



UAS Regulations & Implementation For Contingency/Crisis Management & Disaster Recovery

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UAS/RPAS Technical Officer



AGENDA

Flight Plan

- ✈ **ICAO Unmanned Aviation Regulatory Framework Development;**
- ✈ **UAS in Humanitarian Missions;**
- ✈ **ICAO UAS Humanitarian Missions Guidance Material (U-AID);**
- ✈ **UN Unmanned Aviation Coordination Forum; &**
- ✈ **Other ICAO Resources.**

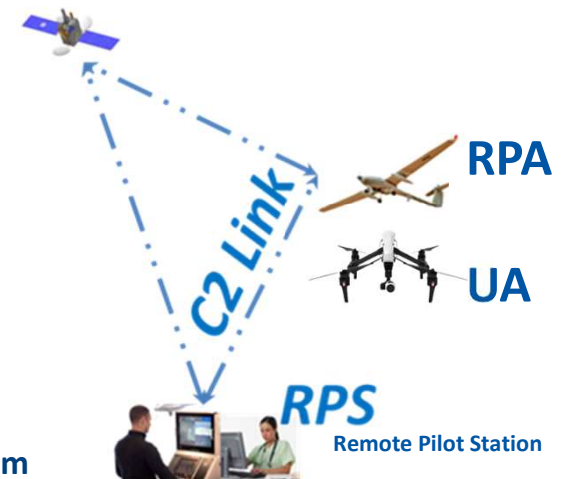


ICAO Unmanned Aviation Regulatory Framework Development



UNMANNED AIRCRAFT SYSTEM FEATURES

- Multiple Frameworks;
- Global Multiple Operational Applications;
- Beneficial Outcomes;
- Manned Aviation Risks...



UAS

Unmanned Aircraft System

RPAS

Remotely Piloted Aircraft System



RPS
Remote Pilot Station

Other components:

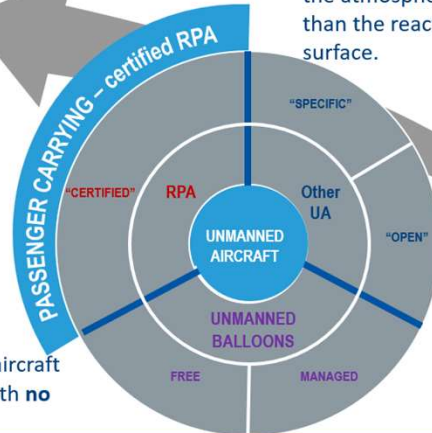
- Launch & Recovery;
- ATC Comm;
- Detect & Avoid (DAA);...

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.



UA=Aircraft

Unmanned aircraft. An aircraft intended to be operated with **no pilot on board**



ICAO Unmanned Aviation Regulatory Framework Development



Doc 7300
Convention on International Civil Aviation (1944)

Article 8

Pilotless aircraft

No aircraft capable of being **flown without a pilot** shall be flown without a pilot over the territory of a contracting State **without special authorization** by that State and in accordance with the terms of such authorization. Each contracting State undertakes to insure that the flight of **such aircraft without a pilot in regions open to civil aircraft shall be so controlled as to obviate danger to civil aircraft.**

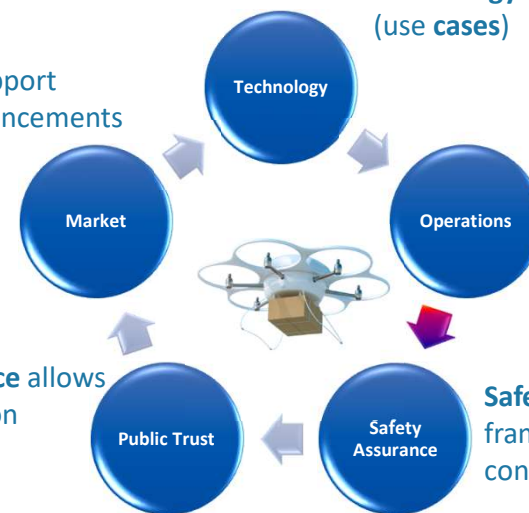
Investments support technology advancements (R&D)

Public confidence allows market expansion (investments)

Technology enables new operations (use cases)

Operations feed regulatory development (data-driven, evidence-based)

Safety assurance (regulatory framework) creates public confidence (trust)

