor brings some burden for the operator. Mitigation measures, implementation costs and resources must be proportionate to the risk they address
- **Performance-based**: rules should be expressed in terms of objectives or mandate a process so that they are technology transparent and do not mandate solutions



NPA Proposal for Open Category

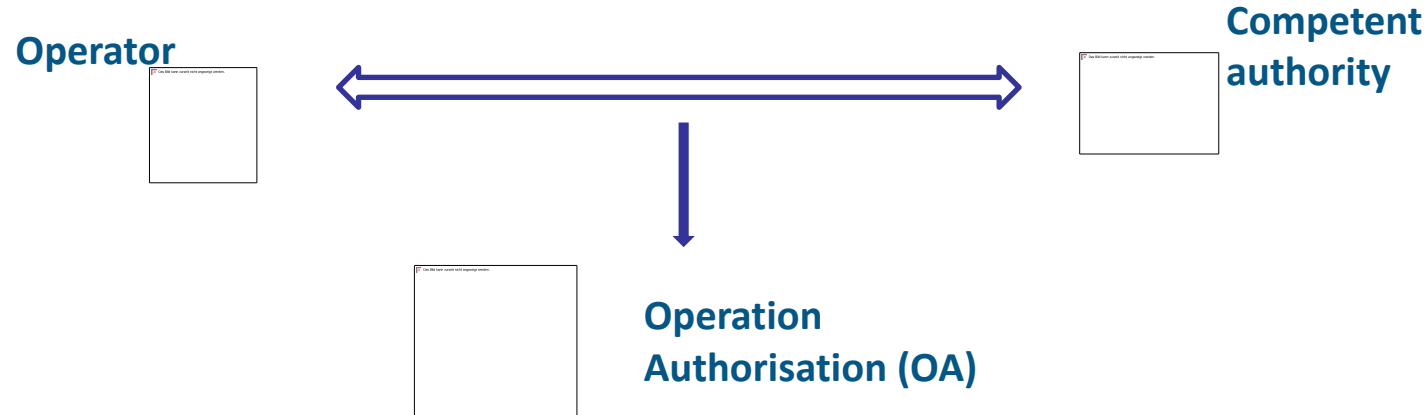




Specific Category: Operation Authorisation

The Specific Category is centered on the concept of **Operational Authorisation** based on a **Risk Assessment** process

1. In order to obtain the Authorisation, the Operator shall give evidence of risk mitigation factors that have been put in place to mitigate the risk of the specific operation

