EASA
European Union Aviation Safety Agency

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EASA Drones Section Manager
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AEI Annual Congress 2021
An overview of the EU Regulations on UAS

UAS categories

Open	Specific	Certified
	 	  

Operation centric, risk-based, performance based regulation

Commission Delegated Regulation (EU) 2019/945 (UAS technical requirements and third country operators)

&

Commission Implementing Regulation (EU) 2019/947 (Registration and operational requirements)

Applicability from 31 Dec 2020

OPEN category - Low risk

NO-PRE APPROVAL

No Type certificate required

CE marking process

Professional such as photographers, inspections in unpopulated areas

SPECIFIC - Increased risk

Approval from NAA

Type certificate may be required

BVLOS operations (linear inspections, aerial work, …)

Transport of goods

Planned starting from 2022

CERTIFIED - Risk as manned aviation

Certificate for the operator, for the UAS, and licensed pilot

Air Taxi

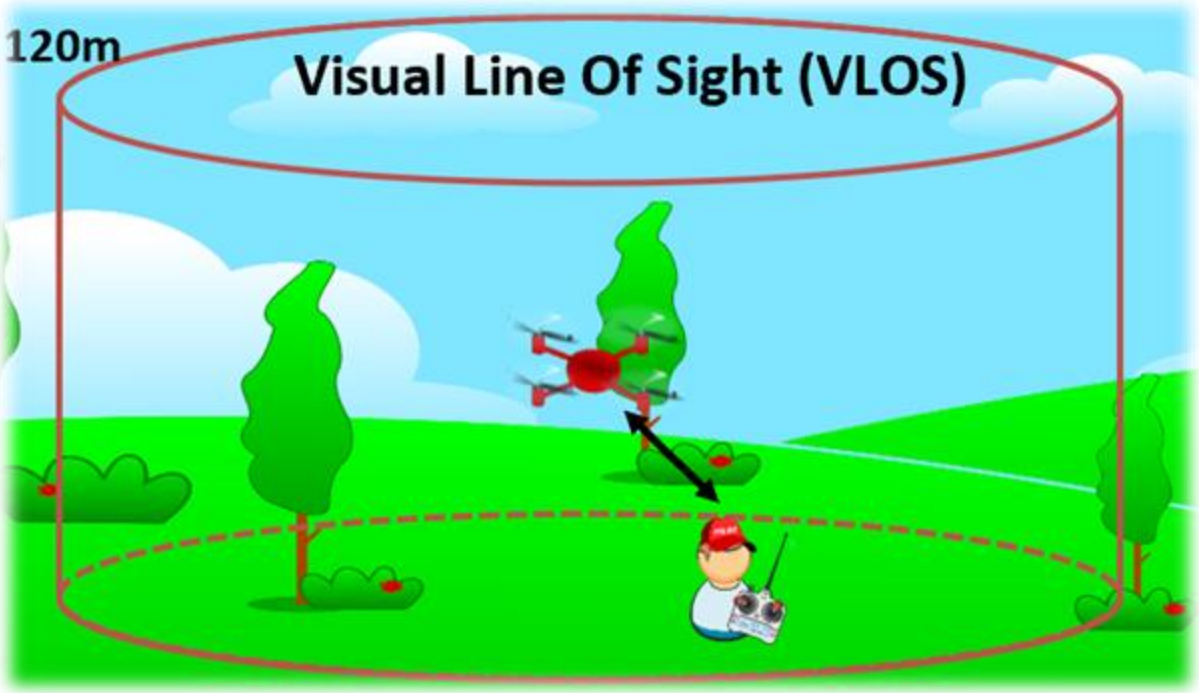
International IFR (cargo, passengers)

