Workshop on Drone UAS/RPAS
Operations, Challenges and Opportunities for the NAM/CAR/SAM Regions
Mexico City, Mexico, 17 to 19 June 2025

SUMMARY OF DISCUSSIONS

Date	17 to 19 June, 2025
Location	ICAO NACC Regional Office. Mexico City, Mexico.
Opening Ceremony	The Workshop was attended by a total of 260 participants: 54 in person and 206 on-line; 29 States/Territories and 5 International Organizations and representatives from aviation industry from the NAM/CAR/SAM Regions. The list of participants is shown in **Attachment A.**

1. References

1.1 Invitation – Workshop on Drone Operations, Challenges and Opportunities for NAM/CAR/SAM Regions (Ref.: NT-N1-8.2.23; LT2/3.10 and E.OSG-NACC115506; SA210-2025).

2. Objectives

2.1 The objective of the workshop was leverage the knowledge related to ICAO concepts, documents, and guidance materials related to unmanned aviation, promoting experience sharing among States, emphasizing the importance of the lessons learned on UAS operations and simultaneously, understand States' challenges and opportunities concerning current and future unmanned aviation operations by proposing actions to assist and support effective and systemic implementation. Moreover, States/Territories and International Organizations provided their experience and challenges on their own drone operations.

3. Introduction

3.1 The workshop was opened by Mr. Luis Sanchez, Regional Officer, Aeronautical Meteorology and Environment on behalf of Mr. Christopher Barks, Regional Director of the North American, Central American and Caribbean (NACC) Regional Office, who extended welcome to all the participants, in person and online. He underscored the relevance of the workshop considering the urgent need to discuss and define actions for the proper management and regulation of UAS, RPAS and Advanced Air Mobility (AAM) as well as the importance of fostering regional coordination, exchanging best practices, encouraging innovation, and charting strategic pathways for sustainable and secure drone operations. In this sense, he highlights the role of the ICAO in leading the development of global standards for unmanned aviation and advanced air mobility, and the relevance of align regional efforts in strengthening cooperation, building capacity, and advance in a shared vision of a safe, efficient, and inclusive airspace.

4. Workshop Schedule and Activities

4.1 Refer to:
https://www.icao.int/NACC/Pages/meetings-2025-wdoco.aspx

5. Presentations

5.1 Introduction to the workshop

5.1.1 The Secretariat outlined the global work on unmanned aviation, focusing on Remotely Piloted Aircraft Systems (RPAS) and Unmanned Aircraft Systems (UAS). ICAO emphasized:

a) ICAO's Regulatory Development: through the RPAS Panel and the Advanced Air Mobility (AAM) Study Group, ICAO is creating Standards and Recommended Practices (SARPs), model regulations (Parts 101, 102, 149), and manuals to safely integrate unmanned aviation into international airspace
b) technological Evolution: innovation on unmanned aviation technology drives new operations, regulatory needs, public trust, and market growth
c) types of UAS Operations: ICAO suggested the use of the terminology “Open” (low risk), “Specific” (moderate risk), and “Certified” (high-risk, like traditional aviation)
d) use cases: UAS are increasingly used for humanitarian aid, emergency response, surveillance, deliveries, infrastructure inspection, and aerial photography and filming
e) the challenges: ensuring safety, interoperability, and public confidence while aligning global regulatory frameworks

5.1.2 ICAO promotes a risk-based, performance-oriented approach to safely expand UAS operations worldwide.

5.1.3 The ICAO indicated about ICAO Global UAS Regulatory Implementation Challenges. Key issues include:

a) safety is a non-negotiable priority
b) regulatory lag compared to rapid UAS innovation (“pacing problem”)
c) common challenges: unclear laws, limited range, privacy concerns, weather, cost, and public acceptance.

5.1.4 Three regulatory approaches:

a) prescriptive: clear but rigid
b) performance-based: flexible but complex, and most indicated for innovation
c) competency-based: skill-focused but resource-intensive.

5.1.5 Implementation strategies include risk-based, operation-centric models, regulatory sandboxes, digital tools, and international harmonization. ICAO emphasizes collaboration and adaptability to safely integrate UAS globally.

