MULTI-SECTOR WORKSHOP ON INNOVATIVE REGULATION

Challenges and benefits of harmonising the licensing process for emerging technologies

14-18 December 2020
MULTI-SECTOR WORKSHOP ON INNOVATIVE REGULATION

Challenges and benefits of harmonising the licensing process for emerging technologies

Welcome

Day 2 – Tuesday 15 December
Session 3

Moving safely from aircrafts to drones: licensing disruptive technologies
MULTI-SECTOR WORKSHOP ON INNOVATIVE REGULATION: Challenges and benefits of harmonizing the licensing process for emerging technologies

Session 3 - Moving safely from aircrafts to drones: licensing disruptive technologies

Ms. Silvia GEHRER
Regional Director, ICAO European and North Atlantic (EUR/NAT) Office, United Nations International Civil Aviation Organisation
Innovation and International Regulatory Frameworks: The ICAO RPAS case

Silvia Gehrer
ICAO Regional Director
Europe and North Atlantic

OECD/NEA Multi-sector Workshop on Innovative Regulations | 15 December 2020
• ICAO Brief
• ICAO Innovation Areas (video)
• Technical Innovation Approval Process: How do we do it?
• RPAS Case: Aircraft, Components, Stakeholders, Layered Approach, RPAS Panel, Scope of Work & Timelines
• Upcoming Webinars, Events & Training
UN specialized agency

Established by the “Chicago Convention” in 1944

Global Forum for cooperation in all fields of civil aviation

193 Contracting States

19 Annexes – Standards, policies & guidance

Strategic Objectives to support the global aviation
ICAO Regional Offices - Main functions

- Facilitate a regionally coordinated implementation of ICAO strategies, SARPs and guidance
- Facilitate regional monitoring and provision of feedback on the implementation progress and hurdles
- Maintain continuous liaison with States, regional and international organizations
- Ensure intra and inter - regional coordination
Introduction to the ICAO Innovation in Aviation Gateway (video)
Innovation: Approval process

- Regulation is almost always focused on minimizing risks
- Understanding from States is required
- How innovation behaves in a variety of states: normal, abnormal and failure
- Regulation requires consistency
- The challenge: The Design, the interaction between systems, and the human training greatly impact the regulatory work
- Manufacturer & Regulator symbiotic relationship | The need for standardization vs speed of discoveries
- SMS model: Adapting regulations | Direct submissions (SARPS)
- Complementing Industry Standards (EUROCAE, RTCA, SAE or ISO)
**Aircraft.** Any machine that can derive support in the atmosphere from the *reactions of the air* other than the reactions of the air against the earth’s surface.

**Unmanned aircraft.** An aircraft intended to be operated with *no pilot on board*:
- A remotely piloted aircraft (RPA) is part of an RPAS (system); piloted from a RPS
  - subset of RPA intended for *international, instrument flight rules (IFR)* operations; full regulatory *certification*
- Small UA: generally <25 kg (commonly “drones”)
- Unmanned free balloons: non-power driven, unmanned, lighter-than-air aircraft in free flight
- Model aircraft: scaled down version; recreational
An **RPAS** consists of:

- One (1) **RPA**
- One (1) or more **RPS**
- **RPA and RPS** connected by **C2 Link** (in direct radio line-of-sight or BRLOS, such as via satellite)
- **Other components** essential for flight, like manned aircraft, including:
  - ATC communications and surveillance equipment (radio coms; CPDLC; ADS-B; SSR transponder)
  - Navigation equipment
  - Launch and recovery equipment (e.g. catapult, winch, rocket, net, parachute, airbag)
  - Flight control computer (FCC), FMS and autopilot
  - System health monitoring
  - Flight termination system
• **ICAO RPAS Panel** brings together regulators and industry
• 26 States from all 6 regions, ensuring geographical representation and **diversity** of points of views/development stages
• Major aviation **industry** organizations: IATA, ACI, CANSO, EUROCONTROL, EASA, IFALPA, IFATCA, IAOPA, RTCA, EUROCAE, NATO, AUVSI, UVSI
• **RPAS panel** acts as a **focal point** and **coordinator** of RPAS work
ICAO’s layered approach

- Core provisions for international air navigation
- Key requisites for safe integration
- Longer-term enablers

Core provisions
- Licensing
- Airworthiness
- Operations & SM
- C2 Link

Integration
- DAA
- ATM
- SAR
- Aerodromes
- AIM

Enablers
- Environment
- Legal
- Security
- Facilitation
- Funding...
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Scope of Work

