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# UAS – RPAS Implementation/Regulation Webinar for the APAC Region

ICAO HQ - RPAS Section

May 2023



## ■ Anne Grimal



- ATM, SMS expert
- International implementation projects
- 20+ years ANSP
- 3 years @ CAA
- 2 years at ICAO
  - RPAS Panel – aerodromes, safety management
  - UAS focal point ROs and UN org.
  - Technical expert training and iPack

## ■ Mark Wuennenberg



- Military/Civil Pilot
- 20+ years UAS policy and regulatory experience
- 5 years @ CAA
- 5 years at ICAO
  - RPAS Panel – WG5 - Operations
  - UAS-Advisory Group Secretary
  - DRONE ENABLE Programme Lead

# Presentation overview

**01** Introduction to UAS

**02** Certified Category

**03** Open Category



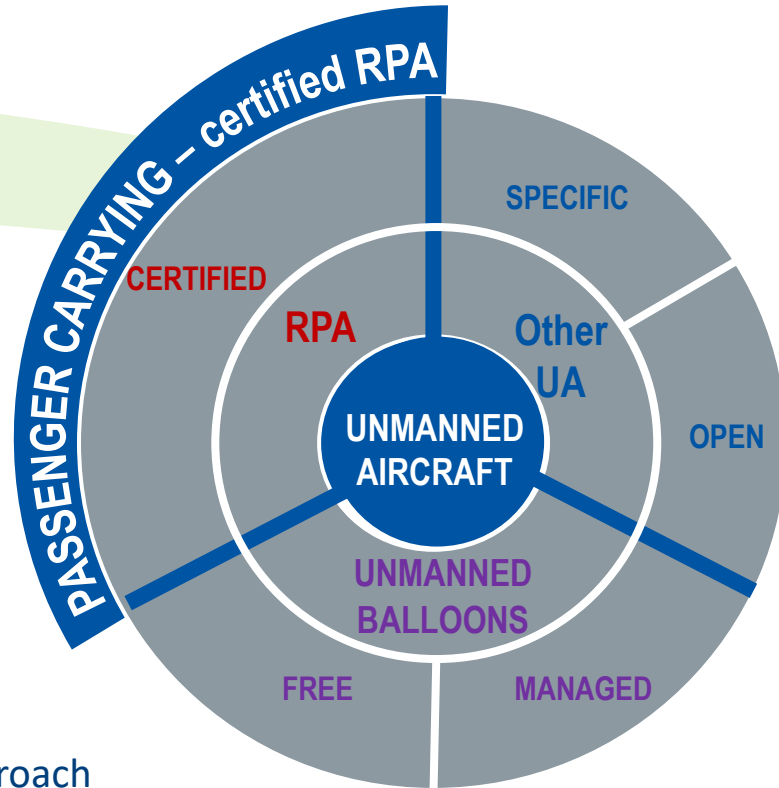
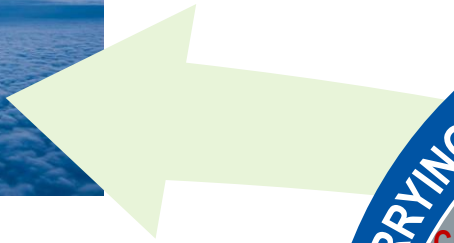
**04** Specific Category

**05** Other UAS activities

**06** ICAO training and iPack



# Terminology



**Unmanned aircraft:**  
an aircraft which is  
intended to be  
operated with **no  
pilot on board** -  
(Annex 7, 2.2)



## Categories

**Open** – Low risk

**Specific** – Medium risk / regulated  
lower risk

**Certified** – Traditional aviation approach



# Categorization/Risk Spectrum

Open

Specific

Certified

**Regulated low-risk**

Visual Line-of-sight  
Weight limits (<25kg)  
Altitude (<500ft)

Photography  
Inspections  
Recreational

**Operations centric-risk based**

Visual Line-of-sight or  
Beyond Visual Line-of-sight  
Greater weights  
Higher altitudes