Package delivery over people

Open category

Prescriptive requirements

Buy → Register yourself → Train → Fly



- A1 fly over people
- A2 fly close to people
- A3 fly far from people

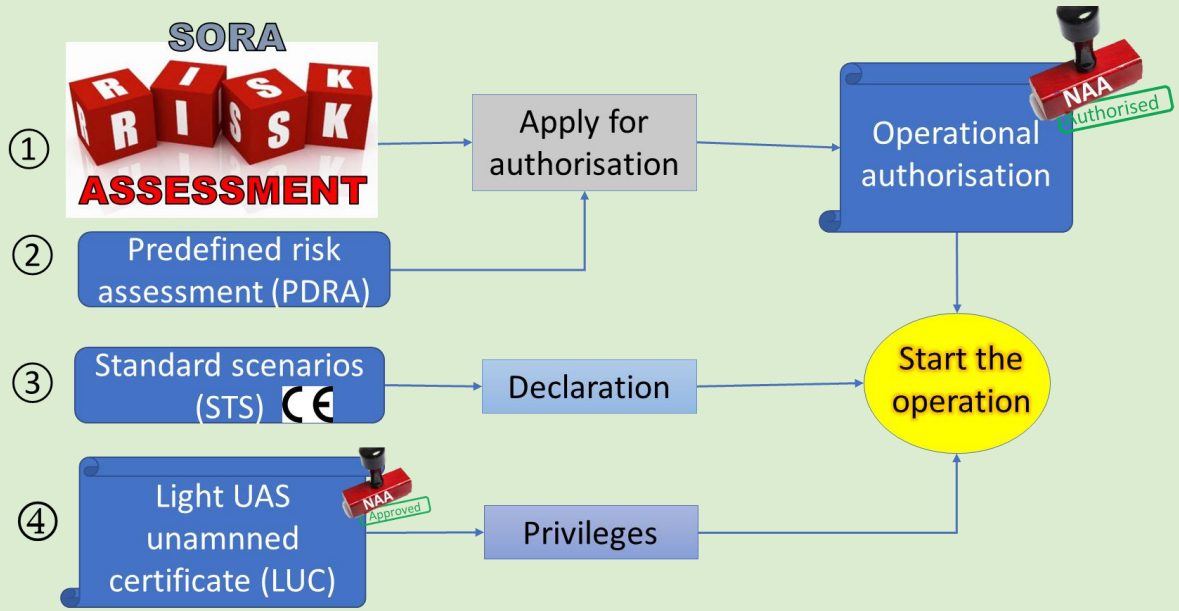
Privately built with MTOM<250g

Privately built with MTOM<25kg

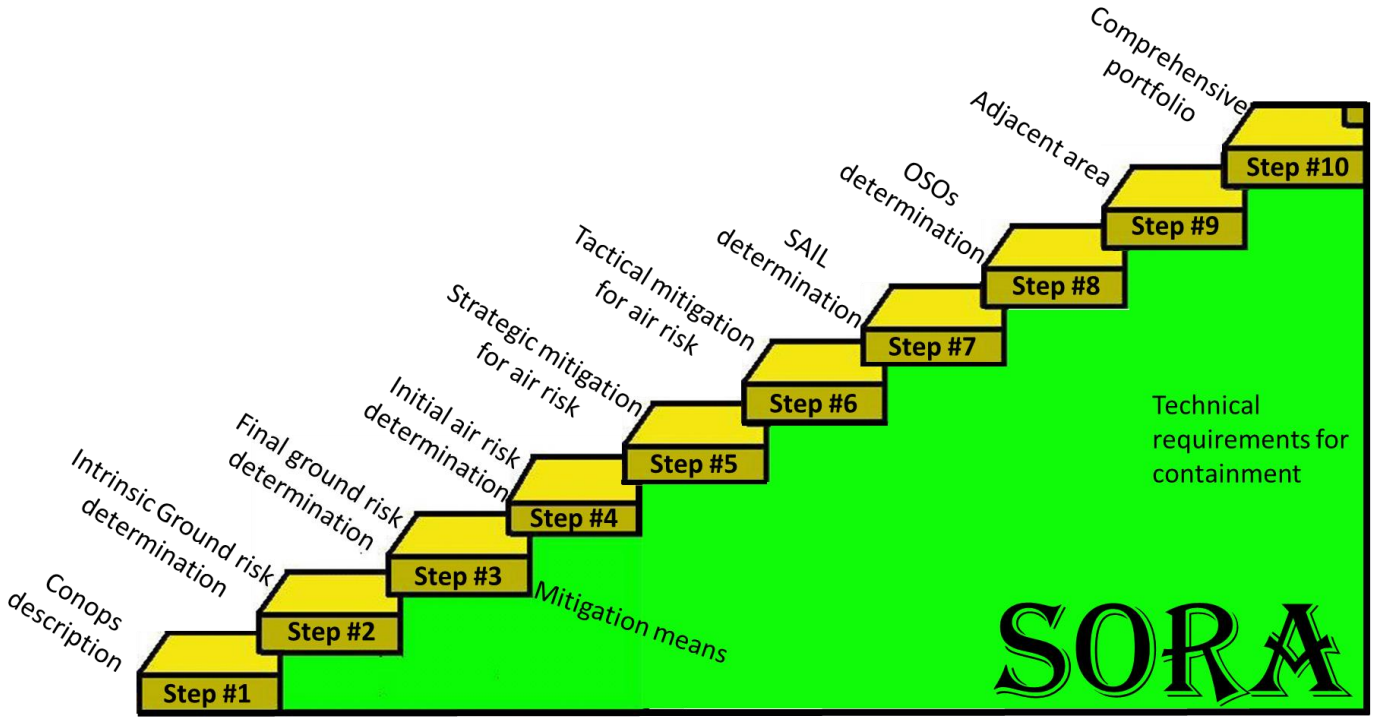
Specific category

Requirements based on the risk assessment performed by the UAS operator

Buy → Register yourself → Carry out risk assessment → Receive authorisation → Fly



SORA methodology- 10 Steps



Intrinsic UAS ground risk class				
Max UAS characteristics dimension	1 m / approx. 3 ft	3 m / approx. 10 ft	8 m / approx. 25 ft	>8 m / approx. 25 ft
Typical kinetic energy expected	< 700 J (approx. 529 ft lb)	< 34 kJ (approx. 25 000 ft lb)	< 1 084 kJ (approx. 800 000 ft lb)	> 1 084 kJ (approx. 800 000 ft lb)
Operational scenarios				
VLOS/BVLOS over a controlled ground area[3]	1	2	3	4
VLOS over a sparsely populated area	2	3	4	5
BVLOS over a sparsely populated area	3	4	5	6
VLOS over a populated area	4	5	6	8
BVLOS over a populated area	5	6	8	10
VLOS over an assembly of people	7			
BVLOS over an assembly of people	8			

