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# The ICAO APAC UAS RPAS/2 Webinar 2024

## Introduction to UAS/RAPS Regulatory Frameworks

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# Introduction

- UAS/RPAS: Safe Integration and Global Standards
  - Overview of ICAO and Regional Approaches to Regulation
    - ✓ Different regulatory needs for recreational drones vs. commercial UAS operations



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# Introduction

- **UA vs. UAS: What's the Difference?**
  - **Unmanned Aircraft (UA): The Aircraft Only**
    - ✓ Any aircraft without onboard pilot.
    - ✓ Operates remotely or autonomously.
    - ✓ Example: Aerial photography drones.
  - **Unmanned Aircraft System (UAS): The Complete System**
    - ✓ Includes UA and operational components.
    - ✓ Control Station + Communication Links.
    - ✓ Operates as an integrated package.



# Introduction

- **Defining RPAS and How It Fits**

- **Remotely Piloted Aircraft System (RPAS)**

- ✓ Always piloted remotely by a human.
- ✓ Real-time flight control by an operator.
- ✓ Operates like manned aircraft.

- **UAS VS. RPAS**

- ✓ All RPAS are UAS, but not all UAS are RPAS
- ✓ UAS includes fully autonomous systems.
- ✓ RPAS requires active human involvement.

- **Components of RPAS**

- ✓ RPA (Aircraft), Remote Pilot Station (RPS), Command and Control (C2) Link.



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## ICAO's Key UAS Classifications

- Remotely Piloted Aircraft (RPA)
  - For high-risk operations, requiring certification under IFR
    - ✓ International cargo delivery using remotely piloted aircraft
- Small UAS (Drones)
  - Lightweight, low-risk operations, often recreational
    - ✓ Photography drones or delivery drones for local transport
- Non-Powered Unmanned Free Balloons
  - Lightweight, used for scientific purposes
    - ✓ Weather balloons for meteorological data collection



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# Operational Concepts in ICAO's Framework

- ICAO Operational Concepts: VLOS vs. BVLOS
  - Structuring safe operations within and beyond visual line-of-sight
    - ✓ **BVLOS** allows remote surveillance while **VLOS** is suited for recreational flights



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# ICAO's Regulatory Framework for UAS and RPAS

## • ICAO Framework: Ensuring Safety and Integration

### ➤ Safety and Operational Standards

- Annex 2: Rules of the Air.
- Annex 8: Airworthiness standards for RPAS.
- Annex 6: RPAS Operator Certificate (ROC).
- Annex 1: Pilot licensing and competency.
- Annex 19: Safety management through SSP and SMS.

### ➤ Key Documents

- **Doc 10019**: ICAO **Manual on RPAS**.
- Focus on safety, State Safety Programs (SSP), and risk mitigation.



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## Safety and Certification Standards

- ICAO Safety Standards for UAS/RPAS
  - Structuring safe operations within and beyond visual line-of-sight
    - ✓ Compliance through Annexes for airworthiness, operations, and personnel
      - ❖ Remote pilots must be licensed (Annex 1); airworthiness ensured via Annex 8





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# Critical Components of RPAS

- **Ensuring Airworthiness in RPAS Operations**

- **Remote Pilot Station (RPS)**

- ✓ Central control hub for flight management.
    - ✓ Subject to airworthiness certification (Annex 8).
    - ✓ Supports real-time operator control.

- **Command and Control (C2) Link**

- ✓ Communication link between RPS and RPA.
    - ✓ Reliability essential for safe operation.
    - ✓ Integral to Annex 8 airworthiness standards.

- **Key Compliance Areas**

- ✓ RPS + C2 Link = Seamless remote operations.
    - ✓ Certification ensures safety and operational integrity.



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# Overview of ICAO's RPAS Panel

- Role of ICAO's RPAS Panel
  - **Purpose:** Developing a regulatory framework for RPAS integration.
  - **Focus Areas:**
    - ✓ Enabling **international IFR operations**.
    - ✓ Ensuring compatibility with **controlled airspace and aerodromes**.
    - ✓ Achieving **global interoperability**.



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# Overview of ICAO's RPAS Panel

- ICAO's Regulatory Milestones

- **Remote Pilot Licence (RPL):**

- ✓ Ensures remote pilot competency and safety.
- ✓ Adopted: **March 2018**, Applicable: **November 2026**.
- ✓ Linked to Annex 1 (Amendments 175 & 177).

- **Certificate of Airworthiness (CofA):**

- ✓ Validates RPAS safety and operational standards.
- ✓ Adopted: **Q1 2021**, Applicable: **November 2026**.
- ✓ Linked to Annex 8 (Amendment 108).