1. AIRWORTHINESS-A8: Adopt: Q1 2021
3. DAA-A10V4P2: Deliv: Q1 2022
5. OPERATIONS-A6P4: Deliv: Q1 2021
6. ATM-A2&11, PANS ATM: Deliv: Q1 2022
7. HITI-New Ch. 10019: VI-deliv: Q1 2021, VII-deliv: Q1 2022
8. RPAS MANUAL (Doc 10019): VI-deliv: Q1 2021, VII-deliv: Q1 2022
9. RPAS/SPM JTF-A19: PR: Q1 2022
10. INTERCEPTIONS TF
11. AERODROME S JTF/WG

ICAO/IMO JWG-SAR

ICAO Sec

Job cards

ASSEMBLY A41 2022
HLSC 2021
ANCONF 2024
COUNCIL
ANC

FLIGHT OPERATIONS (FLTOPSP)
AIRWORTHINESS (AIRP)
COMMUNICATIONS (CP)
FREQUENCY SPECTRUM (FSMP)
NAVIGATION SYSTEMS (NSP)
AERODROME DESIGN & OPERATIONS (ADOP)
METEOROLOGY (METP)
SURVEILLANCE (SP)
ACCIDENT INVESTIGATION (AIGP)
SAFETY MANAGEMENT (SMP)
DANGEROUS GOODS (DGP)
INSTRUCTION FLIGHT PROCEDURES (IFPP)
INFORMATION MANAGEMENT (IMP)
ATM OPERATIONS (ATMOPSP)
ATM REQUIREMENTS & PERFORMANCE (ATMRPP)
SEPARATION & AIRSPACE SAFETY (SASP)
AVIATION SECURITY (AVSEC)
FACILITATION (FALP)
ENVIRONMENTAL PROTECTION (CAEP)
LEGAL (LC)
AIRPORT & ANS ECONOMICS (AEP-ANSEP)
| Events | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Annex 1 and FANC/TRG | | | | | | | | | | | | | | | | | | | |
| Annex 2 | Delivered | | | | | | | | | | | | | | | | | |
| Annex 5 | | | | | | | | | | | | | | | | | | | |
| Annex 2 consequences: Amendments to Annex 5 approval | | | | | | | | | | | | | | | | | | | |
| Annex 10 | Delivered | | | | | | | | | | | | | | | | | |
| All worklist Manual | Delivered | | | | | | | | | | | | | | | | | |
| Annex 6 | | | | | | | | | | | | | | | | | | | |
| Annex 2 consequences: Amendments to Annex 6 approval | | | | | | | | | | | | | | | | | | | |
| FMO COP | | | | | | | | | | | | | | | | | | | |
| Annex 15 | | | | | | | | | | | | | | | | | | | |
| Safety Management Manual | Delivered | | | | | | | | | | | | | | | | | |
| Annex 19 | | | | | | | | | | | | | | | | | | | |
| CI Link Manual | | | | | | | | | | | | | | | | | | | |
| Annex 10 DAA | | | | | | | | | | | | | | | | | | | |
| DAA Manual | | | | | | | | | | | | | | | | | | | |
| Annex 7 | | | | | | | | | | | | | | | | | | | |

**Timeline example**
Current scope of RPAS Panel

- International IFR operations
- Controlled airspace and aerodromes
- Global interoperability
  - RPA to operate alongside manned aircraft, as a predictable, cooperative airspace user: All 19 Annexes affected
  - Priority given to fundamentals to initiate international operations
    » Remote pilot licence – adopted March 2018
    » Certificate of airworthiness – adoption Q1 2021
    » C2 Link – adoption Q1 2021
    » RPAS operator certificate – delivery Q1 2021
ICAO unmanned aviation webinars

- Enabling UAS Operations Part I
- Enabling UAS Operations Part II - Panel Discussion
- Introducing ICAO UAS Model Regulations
- UAS Beyond Visual Line of Sight Operations - for Regulators
- ICAO UTM Framework - Core Principles for Global Harmonization
- U-AID - Humanitarian Operations using UAS
- Safety Management System (SMS) for UAS Operations
- RPAS International IFR Regulatory Framework

www.icao.int/Meetings/webinar-series
DRONE ENABLE 2021
April
www.icao.int/Meetings/DRONEENABLE4
Online Course

Air Navigation Services
Unmanned Aviation Fundamentals

www.icao.int/training
Ms. Jagoda EGELEND
Advisor to the Secretary-General, International Transport Forum at the OECD
Drones in the Transport System: Regulation, Acceptability and Integration
Jagoda Egeland, ITF

Session 3: Moving safely from aircraft to drones: licensing disruptive technologies
NEA Multi-Sector Workshop on Innovative Regulation
15 December 2020
International Transport Forum at the OECD (ITF)

- Only intergovernmental organisation for all transport modes
- 62 members
- Platform for discussion
- Annual Summit
- Mission = foster a deeper understanding of the role of transport in economic growth, environmental sustainability and social inclusion
ITF’s Corporate Partnership Board
Departure point:

If drones are safe to fly, what are the other issues policy makers need to tackle to unlock the benefits of drones?
Working Group on Drones in the Transport System: Acceptability and Integration

- **30** practitioners and academics from **14** countries with expertise in aviation, transport regulation, mobility systems and urban planning.