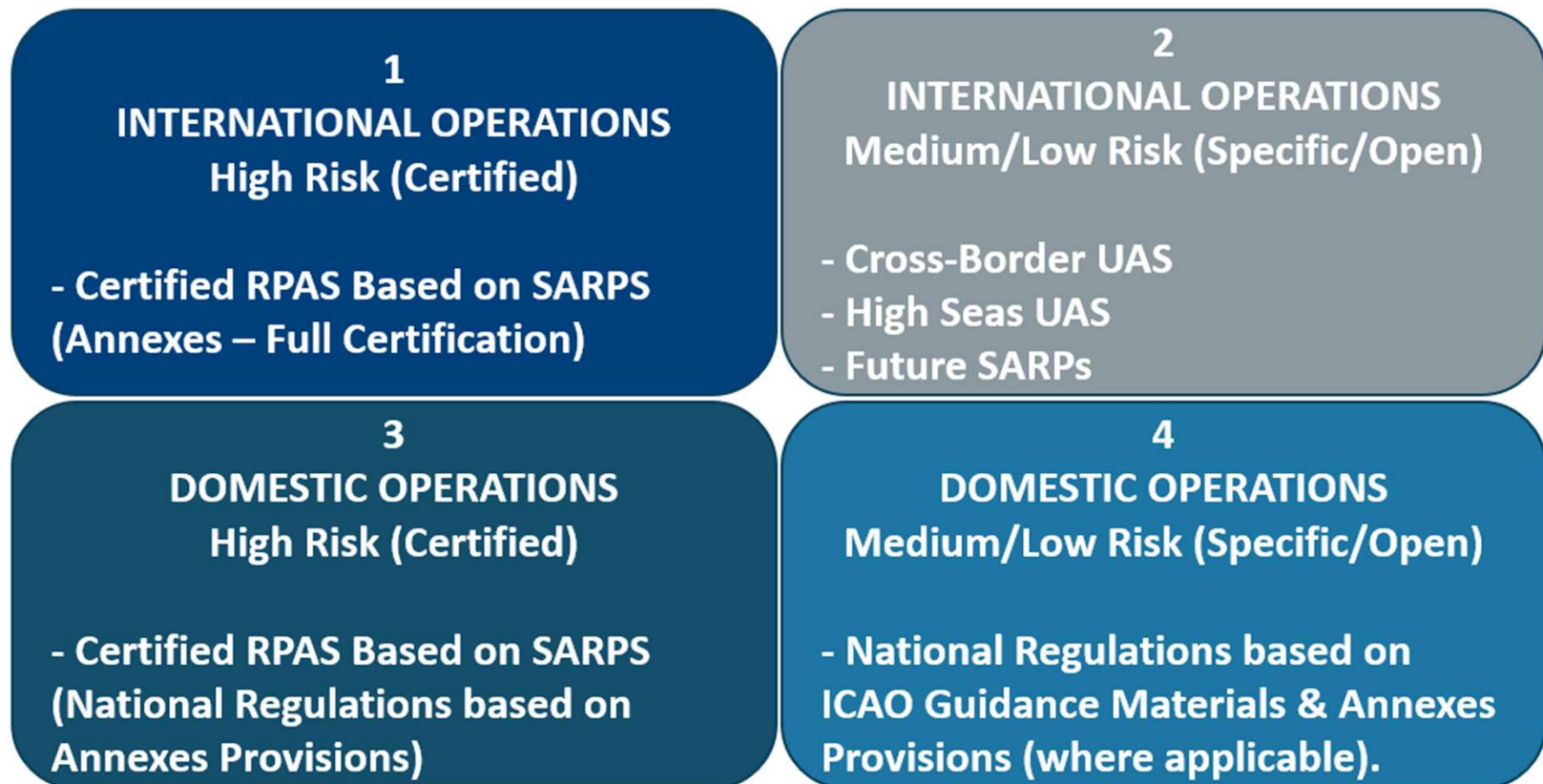


-  technical expertise
-  intergovernmental framework
-  global geographic coverage
-  regulators & industry cooperation

5



ICAO Unmanned Aviation Regulatory Framework Development



ICAO Unmanned Aviation Regulatory Framework Development

“OPEN”

“SPECIFIC”

“CERTIFIED”

PART 101

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

- Photography;
- Inspections;
- Recreational;...



PART 102

Operations centric-risk based
Visual Line-of-sight or
Beyond Visual Line-of-sight
Greater weights
Higher altitudes

- Long route inspections
- Deliveries



ICAO SARPs

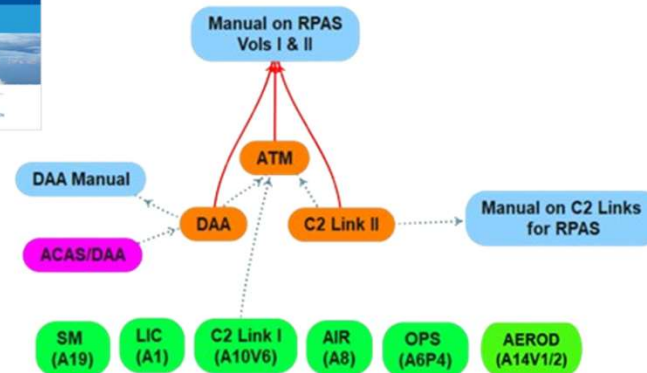
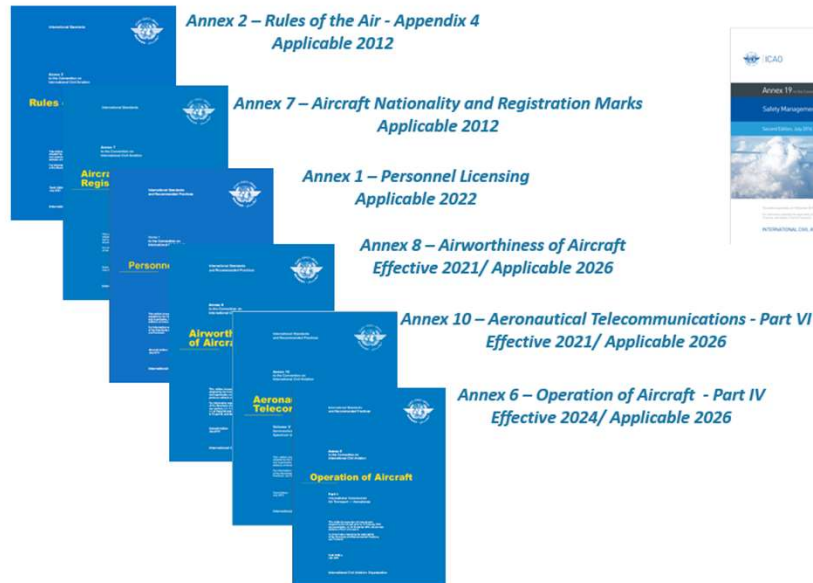
Traditional approach
Integrated operations
International/IFR
Certificated aircraft, pilots, and operators

- Similar to manned aviation



ICAO Unmanned Aviation Regulatory Framework Development

Standard and Recommended Practices



Completed (adopted) packages
Packages under development

Dependencies are between:

1. Technical areas SARPs/PANS
2. SARPs/PANS - other SARPs/PANS
3. SARPs/PANS - guidance

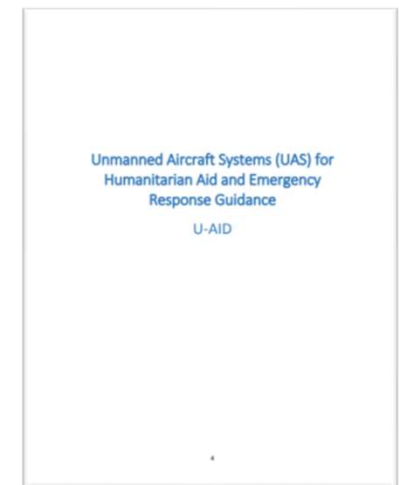
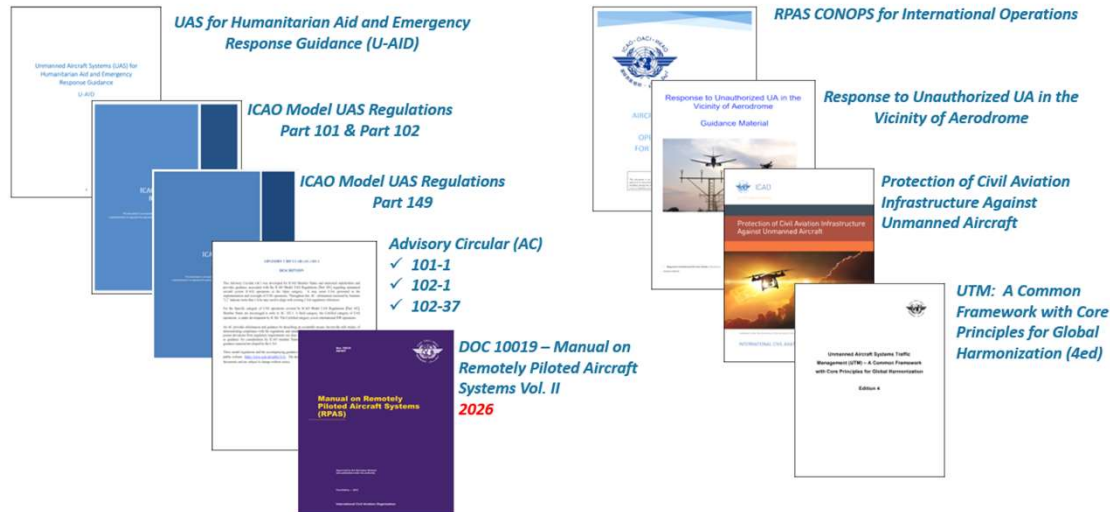
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4

DOMESTIC OPERATIONS
Medium/Low Risk (Specific/Open)

- National Regulations based on ICAO
Guidance Materials & Annexes
Provisions (where applicable).

Guidance Materials



ICAO U-AID is a resource (guidance material) for States to enable humanitarian aid and emergency response operations using UAS, and to enable an expedited review process for urgent operations

ICAO Unmanned Aviation Regulatory Framework Development

10



UAS in Humanitarian Missions

11

➤ UAS/RPAS in Humanitarian Missions:

- UAS/RPAS is a fast deployment tool,
- UAS/RPAS provides a bird's view, improving area assessment,
- UAS/RPAS provides a more accurate capacity to gather data,
- UAS/RPAS could reach remote areas faster,
- UAS/RPAS could provide remote sensing products cheaper than other platforms,
- UAS/RPAS could be used as an integrative platform for the community to prepare and assess before a disaster.



UAS/RPAS
HUMANITARIAN SUPPLY DELIVERY



UAS/RPAS
DISASTER MANAGEMENT
& RELIEF SUPPORT



UAS/RPAS
REFUGEE / IMMIGRATION ASSESSMENT



UAS/RPAS
EDUCATION PROGRAMMES



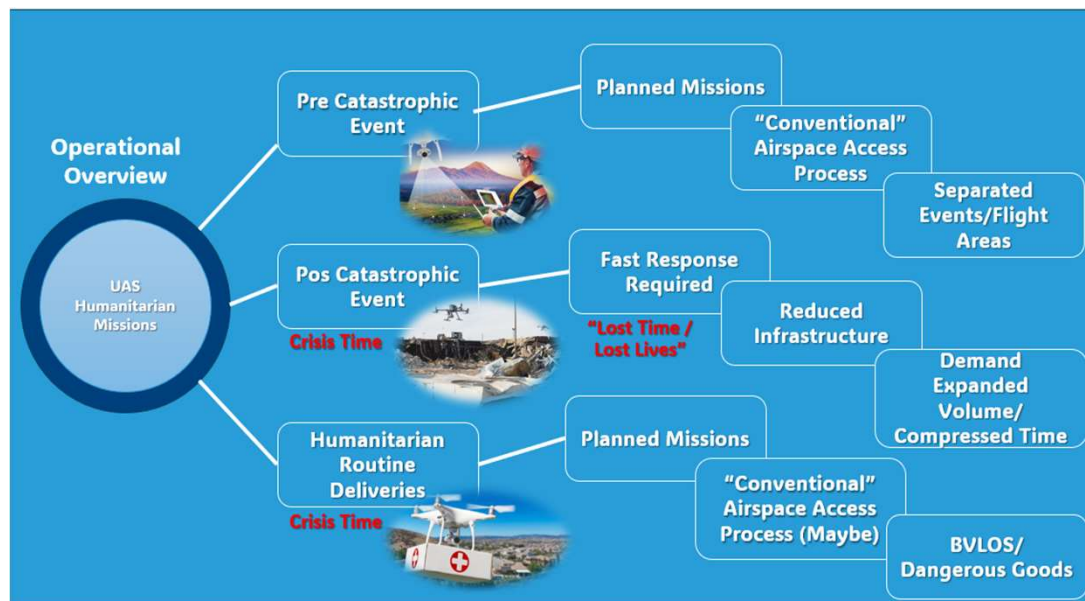
➤ Hurdles for UAS in Humanitarian Missions:

- States' UAS Regulatory Framework,
- UAS operators well-trained for Humanitarian Missions,
- Clear Guidance and Operational Standards,
- UAS Equipment Availability.