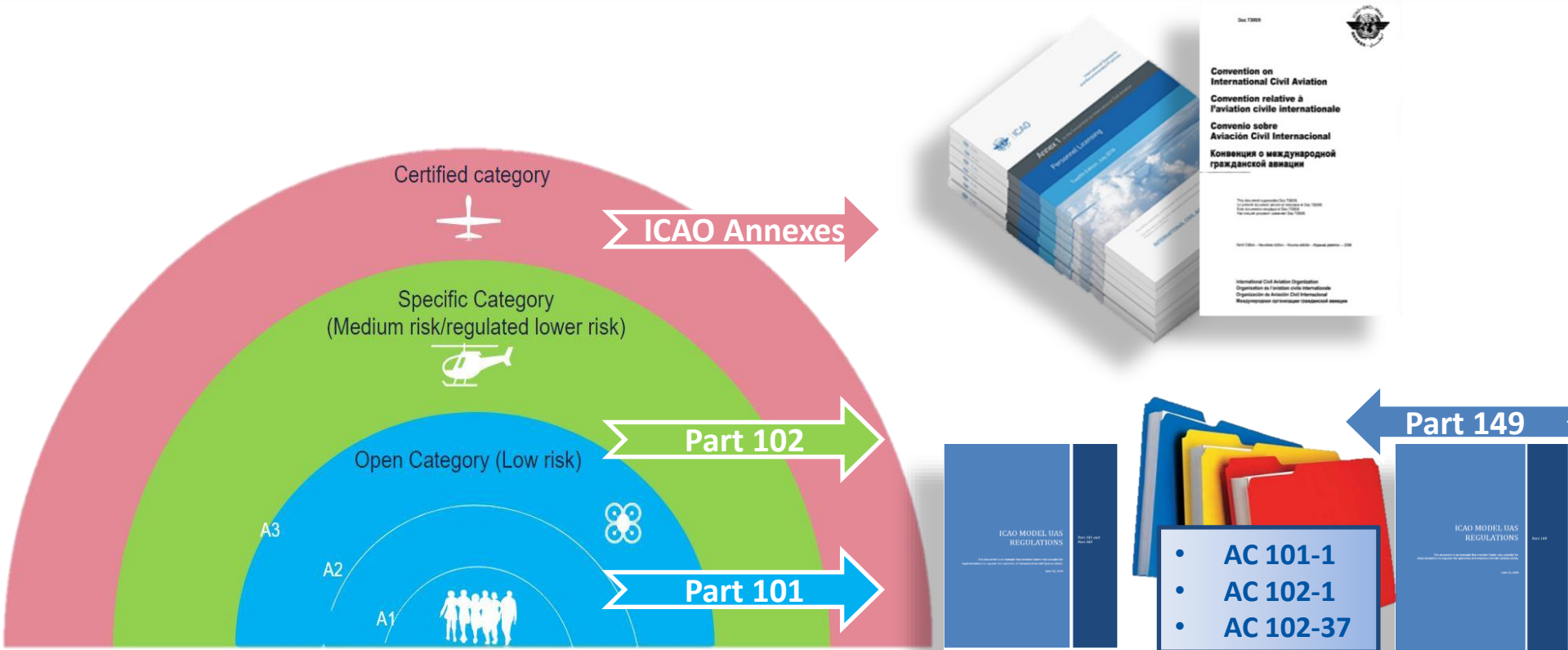
Long route inspections  
Deliveries

**Traditional approach**

Integrated operations  
International/IFR  
Certificated aircraft,  
pilots, and operators

Similar to  
conventional aviation

# Scope of ICAO's Work



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- ICAO RPAS Panel has been developing SARPs since 2014
  - Primary focus for all ICAO RPAS related efforts
- **Scope:**
  - International operation of RPAS certificated in accordance with Annex 8
- **Approach remains consistent with conventional aviation**
  - Requires tradition certification processes
  - Doesn't diverge unless there is need to do so
- **Use cases**
  - Transoceanic cargo delivery (e.g. 737 without pilots onboard)
  - Cross border or high seas operations of certificated RPAS