Table 2 — Determination of the intrinsic GRC

Verification of the design of the UAS

Open category

Specific category

Depending on the risk

low risk

Or declaration

medium risk

high risk

European Aviation Safety Agency

Design verification report

Certified category


European Aviation Safety Agency

TYPE CERTIFICATE

EASA.E.210

This Type Certificate is issued by EASA, acting in accordance with Regulation (EC) No. 216/2008 on behalf of the European Community, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation and in accordance with Commission Regulation (EC) No. 748/2012 to

Part 21

and certifies that the product type design stated below complies with the applicable Type Certification Basis and environmental protection requirements when operated within the conditions and limitations specified on the associated

Type Certificate Data Sheet number: EASA.E.201

Tye Design - Model:

Date of Issue:

09 November 1988

Certification basis:

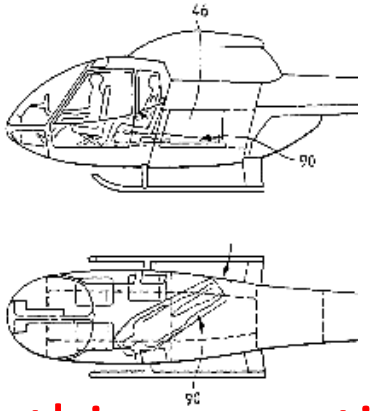
- **SC Light UAS**

  or

- **CS- x complemented by future CS UAS**

Definition of certified category

→ UAS operations with a risk such that the following is required:



Airworthiness certification

Operator certification

Remote pilot license

Examples

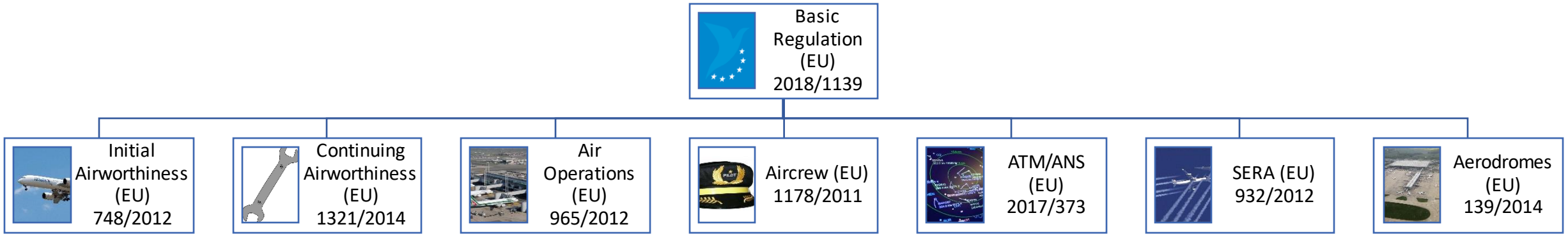
Operations over assemblies of people with a large UAS

Transport of people

Transport of dangerous goods if in case of accident they pose high risk for third parties

RMT.0230: objectives and planning

Comprehensive and interrelated set of affected rules



‘Certified’ category UAS and piloted eVTOL:

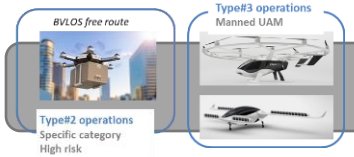
On our way towards the NPA…

2021: December | January | February | March | April | May | June | July | August | September | October | November | December
2022: January | February | March

ToR Issue 3

Concept Paper Issue 3.0

All deliverables of the WGs submitted



Rules development

Internal review / proofreadings

NPA#1 first draft

NPA#1 publication

NAA feedback analysis

Specific Impact Assessment

IA internal approval

Study on “Societal acceptance of UAM”

Final report

Reference material

- Regulatory references
  - Commission Implementing Regulation (EU) 2019/947 + AMC/GM
  - Commission Implementing Regulation (EU) 2019/945
  - Commission Delegated Regulation (EU) 2021/664
  - Commission Delegated Regulation (EU) 2021/665
  - Commission Delegated Regulation (EU) 2021/666
  - NPA 2021/09 AMC/GM update Regulation (EU) 2019/947

Reference material

- Airworthiness
  - Special Condition VTOL + MoC
  - Special Condition Light UAS
  - Guidelines on Design verification of UAS operated in the ‘specific’ category and classified in SAIL III and IV
  - Adoption of international technical standards applicable to the ‘open’ and ‘specific’ category
- Future regulatory references
  - NPA 2021/xx AMC/GM on U-space regulations
  - NPA 2022/xx on UAM with manned VTOL

Reference material

- Support to Member States and stakeholders
  - Focused workshops to support the implementation of the rules
  - Beginning of standardization activities
- Safety promotion
  - EASA High Level Conference on drones
  - Virtual events / information sessions on the EASA YouTube channel
  - Manual on drones' incident management at aerodromes
  - Infographics on the EASA website
- Research
  - U-space integration with ATM / U-space services & operations
  - C-UAS technologies
  - Detect & Avoid
  - VTOL & UAS enabling technologies (e.g. airworthiness, pilots' training)
  - Ground infrastructures

Expected industry developments

EASA regulatory input to EC Drone Strategy 2.0

Drones Business Services
Initially: in corridors
Later: free routes

Passenger-carrying eVTOL
(*with* pilot on board)

International Cargo
(*no* crew on board)

2020

2025

2030

2035

U-space applicability
(January 2023)

Passenger-carrying eVTOL
(*no* pilot on board)

Making it happen – safely!