- **Command and Control (C2) Link Standards:**

- ✓ Maintains safe communication between RPA and remote pilot station.
- ✓ Adopted: **Q1 2021**, Applicable: **November 2026**.
- ✓ Linked to Annex 10 (Volume VI, Amendment 90).

- **RPAS Operator Certificate (ROC):**

- ✓ Authorizes organizations for international RPAS operations.
- ✓ Delivered: Q1 2021, Applicable: November 2026.
- ✓ Linked to Annex 6, Part IV.



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# Overview of ICAO's RPAS Panel

## • ICAO RPAS Panel Activities & Key Focus Areas

### ➤ Airworthiness Standards (Annex 8):

- ✓ Ensures RPAS meet safety requirements like manned aircraft.
- ✓ Applicable: **November 2026**.

### ➤ Command and Control (C2) Link Standards:

- ✓ **Phase I:** Standards adopted in Annex 10 (Vol. 5 & 6). Applicable: **November 2026**.
- ✓ **Phase II:** Refinements due **Q4 2025** (Annex 10, Vol. 6).

### ➤ Detect and Avoid (DAA) Systems:

- ✓ Standards for RPAS to avoid collisions.
- ✓ Delivery: **Q4 2025** (Annex 10, Vol. 4).

### ➤ Licensing Requirements (Annex 1 & 2):

- ✓ Ensures trained and competent remote pilots.
- ✓ Applicable: **November 2022**.



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# Overview of ICAO's RPAS Panel

## • RPAS Operational Frameworks & Future Developments

### ➤ Operational Standards (Annex 6, Part 4):

- ✓ Guidelines for international RPAS operations.
- ✓ Applicable: **November 2026**.

### ➤ ATM Integration:

- ✓ Updates in Annexes 2 & 11 and PANS-ATM.
- ✓ Delivery: Q4 2025.

### ➤ Hazard & Incident Tracking Systems (HITS):

- ✓ Updates in RPAS Manual (Doc 10019).
- ✓ Enhances incident response.

### ➤ Joint Task Forces:

- ✓ Safety Management (Annex 19): Applicable: November 2026.



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# Key Timelines for ICAO RPAS Regulations

- **Structured Roadmap for RPAS Integration & Key Areas**

- **Licensing (2022):**

- ✓ Standards for trained and competent remote pilots.
    - ✓ Aligned with manned aviation pilot requirements.

- **Airworthiness (2021-2026):**

- ✓ Ensures RPAS meet stringent safety standards.
    - ✓ **Effective:** 2021, **Mandatory:** 2026.

- **Command and Control (C2) Link (2021-2028):**

- ✓ **General Standards:** Effective 2021, Applicable 2026.
    - ✓ **Technical Standards:** Effective 2025, Applicable 2028.



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# Key Timelines for ICAO RPAS Regulations

- **Operational and Safety Milestones**

- **Operational Standards (2024-2026):**

- ✓ Focused on international airspace procedures.

- **Safety Management (2021-2026):**

- ✓ Risk mitigation for shared airspace operations.

- **Detect and Avoid (DAA) Systems (2025-2028):**

- ✓ Ensures RPAS avoid collisions.

- **Air Traffic Management (ATM) and Aerodrome Standards (2025-2028):**

- ✓ Integration into existing systems and ground operations.



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# ICAO's Advanced Air Mobility (AAM) Initiative

- Addressing Emerging Aviation Technologies

- **Call for Action:**

- ✓ ICAO 41st Assembly (2022): Resolution A41-9 mandates AAM focus.
    - ✓ Expansion beyond RPAS to include non-RPAS UAS and AAM concepts like Urban Air Mobility (UAM).

- **Formation of AAM Study Group (AAM SG):**

- ✓ Created November 2022 by ICAO Air Navigation Commission (ANC).
    - ✓ Tasked with shaping global AAM strategy..





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# Objectives and Vision of the AAM Study Group

- Building a Harmonized Global Ecosystem
  - **Global Harmonization:**
    - ✓ Ensures interoperability and regulatory consistency worldwide.
  - **Ecosystem Assessment:**
    - ✓ Focus on UAM, UTM, AI, autonomy, and data management.
  - **Gap Analysis:**
    - ✓ Identifies discrepancies in current aviation practices for AAM integration.
  - **Guidance and Framework Development:**
    - ✓ Drafts global AAM framework and safety guidance.
  - **Strategic Recommendations:**
    - ✓ Proposes ICAO's roadmap for the AAM future.



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