- Remote Pilot License (RPL) standards became applicable in November 2022
- Basic license framework – Commercial Pilot License (CPL) but with Class 3 Medical
- Competency-Based Training (CBT) applies to RPL
  - Remote pilots need to demonstrate competencies by learning general aviation knowledge, skills and attitudes



- RPAS operator certificate requirements
- Operating rules
- Remote flight crew operational requirements
- Remote pilot station
- Detect and avoid operational standards
- C2 Link operational standards
- Safety management
- Documentation (Certificates, Logs, Licences, etc.)



- Annex 8, Airworthiness - Amendment 109
  - Effective 12 July 2021 / Applicable 26 November 2026
- SARPs for RPA and RPS adopted
- SARPs for Safety Management as it relates to RPA designers and manufacturers - Annex 19
- Airworthiness Manual (ICAO Doc 9760)

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- UAS Model Regulations - compilation of existing UAS regulations
  - Vanuatu, New Zealand, Australia, Canada and the U.S.
- Model Regulations articulate:
  - remote pilot licensing, standard operating conditions, SMS requirements, operational risk assessments
- Prescriptive and performance-based regulations
- Guidance material providing best practices
- Living document evolving with UAS technologies



## UAS [25 kilograms or less] Operating in compliance with [Part 101] Rules

- Use cases
  - Real estate photography
  - Volumetric assessments
  - Infrastructure inspection
  - Recreational users
  
- Provides a means to established a basic regulatory framework for less complex/lower risk UAS operations



- Subpart A – General Provisions
  - Definitions, Compliance, Accident Reporting
  
- Subpart B – Operating Rules
  - Applicability, Registration, Licensing
  - Area Approvals, Airspace, Aerodromes, Dropping of Articles, Weather, Day/Night Operations,
  - Standard UAS Operating Conditions
  - Approved Aviation Organizations
  - Right-of-way, Near/Over People

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## Part 102 - UAS Operations – Certification

- Use cases
  - Long distance linear inspection (railway, powerlines, etc)
  - Agricultural inspection/spraying (distances/dangerous goods)
  - Delivery services
- Provides a means to issue various certificates to support more complex/higher risk operations
- Operations-centric, risk-based approach



- Subpart C – UAS Remote Pilot Certification
  - Applicability, Eligibility, Conditions, Cancellation
- Subpart D - UAS Authorization or UAS Operator Certification (UOC)
  - Applicability, Requirement, Chief Pilot Duties, Applications
  - Specific authorization – privileges/restrictions, duration, changes/renewals
  - Safety Management System
- Subpart E – Requirements for Manufacturers
  - Means of Compliance, Declaration, Documentation, Records

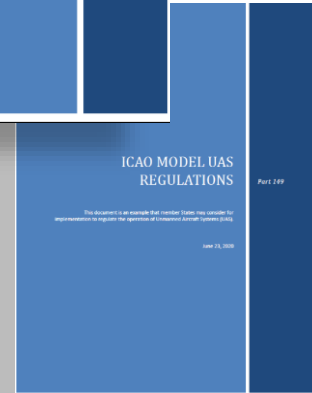
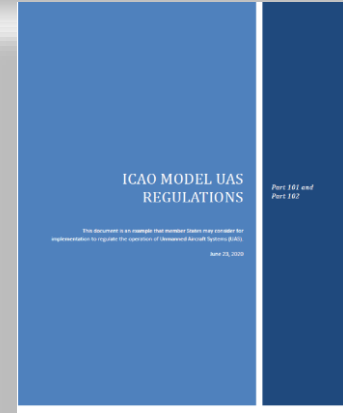


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# Scope of ICAO UAS Model Regulations