5.1.6 The Secretariat highlighted the rapid expansion of UAS/RPAS applications in the NAM/CAR Regions. UAS are used in aviation (e.g., NAVAID validation), agriculture, security, tourism, disaster response, healthcare, and more. Mexico leads the UAS manufacturing in the CAR region. The UAS market is growing.

5.1.7 95% of NACC States have drone regulations, but they are often outdated or insufficient. Humanitarian use is increasing, especially for disaster relief and migration management.

5.6 Main challenges for UAS/RPAS include:

a) lack of harmonized regulations
b) weak unmanned aircraft system traffic management (UTM) infrastructure
c) limited technical expertise
d) airspace integration issues
e) budget constraints and lack of training

6. ICAO SARPs and UAS Model Regulations (Parts 101, 102, 149)

6.1 The ICAO SARPs on RPAS are aimed at supporting the safe and harmonized integration of drones into international civil aviation. Notably, ICAO addresses SARPs for RPAS in instrument flight rules (IFR), Controlled Airspace, Certified RPAS and international operations.

6.2 Key Points on ICAO SARPs. SARPs cover multiple Annexes including:

a) Annex 1: Licensing of remote pilots
b) Annex 2: General rules of the air and special authorizations
c) Annex 6 Part IV: RPAS operations (ROC, flight operations, C2 link, emergency procedures)
d) Annex 7: Registration and identification

e) Annex 8: Airworthiness standards (incl. RPA, RPH, RPS)
f) Annex 10 Vol. VI: C2 Link communications
g) Annex 14: Aerodrome integration
h) Annex 19: Safety management (SMS requirements)
i) All Phases of Flight are covered: Includes guidance for pre-flight, takeoff, abnormal/emergency situations, and post-flight reporting.
j) For Drone operation, certificates are required:
    - Certificate of Airworthiness (CofA)
    - RPAS Operator Certificate (ROC)
    - Remote Pilot License (RPL)
k) C2 Link Requirements: Service Level Agreements (SLAs) between operators and communication service providers, including real-time interference management.
l) SMS Mandate: RPAS operators must implement a Safety Management System acceptable to the State of the Operator.

6.3 Overall, the SARPs provide a comprehensive international framework for the safe, regulated, and interoperable operation of RPAS in controlled airspace, aligned with manned aviation principles.

6.4 The Secretariat outlined ICAO's Model Regulations developed to support States on safely integrating UAS into national airspace. The key components on ICAO Model regulations are:

a) **Part 101**: for low-risk UAS operations (e.g., hobbyists, photography). Focuses on general rules like staying below 400 ft, flying within Visual Line of Sight (VLOS), and keeping distance from people and aerodromes.
b) **Part 102**: for moderate-risk operations. Includes requirements for remote pilot certification, UAS operator certificates, and airworthiness declarations.
c) **Part 149**: for organizations providing UAS services. Establishes requirements for Safety Management Systems (SMS), audits, qualified personnel, and administrative procedures.

6.5 ICAO model regulations are non-binding and designed for adaptation by individual States to support safe, risk-based UAS integration.

6.6 The ICAO U-AID guidance material provides non-binding support to States for safely and efficiently enabling UAS operations in humanitarian aid and emergency response scenarios. Key points include:

a) Purpose: Facilitate expedited approval processes for urgent UAS operations during crises (e.g., natural disasters, medical supply delivery, search and rescue).
b) Users: International organizations (World Food Program/WFP, Office for the Coordination of Humanitarian Affairs /OCHA), governments, NGOs, and UAS operators.
c) Constraints: Regulatory hurdles, limited range, weather dependence, privacy concerns, community acceptance, and high operational costs.

d) Operational Framework: Covers pre/post-disaster missions and routine deliveries. Emphasizes risk assessments, training, emergency plans, and coordination.
e) Stakeholders: Civil aviation authorities, military, disaster response agencies, local communities, and UAS operators.
f) Support Materials: Includes application forms for planned and urgent missions, and a UAS accident reporting form.