UAS in Humanitarian Missions

12

Humanitarian Missions Operational Context



Challenges Faced by UAS Operators in Humanitarian Missions

Lack of UAS Operational/Technical Training for Personnel	Airspace Access Allowance Hurdles (Airspace density, ATM constraints,...)
Absence of a UAS Regulatory Framework in States	Interference in C2 Link (Jamming, Spoofing, ...)
Lack of Aeronautical Knowledge by Operators	Cybersecurity Issues
Lack of Understanding by Staff/CAA of the State's UAS Regulatory Framework	Absence of Agreement between States related to Certifications Recognition
Lack of Knowledge related to the State's regulatory framework	Lack of Knowledge related to UAS Operations/Regulations in CAAs
Absence of knowledge related to CoFA, Continuity of Airworthiness or Type Certificate in States	Absence of a Clear Process or a slow process in Achieving Authorization for UAS Operations
Absence of Operational Agreement between States for Cross-Border Operations	Difficulty for Community or Local Social Acceptance Related to UAS Operations
How to establish UAS Operational, Technical or Governance Requirements for the Procurement Process	Lack of Guidance Material for UAS Operations
How to Establish a Risk Assessment for UAS Operations	UAS Operations Liability Issues

1st Workshop on UAS for UN Missions
UN HQ 29 April – 01 May

UAS in Humanitarian Missions

13

Humanitarian Missions Stakeholders

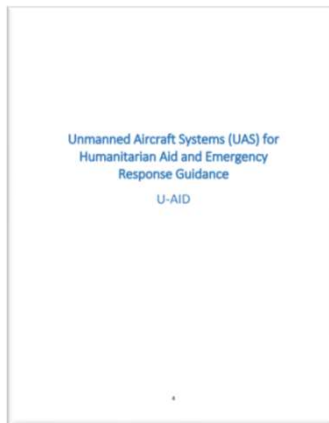


- ✈️ Regulatory Framework;
- ✈️ Coordination of Actions;
- ✈️ Operational Allowances;
- ✈️ Community Acceptances;
- ✈️ Enabling Clauses;
- ✈️ Support for Operations;
- ...

ICAO UAS Humanitarian Missions Guidance Material (U-AID)

14

ICAO U-AID Guidance Material



- Support Aviation Authorities in their review of requests for UAS operational authorizations in response to humanitarian emergencies;
- Non-binding to the status of UAS regulations; &
- Aims to facilitate the deployment of UAS in humanitarian missions in a safe, coordinated and efficient manner.

Operational Overview

Dangerous Goods

Safety Risk Assessment

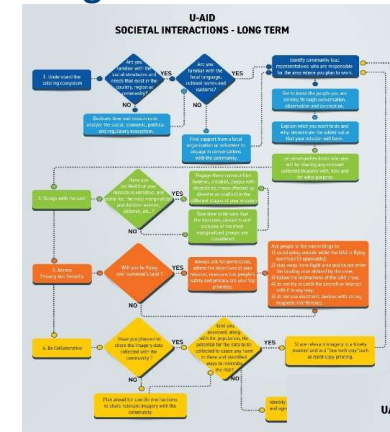


Long Term
Decision Tree



Short Lead Time
Decision Tree

Societal Interaction Long Term Decision Tree



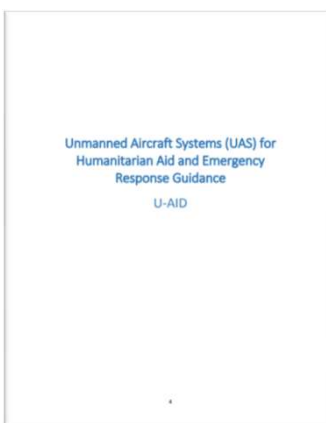
Short Lead Time Decision Tree



ICAO UAS Humanitarian Missions Guidance Material (U-AID)