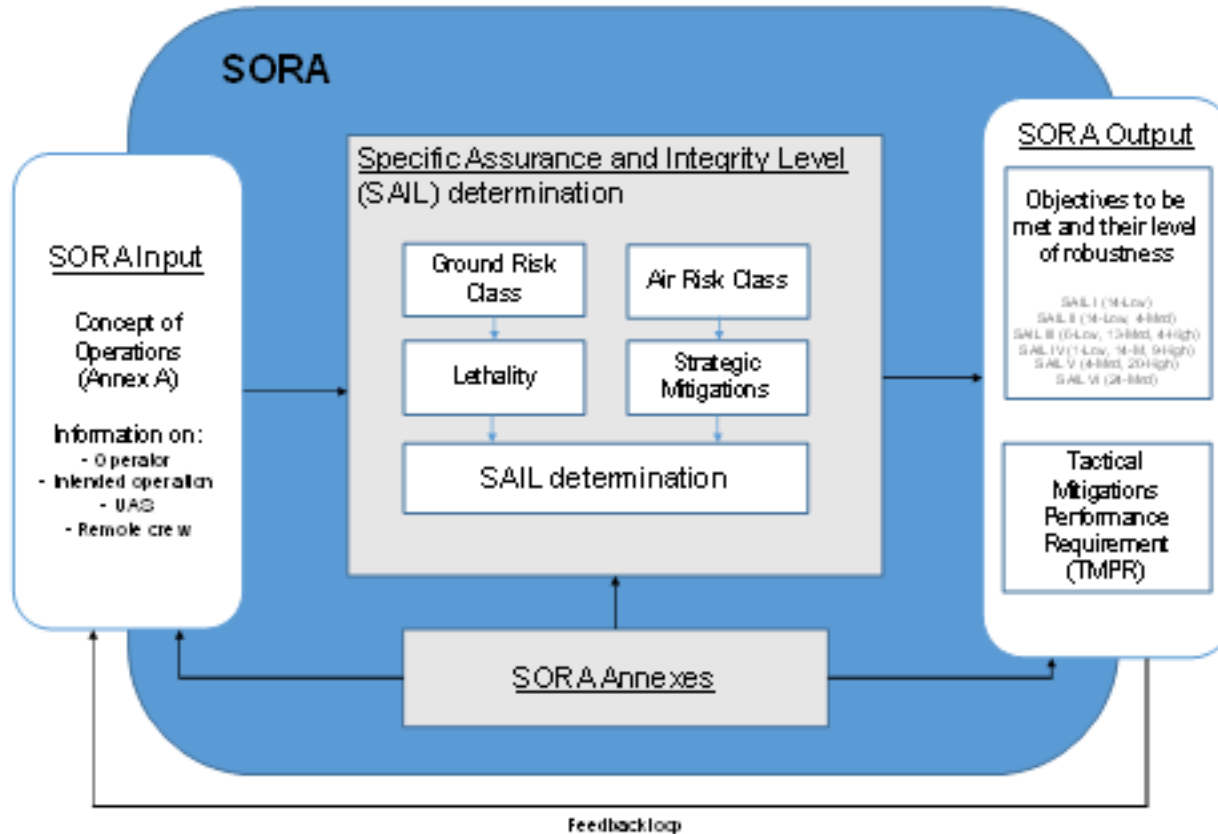


2. In order to identify the necessary **mitigation factors**, the operation is analyzed by means of a risk assessment model adopted by EASA as AMC:
 - the JARUS **SORA** (specific operation risk assessment)
- The **SORA** identifies the necessary **risk mitigation factors** in terms of **harm barriers** and **threat barriers** necessary to reduce both the **AIR risk class (ARC)** and **GROUND risk class (GRC)** to a level deemed acceptable



SORA – Specific Operations Risk Assessment

The SORA document with its Annexes, prepared by JARUS WG 6, is referenced by NPA AMC1 UAS.SPEC.40.





Standard Scenarios

To facilitate the task of Operators and promote operations in the specific category, the NPA introduces the concept of **Standard Scenarios**.

If the Operator elects to carry out an operation already covered by one of the “**Standard Scenarios**” that will be adopted by EASA, he/she will find the mitigation means to be put in place (harm barriers and threat barriers) **already identified** in the documentation published with that standard scenario, as well as the precise Conops within which the Operation is permitted

“**Low risk**” and “**High risk**” standard scenarios will be addressed

The operator of the UAS is responsible for staying within the operational and technical limits defined by the Standard Scenario.

Any deviation from these limits leads to non-compliance with this scenario and its approvals



LUC – Light UA Operator Certificate

- Any legal person shall be eligible as an applicant for a LUC
- An application for a LUC or for an amendment to an existing LUC shall be submitted to the competent authority and shall contain the information required by UAS.LUC.30 (Management System) and UAS.LUC.40 (LUC Manual, describing procedures and activities of the Operator)
- A UAS operator holding a LUC shall be entitled to authorize its own operations, within its terms of approval.



Contribution to Security and Privacy in the NPA: examples

- **Registration:** UAS operators must register the UA except those operating UAS with an MTOM of less than 250 g. For security considerations, the UAS operator must also register the UA when the UA is heavier than 900 g.
- **Electronic identification:** functionality required for class C1 when equipped >5 megapixels camera, or class C2 or when required by the zone of operation.
- **Geofencing:** functionality is required for UAS in class C2, or required by the zone of operation.
- **Lights:** C1 required for controllability; C2 and C3: as required for the operating conditions;
- MSs may define **zones** also for security or privacy reasons.
- The **obligation of the operator** to comply with security requirements: defined in Article 3 .
- Remote pilot of a UA to **avoid flying close to emergency response efforts.**
- The basic remote-pilot competence in open category: **must demonstrate knowledge of relevant EU security and privacy/data protection regulations.**



UA Categories and Applications in synthesis

- The **Specific Category** is a very promising category to cater for the expected high growth of commercial UA applications
 - BVLOS is certainly an important enabler and BVLOS operations will not be allowed in the open category
 - Standardized operations and the JARUS SORA are key elements for the effectiveness of is category
- The **Open Category** will cater for most leisure operations but also relatively simple commercial applications
- The **Certified Category** will host operations with higher risk, such as:
 - Large or complex UAS operating on densely populated areas
 - Large or complex UAS operating BVLOS in high density airspace
 - UAS used for transport of people
 - UAS used for the carriage of dangerous goods that create high risks for third parties



Planned regulatory work

- Categories open and specific
 - Consultation period ended on 15 September;
 - Workshop held on July 5
 - Opinion: planned for January 2018;
 - Adoption of regulation depending on adoption of the Draft BR
- Next activities:
 - Development of Standard supporting technical requirements
 - Standard scenarios for specific category planned for Q2 2018
- **Category certified:**
 - NPA planned for Q1 2018
 - CS-UAS planned for Q1 2019