Critical UAM enablers EASA is working on

International Cooperation
Harmonised Technical Standards, Research, Demonstrations

Uncooperative and malicious Drones
Counter-UAS Action Plan

Airworthiness, Aircraft Certification and Maintenance
eVTOL and UAS

Civil-Military Coordination
Dual-use Drones, ATM Integration

Vertiports
Technical Specifications and Navigation Aids

Training and Simulation
Virtual & Augmented Reality

Air Operations
Operating Rules in Urban Environments

Novel Technologies
Flight Controls, Avionics, Propulsion, Energy

Personnel training and licencing
Operators, eVTOL Pilots, Remote Pilots

Digitalisation
Artificial Intelligence, Autonomy, Cybersecurity

Operator Certification
Air Operator Certificates

Airspace Architecture and Integration
U-space, C2-Link, Detect-and-Avoid, iConspicuity

U-space:
Update on AMC/GM for U-space implementation

State of play:

- October: completion of the review by SG of the package

→ Technical work is on-going, timeline currently met

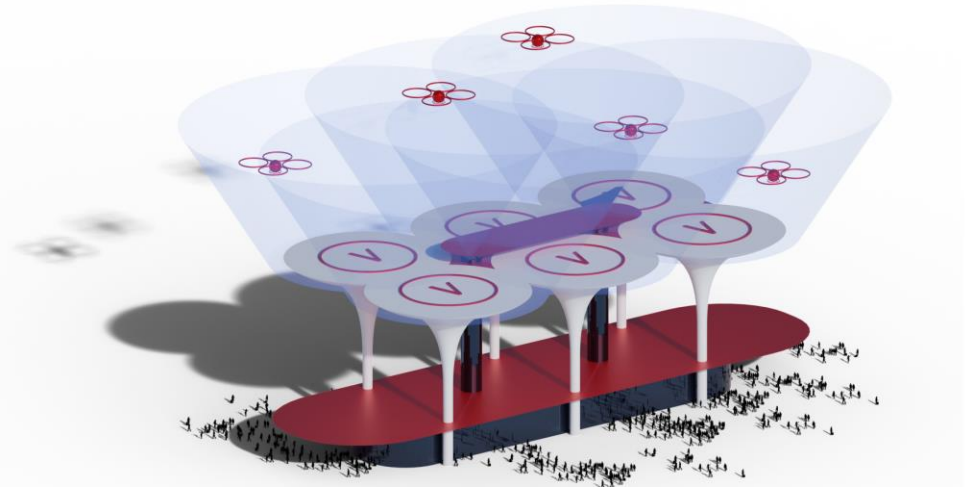
Next immediate steps:

- SG last meeting in October: final AMC/GM proposal available

→ Preparation of NPA has started (publication expected in 01/2022)

Vertiports (VPT) background

- **EASA Vertiports Task Force (VPT TF)** established with representatives from NAAs aerodromes and (future) vertiports operators, VTOL aircraft manufacturers, experts and EASA staff,
- Baseline existing EASA CS/GM for heliports (CS-HPT-DSN), ICAO Annex 14, Vol II – Heliports and inputs received from VTOL manufacturers.



Short Progress Summary

Programme overview

Vulnerability of manned aircraft to drone strikes

- Three year, competitively-tendered programme
- Sponsored by the European Commission under Horizon 2020 and contracted through EASA

Key objectives

- **to deepen the understanding** — through experimental testing and simulation techniques — regarding the effects of the collision of mass market drones ('threat') with manned aircraft ('target');
- **to identify drone design strategies** aimed at containing the risk that drone-aircraft collision may induce on the aircraft and its occupants; and
- **to define a draft design requirement and test standards** for future drones to be put on the market within the EU open category (CE marking).