15

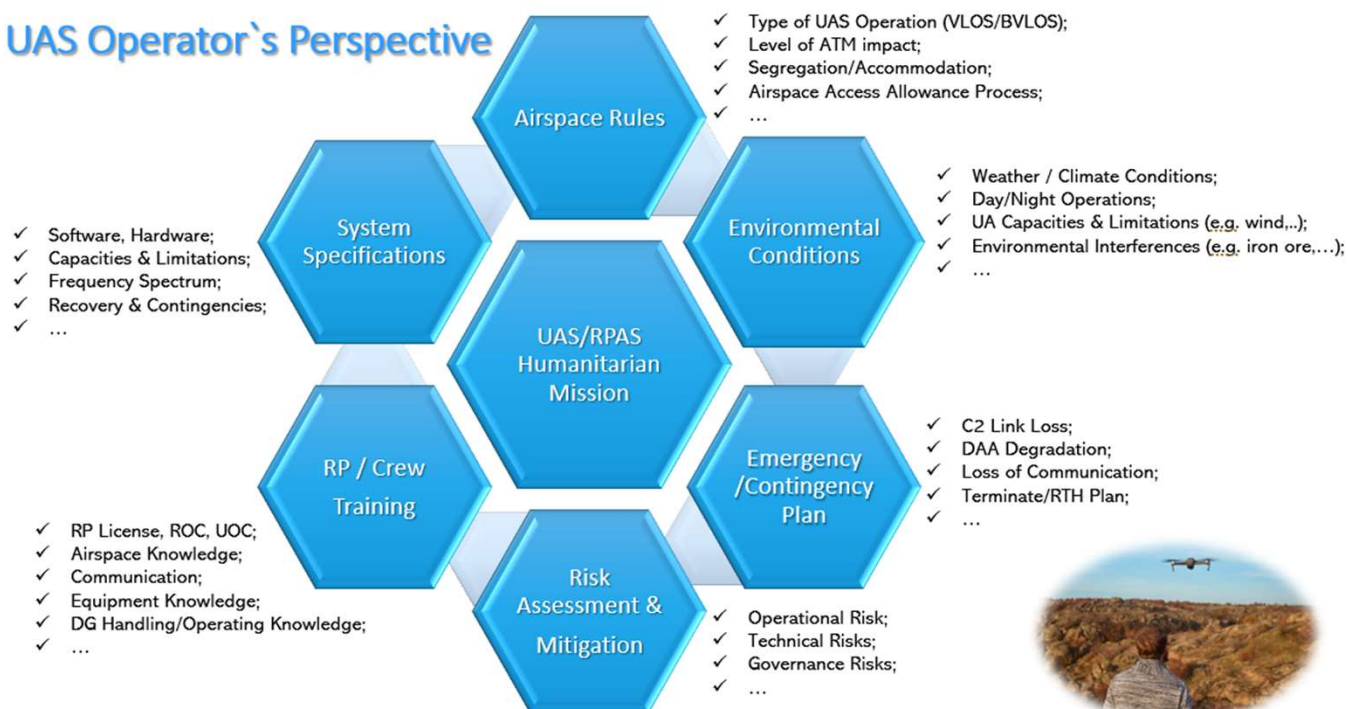
ICAO U-AID Guidance Material



ICAO U-AID Webpage

Operational Overview

UAS Operator's Perspective



ICAO UAS Humanitarian Missions Guidance Material (U-AID)

Operational Overview Roles & Responsibilities



Aviation Authorities

- ✈ Establishment of Regulatory Framework;
- ✈ Feasibility for a Previous U-AID Register;
- ✈ Educational Programs for Societal Acceptance;
- ✈ Enable U-AID Operations.



Military / Airspace

- ✈ Airspace Access Analysis & Allowance;
- ✈ Airspace Capacity;
- ✈ Airspace Players Coordination;
- ✈ Oversight of Airspace's Dynamics and Safety Conditions.



Disaster Response Agencies

- ✈ Knowledge About the Regulatory Framework;
- ✈ Reach Out to Aviation Authorities, Local/Community Authorities;
- ✈ Skilled Crews/Pilots/Operators;
- ✈ Establish a CONOP for U-AID Operations;



UAS Operators

- ✈ Knowledge About the Regulatory Framework;
- ✈ Comply with the Rules, Allowances & Coordination;
- ✈ Operate UAS in good conditions of Maintenance;
- ✈ Establish a Risk Assessment Process for the Missions;
- ✈ Report Any Problem to the Adequate Contact.

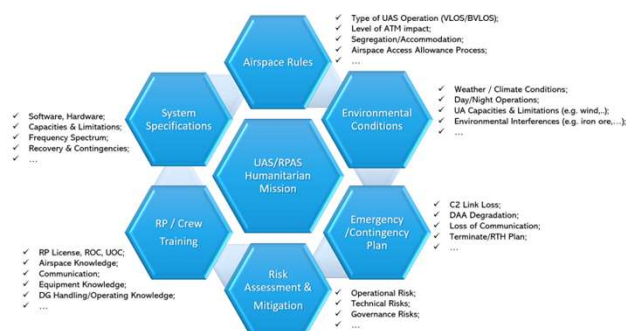
ICAO UAS Humanitarian Missions Guidance Material (U-AID)

17

Operational Overview



ICAO

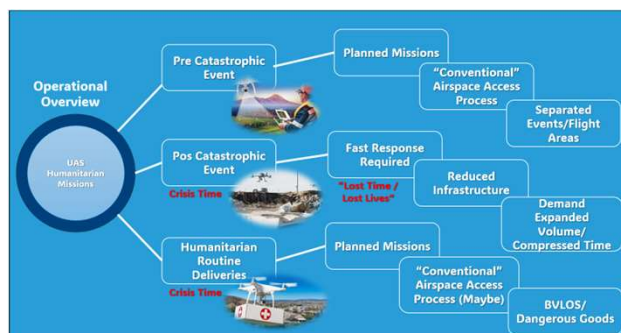


- ✓ Establishment of a **Performance-Based Regulatory Framework** for UAS Operations in Emergency/Humanitarian Events;
- ✓ Expediting UAS Operations Approval Process:
 - ✓ Pre-Register of Possible Responders;
 - ✓ Simplified Airspace Access Process; and/or
 - ✓ MoU/Agreement Amongst Stakeholders;
- ✓ Multilateral / Bilateral Agreements for Cross-Border Necessities; &
- ✓ Leverage the Awareness of the UAS Regulatory Framework.

ICAO UAS Humanitarian Missions Guidance Material (U-AID)

18

Operational Overview



- ✓ Reach Out to/ Interact with Local/Community Authorities;
- ✓ Leverage the Awareness of the UAS Regulatory Framework & UAS Operations Features;
- ✓ Coordinate/Explain the UAS Operation Actions With the Local Community (Flyers, Videos, Contacting People,...);
- ✓ Explain the Importance of UAS for the Humanitarian Objectives in the Scenario.



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19

➤ UAS/RPAS in Humanitarian Missions:

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EDUCATION PROGRAMMES



➤ Hurdles for UAS in Humanitarian Missions:

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- Clear Guidance and Operational Standards,
- UAS Equipment Availability.

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20

Main Objective

Standardize and Leverage Unmanned Aviation activities in the UN System, in an efficient and collaborative environment, based on the principles of **Safety, Expertise, Harmonization & Capacity Building**.



Assumptions

- ✈ UAS operations should be conducted **safely and efficiently** across the UN system;
- ✈ Comprehensive customized **training programs for personnel** should be implemented and **shared among the partner** entities;
- ✈ Frameworks (*inter alia*: **regulatory, standards, operational guidelines, etc.**) should be **harmonized**, as far as practical, to **facilitate UAS employment** across the UN System;
- ✈ **Exchange of knowledge** should be established through the necessary mechanisms to **share best practices and lessons learned** through UN System entities;
- ✈ States should receive the **appropriate support to develop and implement unmanned aviation regulatory frameworks** to enable such UAS employment; and
- ✈ **Collaborative partnerships** should be fostered and executed to promote the development and implementation of a harmonized Unmanned Aviation regulatory framework.