- Report publication: **spring 2021**.
Drones create positive socio-economic impacts, but their market potential remains uncertain

- Drones have the potential to unlock a wide range of economic benefits by improving the efficiency of supply chains and offering a new mode of passenger transport.

How can we leverage the benefits?

- Governance and regulation
- Acceptability
- Integration
To seize the market opportunities provided by drones:

- **Recruit** experienced personnel from the drone and IT industries.
- **Define** responsibilities across public authorities and levels of government.
- **Assess** if/how much economic regulation is necessary
  - Assess the adequacy of national regulations developed under the **Chicago Convention**.
- **Foster** PPPs to overcome investment uncertainty.
- **Address** impacts, risks and public concerns that may come with deployment of drones.
Challenges to competition and how to address them

- **Examine**: Access to infrastructure, vertical integration.
- **Be aware** of common competition issues and of specific regulatory tools to address them.
- **Learn** from other sectors, e.g.:
  - Access rules where capacity is scarce (airport slot allocation)
  - Technical interoperability requirements (telecommunications)
- When regulating, **consider** the existing framework guiding transportation of people and goods by air (Chicago Convention)
Unlocking the benefits of drones will need public acceptance

- Adverse impacts of drones need to be addressed:
  - Noise
  - CO2 emissions
  - Air pollution
  - Impacts on wildlife
  - Optical pollution
  - Privacy concerns

- Acceptability of drones can be enhanced by:
  - Stakeholder consultation
  - Launching public information/communication campaigns
  - Raising awareness among drone operators re. public concerns and their mitigation
Regulations can protect individuals’ privacy

• **Adapt/expand** existing legal data protection frameworks.
• **Provide** information to drone operators on how to mitigate privacy concerns.
• **Consider** static and dynamic no-fly zones.
• **Consider** requirements for mandatory registration and remote identification.
• **Develop** communication strategies.
• For each drone service: **decide** what data a drone is allowed to collect considering potential privacy concerns; **provide** information to the affected parties.
Drones as part of the transport system: Don’t wait, be proactive

• **Establish** mobility needs and priorities and explore how drones can support them.
• **Ensure** interoperability and scalability of drones within the mobility network.
• **Ensure** citizens are protected and have fair access to the market.
• **Adopt** performance-based standards.
• **Conduct** public-private small-scale drone pilot programs.
• **Foster** the emergence of civil aviation authorities with interdisciplinary competencies and capabilities.
• **Support** the design and implementation of a robust UTM system
• **Incorporate** drone operations into long-term urban planning strategy.
Thank You

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Workshop Moderator

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Executive Vice-President and Chief Regulatory Operations Officer Regulatory Operations Branch
Canadian Nuclear Safety Commission (CNSC)
Mr. Christian SCHLEIFER-HEINGÄRTNER
Secretary General, EUROCAE
OECD/NEA Workshop
Certification process in aviation

Christian Schleifer-Heingärtner
Secretary General
Certification responsibilities

→ Global frame
→ Chicago convention
→ 19 Annexes
→ Regional bodies
→ RSOOs - EASA
→ National CAAs
Aircraft certification

- State of design
  - Certification
  - Continued airworthiness
  - Δ - production
  - Conformity

- Products certified
  - Aircraft
  - Engines
  - Propeller
  - TCDS

- Parts and equipment
  - ETSO
  - Integration

- Safety level
Regulation – Standard

- Prescriptive versus PB, RB and OPS centric
  - Reference to industry standards
- Standards reaction to regulation
- Forward looking
  - In anticipation of regulatory requirements
- Referenced by the regulator
  - EASA, EU Leg, FAA, ICAO
- (E)TSO – MOPS, SW, Environment
ETSO-2C501

Subject: MODE S AIRCRAFT DATA LINK PROCESSOR

1 – Applicability: This ETSO gives the requirements which Mode S Aircraft Data Link Processors that are manufactured on or after the date of this ETSO must meet in order to be identified with applicable ETSO marking.

2 – Procedures

2.1 – General: Applicable procedures are detailed in CS-ETSO Subpart A.

3 – Technical Conditions


3.1.2 – Environmental Standard: See CS-ETSO Subpart A paragraph 2.1

3.1.3 – Computer Software: See CS-ETSO Subpart A paragraph 2.2

4 – Marking: marking is detailed in CS-ETSO Subpart A paragraph 1.2.