- Open category: **Part 101**
- Specific category: **Part 102**
- Approved Aviation Organizations: **Part 149**
- Advisory Circulars (means of compliance):
  - **AC 101-1**
  - **AC 102-1**
  - **AC 102-37**: Dangerous Goods



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- **RPAS 2022**
  - SARPs update (Annexes 6, 8 and 10)
  - Certification focus (Components, Fit-for-purpose, AAM, Automation)
  - Standards development and Research activities
  
- **DRONE ENABLE 2022**
  - Supporting Integration
  - Facilitation of cross border UAS operations
  - Environmental considerations
  - Request for Information outcomes (UTM Data Requirements and Best Practices)



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# Other Activities – DRONE ENABLE 23



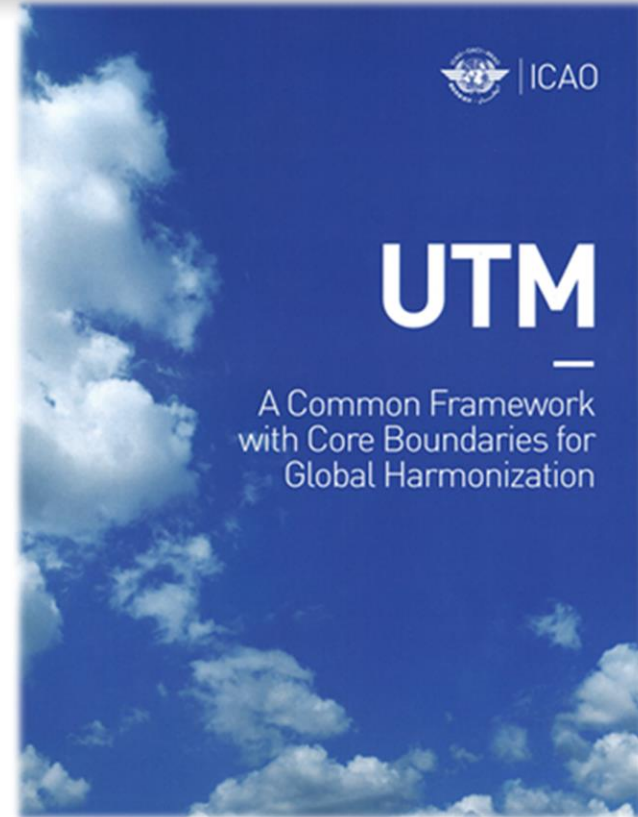


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# Other Activities – UTM Framework

- A framework and core capabilities of a “typical” UTM system
- High level UTM requirements
- Maintain safety and facilitate integration with existing aviation system
- Not a technical solutions document
- Developed in collaboration with industry/academia
- Enable safe and efficient growth





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# Other Activities – UTM Framework



Provides key principles, scope and building blocks

Defines the various services to be provided

Identifies complementary concurrent activities

Identifies gaps/issues/challenges

Appendices address specific topics or problem areas



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# Other Activities – UTM Framework

## SERVICES

- Activity reporting service
- Aeronautical Information Management
- Airspace authorization
- Discovery service
- Conflict management and separation service
- Mapping service
- Registration service
- Restriction management service
- Flight planning service
- Identification service
- Tracking and location service
- Meteorological service