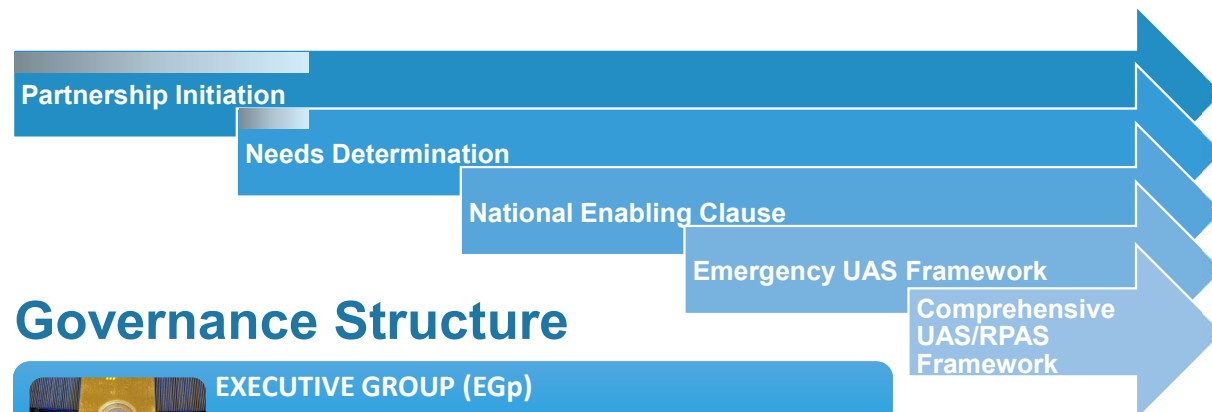
Strategic Concept



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21

Macro Activities



Governance Structure



EXECUTIVE GROUP (EGp)

- High Level Directives
- SGs & DGs UN System
- At Least, Once Every Two Years



STEERING GROUP (SGp)

- Guidance of the "FORUM"
- D/ANB, D/UNDOS, D/WFP + 2 others*
- At Least, Twice a Year



COORDINATION GROUP (CGp)

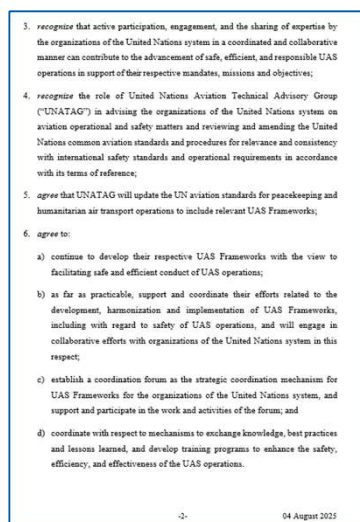
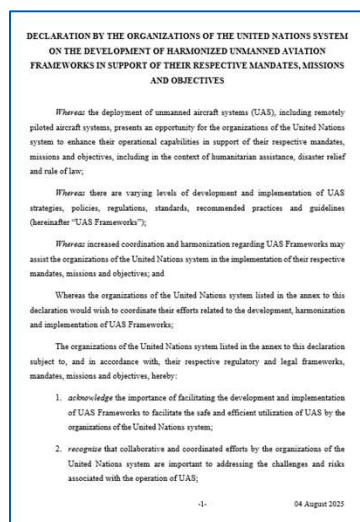
- Technical Level
- SME UN System & Org.
- Virtual Meetings &, at Least, Once a Year (presential)



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22

DECLARATION BY THE ORGANIZATIONS OF THE UNITED NATIONS SYSTEM ON THE DEVELOPMENT OF HARMONIZED UNMANNED AVIATION FRAMEWORKS IN SUPPORT OF THEIR RESPECTIVE MANDATES, MISSIONS AND OBJECTIVES



- ✈ Establish the UN Unmanned Aviation Forum to align UAS frameworks and facilitate cooperation among UN organizations;
- ✈ Establish the commitment of UN entities in developing their frameworks, coordinate efforts to develop, harmonize and implement UAS frameworks, share expertise, lessons learned and best practices, and develop training programs to enhance safety and effectiveness.
- ✈ Hitherto, the Declaration has been endorsed by **14 UN Entities**.



UN Unmanned Aviation Coordination Forum

Workshop on UAS for UN System



Workshop on ESAF Region



Understanding Challenges and Opportunities for UN Entities and States on UAS/RPAS Operations

Workshop on NACC Region



**Next: Workshop for APAC Region
4 to 6 November (Bangkok)**

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24

Lack of UAS Operational/Technical Training for Personnel

Absence of a UAS Regulatory Framework in States

Lack of Aeronautical Knowledge by Operators

Lack of Understanding by Staff/CAA of the State's UAS Regulatory Framework

Lack of Knowledge related to the State's regulatory framework

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Absence of Operational Agreement between States for Cross-Border Operations

How to establish UAS Operational, Technical or Governance Requirements for the Procurement Process

How to Establish a Risk Assessment for UAS Operations

Airspace Access Allowance Hurdles (Airspace density, ATM constraints,...)

Interference in C2 Link (Jamming, Spoofing, ...)