5 – Availability of Referenced Document: See CS-ETSO Subpart A para 3
Example: ROAAS

- EASA and ICAO Runway excursion one of the main causes for accidents in international aviation
  - ICAO GASP – runway safety “main killer in aviation”
  - European Action Plan for the Prevention of Runway excursions
- EASA NPA 2013-09
  - Proposal to mandate ROAAS
  - BUT Lack of standards
- Industry/EASA initiative for ROAAS MOPS in EUROCAE

Example: ROAAS A340 F-GLZQ in Toronto – photo from the investigation report
EUROCAE WG-101 established 2015

Deliverable:
- ED-250 Minimum Operational Performance Specification (MOPS) for ROAAS
- Published Dec 2017

High level of interest and support
- Representation from Europe and other regions
- Active participation of all main stakeholders and manufacturers

EASA NPA 2018-12 'Reduction of runway excursions' → CS-25.705 → CS-26.205 → AMC25.705 → ED-250

Decision 2020/001/R → CS25

NPA 2019-06 ETSO 2C518
Example: Cybersecurity in Aviation

Focus

- Primarily on information security for aviation safety
  - air and ground
- Expanded to other interfacing areas of relevance,
  - Supply Chain, Ops & Biz

Membership

- > 230 participants
- Stakeholders from 10 countries & several European/international organisations
Example: Cybersecurity in Aviation

Published documents

- ED-201 AISS Framework Guidance Document
- ED-203A Airworthiness Security Methods and Considerations
- ED-204A Information Security Guidance for Continuing Airworthiness
- ED-205 ATM and Ground Systems
- ER-013 Aeronautical System Security Glossary
- ER-017 Int. Aeronautical Information Security Mapping Summary

Training
Examples for Cyber Security

- ED Decision 2020/006/R (1 July 2020)
- RMT 0648, NPA 2019-01, SC
  - Amdt CS 23, CS-25, CS-27, CS-29, CS-APU, CS-E, CS-ETSO, CS-P

SUBPART F — EQUIPMENT CS 25.1319 is inserted as follows:

CS 25.1319 Equipment, systems and network information protection

(a) Aeroplane equipment, systems and networks, considered separately and in relation to other systems, **must be protected from intentional unauthorised electronic interactions** (IUEIs) that may result in adverse effects on the safety of the aeroplane. Protection must be ensured by showing that the security risks have been identified, assessed and mitigated as necessary.

(b) When required by paragraph (a), the applicant must make procedures and Instructions for Continued Airworthiness (ICA) available that ensure that the security protections of the aeroplane’s equipment, systems and networks are maintained.
ED Decision 2020/006/R (1 July 2020)

and to the related AMC and/or GM → AMC 20-42

(b) This AMC recognises as an acceptable means of compliance the following EUROCAE documents:

• EUROCAE ED-203A, Airworthiness Security Methods and Considerations, dated June 2018
• EUROCAE ED-204, Information Security Guidance for Continuing Airworthiness, dated June 2014

(c) This AMC establishes guidance to use ED-202A, 203A and 204 in the different contexts of the initial and continued airworthiness of products and parts.
EASA SC VTOL

- issued 2 July 2019
- based on CS23 and CS27, but specific requirements for VTOL
- Objective based certification requirements
  - flexibility to certify innovative state-of-the-art designs and technology
  - establish a common set of conditions for the certification of these new concepts
- Accepted Means of Compliance
  - Industry standards - EUROCAE WG-112
- Priorities agreed between EASA and EUROCAE
  - Structured list with all necessary AMC topics
Christian Schleifer-Heingärtner
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Controlled Flight Into Terrain (CFIT)
Runway Excursion
Mid Air Collision
Replacing existing with new technology
Mr. Simon MOORE
Assistant Secretary, Safety and Future Technology, Australian Department of Infrastructure, Transport, Regional Development & Communications
Some key considerations of the Australian approach:

- Timing
- Proportionality
- Social license
Mr. Vassilis AGOURIDAS
UAM Initiative Leader (EU Smart Cities Marketplace) / Head of EU Public Co-Creation & Ecosystem Outreach (AIRBUS Urban Mobility)
Drone and micro-reactor emerging ecosystems: how similar might be?
Lessons learnt from the emerging drones ecosystem

The importance of multilevel governance & breaking the silos for cross-sectoral collaboration and coordination

A multi-fold approach is required

- Establish public & private support
- Seek ground & air synergies
- Co-create with citizens
- Cities & Regions in the driving seat

Regulation
Funding & Financing
Urban Mobility Planning
Public Co-Creation & Social Embracement
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QUESTIONS FROM PARTICIPANTS

• Question 1
• Question 2
• Question 3
MULTI-SECTOR WORKSHOP ON INNOVATIVE REGULATION

Challenges and benefits of harmonising the licensing process for emerging technologies

Thank you for your participation today and see you all tomorrow!