Other Activities (I): Standardization

- EASA participates in EUSCG: European Forum coordinated by EC in charge of defining a RDP for standardization activities in the Civil UAS domain
 - 2nd meeting held on 6 September
 - Several standardisation bodies involved (EUROCAE, ISO, SAE, ASTM)
 - Particular focus on standards in support of the NPA Open Category (CE Marking) and Standard Scenarios
 - Main standards to be included in the RDP:
 - E-Ident
 - Geo-fencing
 - Height limitation
 - Reduction of injury level
 - Reliable and predictable method to terminate flight
 - ...
- Similar forum established in US (UASSC – UAS Standardisation Collaborative)



Other activities (II)

- Cooperation with EC, Member States and Stakeholders
 - Examples: workshops; Expert group to prepare the NPA; participation in conferences; meetings
 - Cooperation with Member States on implementation of rules: defining expectations
- International cooperation:
 - Active participation to ICAO and JARUS; close contacts with FAA
- Safety promotion:
 - Survey of ECAC Member States activities
 - preparing a European UAS safety promotion campaign



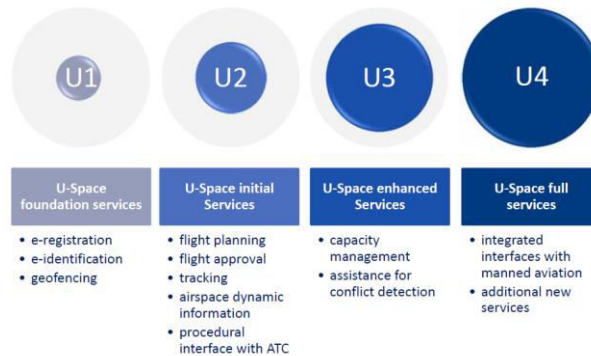
Other activities (III)

- **U-space and ATM master plan**
 - Cooperation with EC, EDA, EUROCONTROL and SJU
 - Adoption end of the year of an addendum to the ATM master plan
 - U-Space a reality by 2019 with a step by step approach:
 - Registration, E-identification, Geo-fencing are the 3 pillars in 2019
- **Dual-Use UAS:**
 - Cooperation with EDA (e.g. risk assessment)
 - Cooperation with several military airworthiness authorities
- **Research:**
 - Cooperation with EDA and SJU (e.g. support to their projects)
 - Definition of a research programme for the UAS-manned aircraft collisions



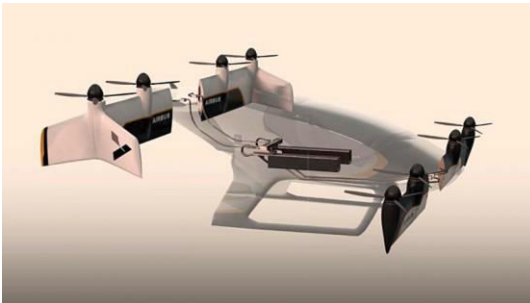
- **Development of the concept of the “U-Space” on access to low level airspace especially in urban areas – first step by 2019**
 - Set of services in a given area; not only for very low level; high level of digitalisation and Automation; step by step approach
 - Adoption of blueprint by end of the year as part of a revision for UAS of the ATM master plan
 - Interface with NPA: list of gaps / differences identified for the various steps
 - Full consistency for the first step (2019)
 - Beyond technical issues: liability and financing of service provider and rulemaking actions need to be fully assessed

What could be the services?





Urban mobility :EASA-NAA cooperation needed



- Performance based; risk based; holistic approach
- How to proceed when rules are not available?
- Technical challenges:
 - Batteries: Power to weight/ volume ratio, endurance; availability of necessary metals, fire, charge, replacement, disposal.
 - Autonomy; artificial intelligence; ethics
 - Cybersecurity
 - Noise physically less but issue of perception
- Role of human: competencies



List of Acronyms

- ASD: Organization representing European Aeronautics, Space and Defence Industry
- ASTM: American Society for Testing and Materials (US Standardization Organization)
- CE: Conformité Européene
- CS-LUAS: Certification Specification-Light Unmanned Aeroplane Systems
- CS-LURS: Certification Specification-Light Unmanned Rotorcraft Systems
- C2: Command and Control
- D&A: Detect and Avoid
- DMAE: Drones Manufacturers Alliance Europe
- ECAC: European Civil Aviation Conference
- FAA: Federal Aviation Administration
- FCL: Flight Crew License
- ICAO: International Civil Aviation Organization
- KE: Kinetic Energy
- MP: MegaPixels
- MS: Member States
- NPA: Notice of Proposed Amendment
- RIA: Regulatory Impact Assessment
- SAE: Society of Automotive Engineers
- SC: Special Condition
- UA: Unmanned Aircraft
- UAS: Unmanned Air System



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Questions and comments welcome

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EASA documents on UAS
available at

<http://www.easa.europa.eu/easa-and-you/civil-drones-rpas>

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