Cybersecurity Issues

Absence of Agreement between States related to Certifications Recognition

Lack of Knowledge related to UAS Operations/Regulations in CAAs

Absence of a Clear Process or a slow process in Achieving Authorization for UAS Operations

Difficulty for Community or Local Social Acceptance Related to UAS Operations

Lack of Guidance Material for UAS Operations

UAS Operations Liability Issues

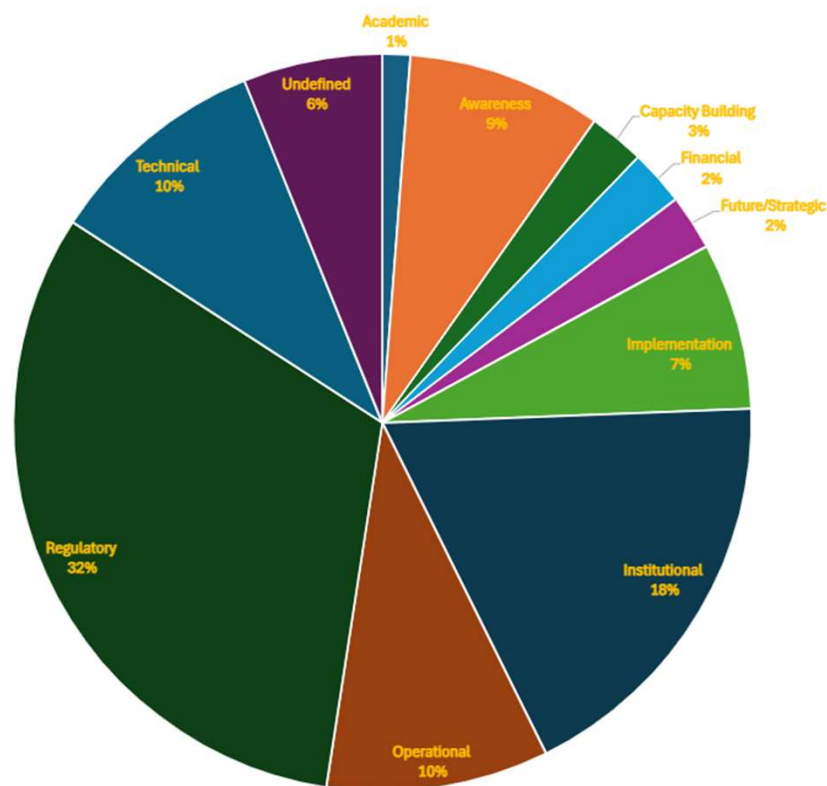


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25

Challenges for NACC States

(NACC/SAM Workshop on Drones/UAS Operations, Challenges and Opportunities)
Based on States' Presentations



- Regulatory (32%):** Absence or inconsistency of national UAS regulations, lack of harmonized frameworks, gaps in legal definitions, and delays in issuing enabling rules for commercial or humanitarian RPAS operations.
- Institutional (18%):** Insufficient institutional capacity, including limited technical personnel, fragmented oversight roles across agencies, and over-reliance on third-party or foreign regulatory precedents.
- Operational (10%):** Unauthorized UAS usage, absence of SOPs, lack of standardized maintenance practices, and complexities in executing cross-border or inter-agency operations.
- Technical (10%):** Absence of foundational systems such as national licensing or certification frameworks, airworthiness pathways, and certified training programmes, lack of maintenance procedures, limited simulator infrastructure, and insufficient technical integration with air traffic services.
- Awareness (9%):** Low awareness among operators and authorities regarding UAS rules, safety protocols, and reporting obligations, hindering effective enforcement and safe integration.
- Implementation (7%):** Hurdles in licensing, insurance, operational approval, and monitoring compliance were reported as barriers to converting regulations into functioning systems.
- Undefined (6%):** Some challenges lacked clear categorization but suggested structural or procedural inefficiencies.
- Other categories (<5% each):** This includes Capacity Building, Financial, and Future/Strategic challenges, such as training deficiencies, budget constraints, academic capacity and preparedness for emerging technologies like AI-driven RPAS or UAM integration

UN Unmanned Aviation Coordination Forum

Workshop Survey

26



- ✓ Excellent panel, we need documents to continue implantation in our country;
- ✓ I would suggest that ICAO holds more workshops with sufficient time of maybe 5 days;
- ✓ This was very well done but would love more of this and more operators involved as they are the ones tackling real life challenges with UAS on a daily;
- ✓ It has really been a good learning workshop to sit in the shoes of the regulator and policy makers to see the vision and idea. Would love to be a part of the next workshop to build and also take back learning pointers to build better practices from engagement of stories and facts of other people;
- ✓ Great, enlightening workshop. Emphasis or requirement of addressing system safety approach to consider interfacing with other stakeholders as well as embracing Management of Change in UAS operations....