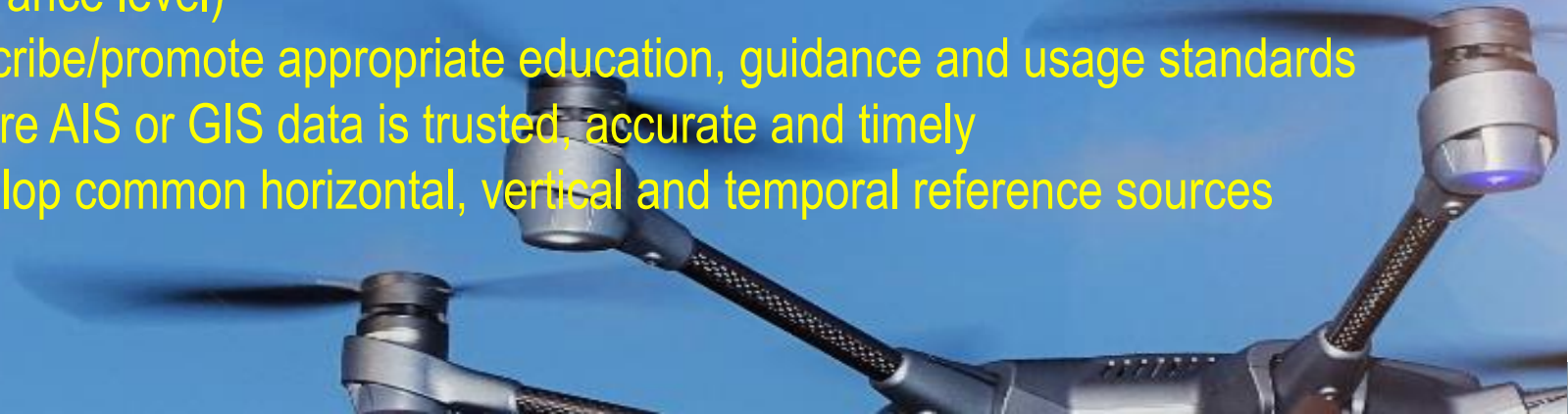
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# Other Activities – UTM Framework

## CONCURRENT/ENABLING ACTIVITIES

- Develop a regulatory approach that is performance- and risk-based
- Development of and compliance with standards data management
- Optimization of common and shared airspace
- Optimization of frequency spectrum
- Application of appropriate assurance standards (e.g. cybersecurity or software assurance level)
- Prescribe/promote appropriate education, guidance and usage standards
- Ensure AIS or GIS data is trusted, accurate and timely
- Develop common horizontal, vertical and temporal reference sources





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# Other Activities – UTM Framework

## GAPS

- Airspace classification
- Rules of the Air
- Airspace access
- Operational procedures
- Liability determination
- UTM system certification
- Data standards
- Contingency management





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# Other Activities – UTM Framework

## ISSUES

- Airspace/procedure design
- Frequency spectrum availability and supportability
- Provision of service may change airspace classification
- UTM and ATM interface
- Data exchange and privacy protocols





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# Other Activities – UTM Framework

## CHALLENGES

- Capability to identify/detect and avoid conflicting aircraft
- Enhanced detectability/conspicuity of UA by manned aviation
- Development of separation standards within the UTM
- Policies to address means of compliance or system approval
- Implementation/maintenance of a safety management system
- Forecasting and dissemination of micro-weather





## ▪ **EDITION 1 (RELEASED)**

- Registration, identification and tracking
- Communications systems
- Geofencing-like systems
- Potential UTM architectures

## ▪ **EDITION 2 (RELEASED)**

- UTM-ATM boundaries and transitions
- Information exchange between ATM and UTM

## ▪ **EDITION 3 (RELEASED)**

- UTM risk assessment/contingency procedures
- UTM service providers structure
- Separation/deconfliction in UTM

## ▪ **EDITION 4 (RELEASED)**

- UA UTM performance requirements
- UTM system certification requirements
- UTM in aerodrome environments



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# Other Activities – UAS Toolkit

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Global Priorities

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## THE ICAO UAS TOOLKIT

Helpful tools to assist States in realizing effective UAS operational guidance and safe domestic operations

[www.icao.int/safety/UA](http://www.icao.int/safety/UA)



ICAO / Safety / Unmanned Aviation / UAS Toolkit

UAS Toolkit Home

Narrative

Recreational Operations

State Regulations

UAS Tools

Frequently Used Terms

FAQ

News

### UAS Toolkit Home

#### Narrative



The narrative presents UAS best practices, lessons learned and regulations for your consideration. We believe that developing UAS guidance and regulations that consider public and aviation safety first, along with security and privacy protection while promoting industry, is an achievable mission.