This Horizon 2020 programme has been sponsored by the European Commission

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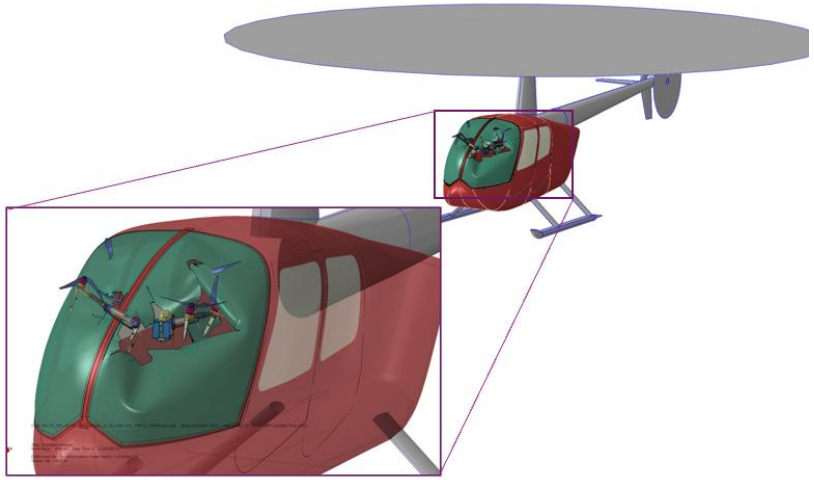


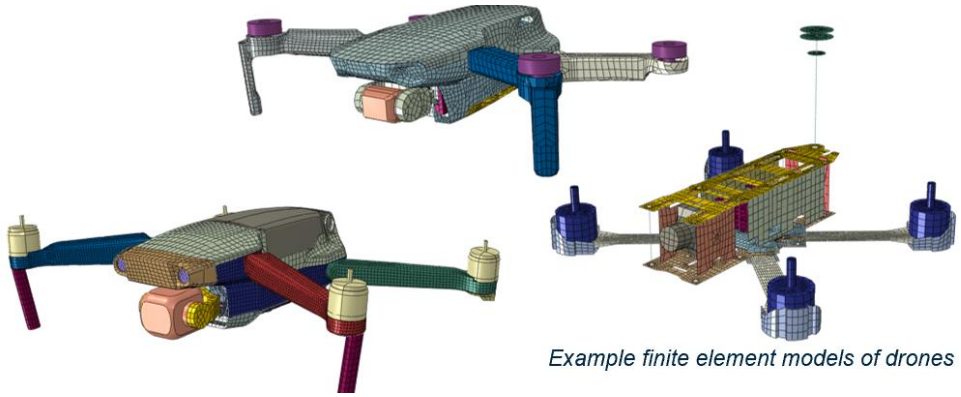
Example collision between large consumer drone and light rotorcraft windshield (preliminary result)

QINETIQ

Project Progress

Completed activities

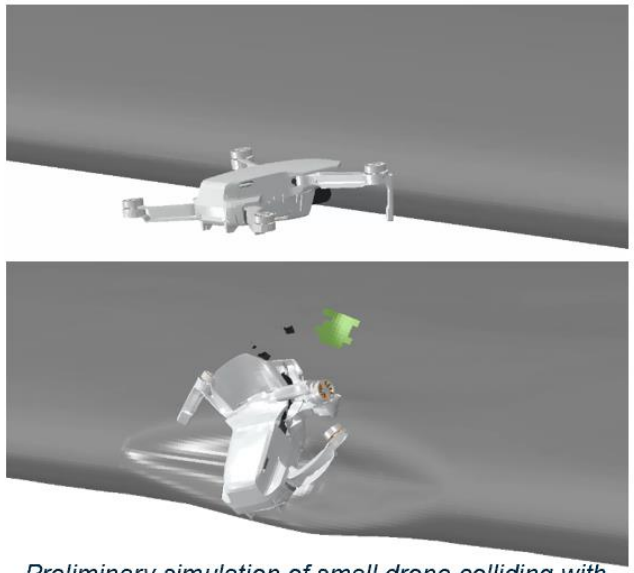
- Stakeholder community assembled
- Reports delivered, describing:
  - Worldwide state-of-the-art [Published]
  - Definition of a ‘Collision envelope’, including [Published]
  - Modelling approach [Delivered to EASA]
  - Collision Simulation Framework specification [Draft]



Example finite element models of drones

Ongoing activities

- Finite element-based simulation methods have been developed and are in the final stages of validation. This has included:
  - Development and calibration of drone ‘threat models’
  - Validation of failure modelling methods for aircraft structures
- Once validated, these methods (and full-scale tests) shall be used to simulate collision scenarios against CS-23, CS-25, CS-27 & CS-29 aircraft.
- These activities will greatly increase knowledge of drone collision threats and allow design mitigations to be proposed and evaluated.