PRE

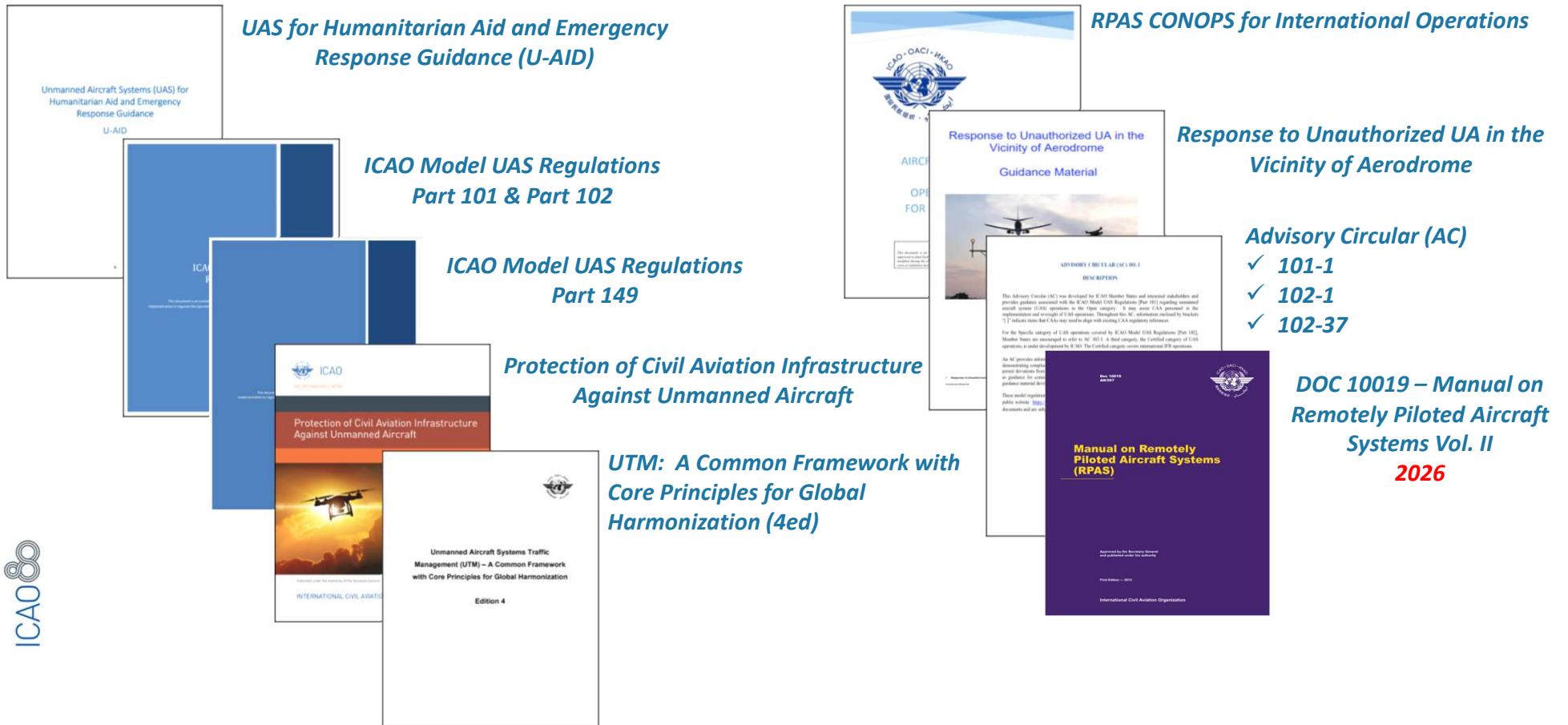
POST

T-Test Paired

P-Value $\geq 0,05$ – Workshop No-Significance
P-Value $< 0,05$ – Workshop Significance

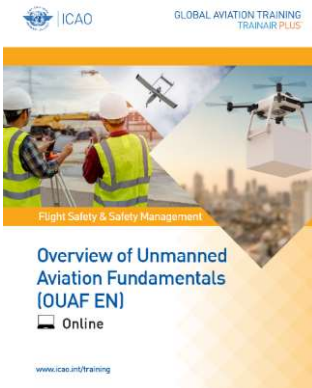
Other ICAO Resources

27



Other ICAO Resources

28



**Overview of
Unmanned Aviation
Fundamentals
(OUAF)**



**Unmanned Aircraft
Systems Operations
(UASO)**



**Unmanned Aircraft
Systems Regulations
(UASR)**



**Unmanned Aircraft
Systems Safety
Management System
(UASSMS)**

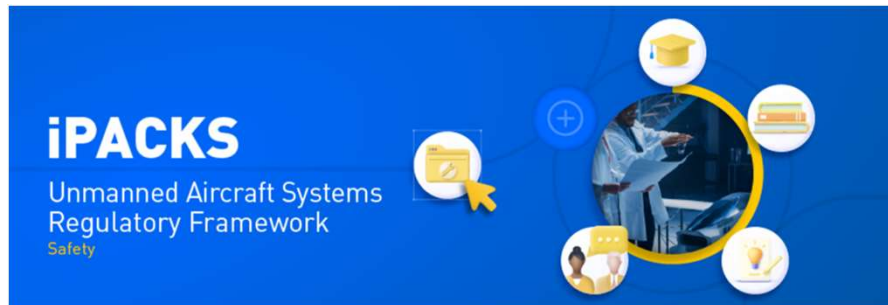


**Scan to view
the courses**



Other ICAO Resources

29



iPACK: This Implementation Package (iPack) is a self-contained package aimed at assisting and guiding ministries of transport, Civil Aviation Authorities (CAAs), and organizations that intend to operate UAS in multiple countries in the implementation of a UAS regulatory framework that remains outside of the Remotely Piloted Aircraft Systems (RPAS) framework.

Key components

iPacks consist of several key components that work together to facilitate the implementation of ICAO provisions. These include:

			
Expert consultation	Training	Guidance material	Tools
iPacks offer consultative support of a subject matter expert for a duration of 15-20 days . Subject matter experts can guide, review, provide clarification, and support States in their activities.	A standardized, competency-based training course will be provided for up to 12 technical specialists , enabling States to better confront their specific implementation challenges.	Our carefully curated guidance material includes ICAO annexes, manuals, guidance documents, and Procedures for Air Navigation Services (PANS) to ensure States have the complete library of resources they need.	Each iPack includes a unique set of tools to assist States with their implementation goals by conducting a gap analysis against the ICAO State Safety Plan (SSP) framework.



Other ICAO Resources

30

ICAO TV

U-AID

Humanitarian Operations Using UAS 2020



This webinar will present ICAO's guidance material for humanitarian aid and emergency response (U-AID) using UAS. Following an overview of this material and best practices, UA Operators who perform humanitarian operations (**Drone Delivery Canada and GlobalMedic**) will share their experiences. Additionally, the efforts by a new organization (**UPDWG**) who is intent on progressing "drone delivery data" collection will present their method to inform the efficacy of safe UAS operations, in a free access platform.

ICAO Unmanned Aviation & Advanced Air Mobility Webpage





*“By embracing innovation and working together, we can create a new era in aviation that is inclusive of a broad range of users and operations. To achieve this vision, **high levels of global cooperation** should be enabled by strategic planning while remaining adaptable to changes”.*

Call to Action AAM 2024

Thank You