- Guidance for humanitarian operations conducted by UAS
- Addresses on-going and emergency response/approvals
- Emphasizes safety risk assessment
- Includes sample forms for the applicant and the CAA for expedited approval
- Provides considerations for carriage of dangerous goods
- Supports counterparts in the UN System and NGOs



- Air Navigation Commission approved the establishment of an AAM-Study Group
  - Aim is to have a small agile group
- State Letter released December 2022
  - Directed to select States and International Organizations
- Comprised of policy, regulatory, technical and operational experts
- First meeting is ongoing (1-5 May)



## Objectives of the AAM-SG

- Develop holistic AAM vision and framework proposal
- Focal point for ICAO AAM-related work with the aim of ensuring global interoperability/harmonization
- Perform an assessment of the entire AAM ecosystem
- Perform a gap analysis to determine what work is needed on ICAO's part
- Develop initial guidance material
- Recommendations for AAM Strategy and future work



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# Advanced Air Mobility

A promotional banner for the AAM 2024 symposium. The background is a cityscape at dusk with various advanced aircraft flying. In the foreground, a futuristic, purple, pod-like aircraft is on a landing pad. The text is centered in blue and white.

**AAM 2024**  
ICAO'S FIRST ADVANCED  
AIR MOBILITY SYMPOSIUM  
**9 — 12 September 2024**  
ICAO Headquarters, Montréal, Canada

- Traditional Conference activities
- Flight demonstration (AAM, UAS, etc.)
- Student competitions (Papers, Flight Trials, etc.)

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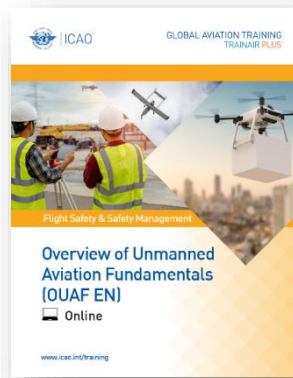
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## Unmanned Aviation online courses



**Overview of Unmanned Aviation Fundamentals**



**Unmanned Aircraft Systems Operations**



**Unmanned Aircraft Systems Regulations**



**Unmanned Aircraft Systems Safety Management System**

<https://store.icao.int/en/training/self-paced/unmanned-aircraft-systems>

**10% DISCOUNT valid until 22 May with the code UAS-2023**



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Training

# Unmanned Aviation classroom course



GLOBAL AVIATION TRAINING  
TRAINAIR PLUS

Flight Safety & Safety Management

**Unmanned Aviation  
Fundamentals (UAF EN)**

[www.icao.int/training](http://www.icao.int/training)

**Course Goal:** provide CAA personnel involved in the regulation of unmanned aviation with the competencies required to address the current and emerging safety issues related to unmanned aircraft operating in international and national airspace, consistent with the developing ICAO Standards and Recommended Practices (SARPs) framework.

**Target Population:** Middle management level CAA personnel involved in policy development, regulations, safety, and operations of unmanned aviation.



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# ICAO iPack: Establishing a regulatory framework for UAS



## ICAO SME

Dedicated UAS Subject Matter Expert for 20 workdays over a period of three months.



## Training

- Overview of Unmanned Aviation Fundamentals – Online Course;
- Unmanned Aviation Fundamentals - Virtual Course;
- Unmanned Aircraft Systems Regulations - Online Course;
- Unmanned Aircraft Systems Operations Online Course;
- Unmanned Aircraft Systems (UAS) Safety Management System (SMS) - Online Course.



## Tools

- Model UAS Regulations;
- Advisory Circulars;
- Checklists;
- Decisions aids;
- Templates; and
- Forms.



## Documents

- ICAO Model UAS Regulations;
- Advisory Circulars;
- other associated guidance material; and
- relevant ICAO Annexes.





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