Preliminary simulation of small drone colliding with a GA leading edge structure

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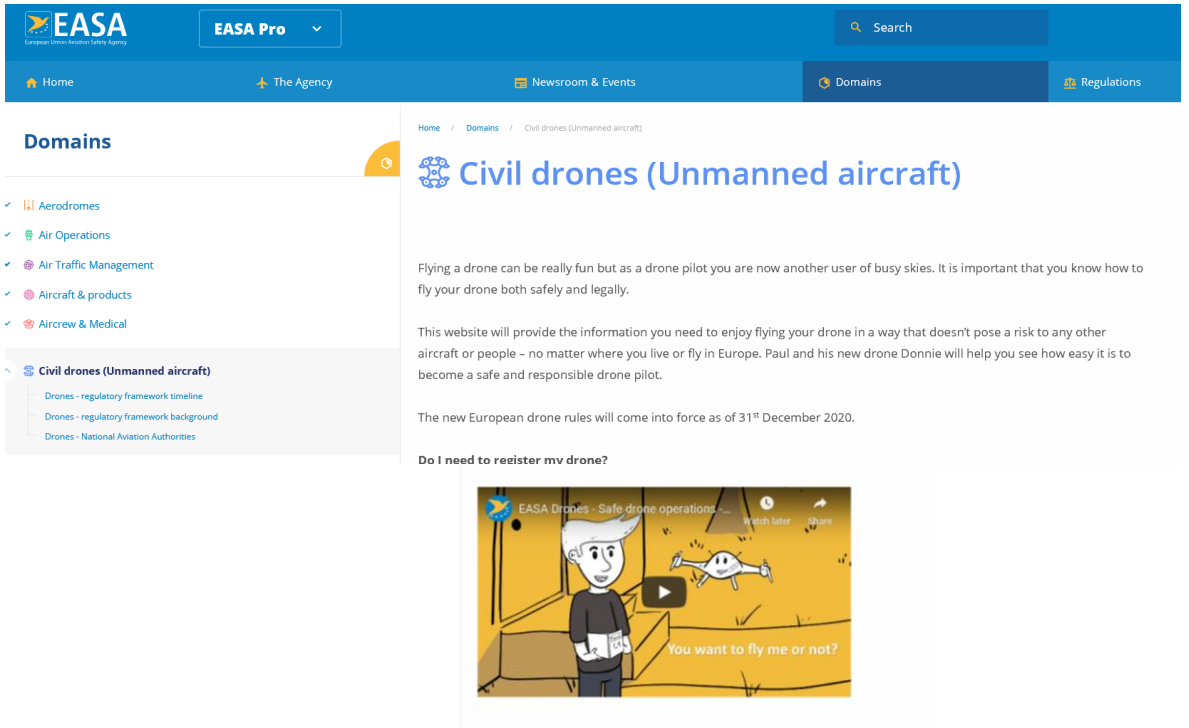
EASA drone website

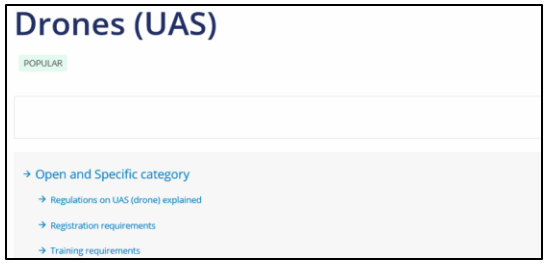
https://www.easa.europa.eu/domains/civil-drones-rpas

Documentation



Videos and presentations

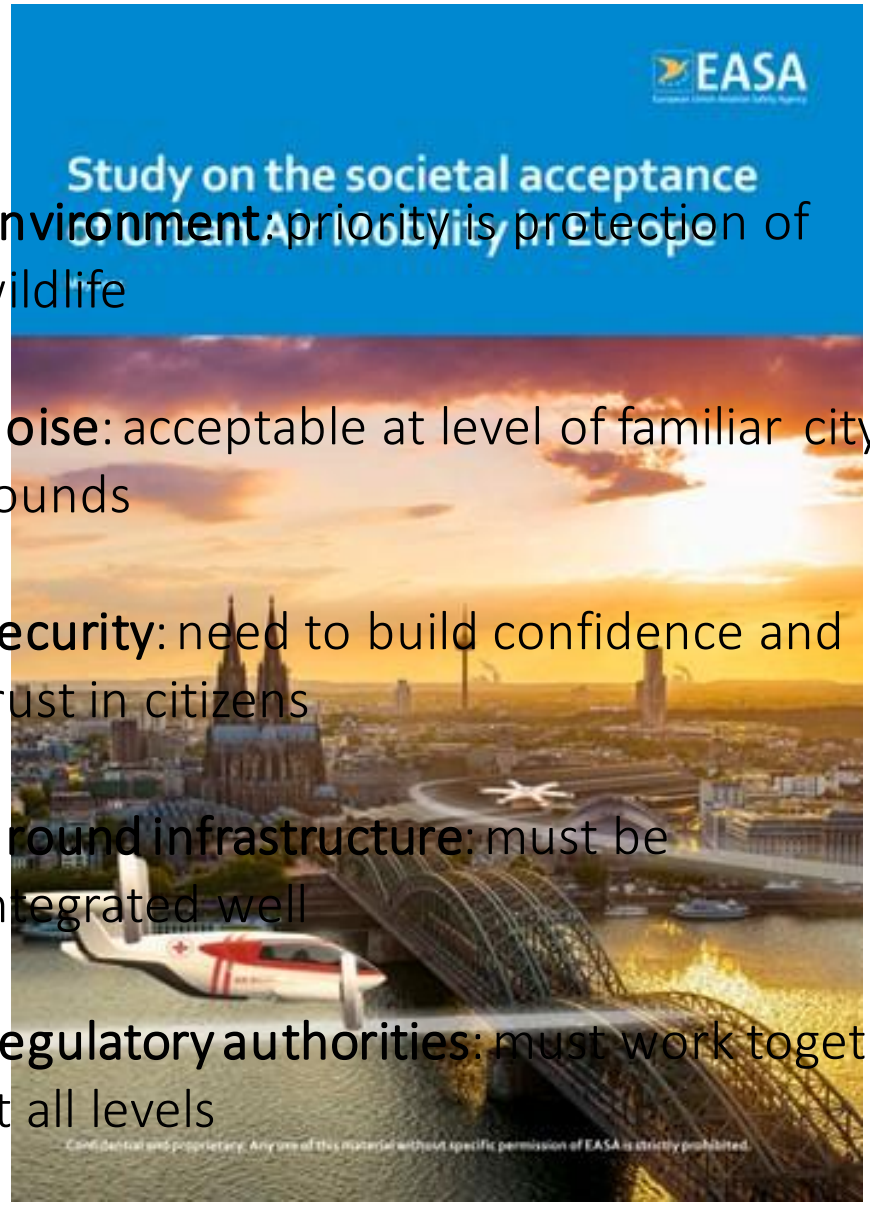
FaQ



UAM societal acceptance

- A **positive** initial **attitude** to UAM throughout the EU
- Strong support for use cases in the **public interest**
- **Top 3 expected benefits**: faster, cleaner, extended connectivity
- **Top 3 concerns**: safety, environment/noise and security
- **Safety**: existing aviation safety levels are the benchmark

- **Environment**: priority is protection of wildlife
- **Noise**: acceptable at level of familiar city sounds
- **Security**: need to build confidence and trust in citizens
- **Ground infrastructure**: must be integrated well
- **Regulatory authorities**: must work together at all levels



EASA High Level Conference (HLC) on Drones

'UAM becoming a Reality'
18-19 January 2022

- In collaboration with AMSTERDAM DRONE WEEK

Format outline (tentatively, work in progress):

- **Hybrid event** allowing physical presence subject to pandemic; short-term decision possible
- High-level participants on **18 Jan 2022**
- Various technical workshops planned on **19 Jan 2022**

- **Save the date!**

European Union Aviation Safety Agency

Thank You!

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Your safety is our mission.

An Agency of the European Union