6.7 U-AID promotes preparedness and coordination to ensure timely, safe UAS use in humanitarian contexts.

7. States` Session

7.1 Mexico

7.1.1 The Agencia Federal de Aviación Civil (AFAC) is the entity responsible to develop the Mexican regulation.

7.1.2 AFAC, outlines the regulatory framework and status of Remotely Piloted Aircraft Systems (RPAS) operations in Mexico, in accordance with NOM-107-SCT3-2019. Key Points:

a) standard effective since January 2020, ratified in November 2024, based on ICAO Doc 10019 and FAA regulations (Parts 48 and 107).
b) operational requirements:
    - RPAS operations manual
    - Registration with AFAC
    - RPAS pilot license issued by AFAC
    - Civil liability insurance
    - Risk management and safety assessment

7.1.3 Additional requirements for large RPAS: type certificate, airworthiness certificate, and registration certificate.

7.1.4 Special operational authorizations: night operations, near aerodromes, BVLOS, over people, etc. According to 2025 registry data: 9,937 RPAS registered, 92% are micro, and 66% used for commercial purposes and operational authorizations issued: 9 total (some for-training centres and operations in controlled airspace). RPAS pilot licenses issued: growing annually, with 12 licenses for large RPAS issued in 2024.

7.15 Challenges on Special operational authorizations:

a) new types of operations are not yet covered (e.g., fumigation, window cleaning, passenger transport)
b) recreational operations by foreigners not allowed under current rules
c) lack of public awareness about regulations

d) need for coordination with other national agencies
e) proposal: update regulation to include UAS and RPAS classifications, risk-based operational categories (open/specific), certification framework, and bilateral agreements.

7.16 SENEAM (*Servicios a la Navegación Aérea en el Espacio Mexicano*) outlines its efforts in using measurement drones to enhance aviation safety and infrastructure resilience in Mexico:

a) Regulatory Collaboration: SENEAM is working with AFAC to develop a regulatory framework for UAS operations focused on calibration and measurement, ensuring both innovation and safety.
b) Calibration & Precertification: The project includes standardized procedures for calibrating radio navigation aids, improving accuracy and reliability.
c) Operational Coordination: UAS use is integrated with airport and air traffic service (ATS) coordination, including NOTAMs and temporary runway closures. Teams of pilots and analysts' complete calibrations in under 10 minutes per aid.
d) Advantages: UAS offer 24/7 availability, flexibility to operate at any airport, and are crucial during emergencies.
e) Real-World Success: After Hurricane Otis damaged Acapulco Airport, SENEAM teams restored communications within 2 hours and key navigation aids (ILS/VOR) in under 24 hours, reestablishing air bridge operations within 36 hours—enabled in part by UAS.

7.17 SENEAM emphasizes innovation, collaboration, and technology (UAS/RPAS) to strengthen aviation operations and emergency response capacity in Mexico.

7.2 Colombia

7.2.1 Colombia has developed a robust framework for unmanned aviation through RAC 100 and related regulations, enabling safe and diverse UAS operations. Categories include open, specific, and certified (in development), covering commercial and non-commercial use. Key achievements:

a) Over 4,700 UAS and 3,200 pilots registered.
b) Tools like the UAS Colombia platform and geographic viewer support digital oversight.
c) Events like F-DRONE promote industry engagement.

7.2.3 Challenges include airspace management, social acceptance, and industry professionalization. Opportunities lie in sectors like agriculture, risk management, and smart mobility. Unmanned aviation is seen as a key driver for innovation and national development.

7.3 Dominican Republic

7.3.1 Dominican Republic (IDAC) is advancing a comprehensive regulatory and infrastructure strategy to implement AAM and Urban Air Mobility (UAM), focusing on electric vertical take-off and landing (eVTOL) aircraft, vertiports, and UTM integration.

a) Objectives: Integrate UAS and eVTOL into urban mobility as a new transport model.
b) Rulemaking: New regulations (RAD-48, RAD-109), vertiport and air corridor authorization processes.
c) Project Management: Agile approach with strong stakeholder engagement (government, industry, communities).
d) Vertiports: Multi-phase rollout from pilot sites to a national smart vertiport network by 2050.
e) UTM Roadmap: Six phases, from regulation to national deployment.
f) Challenges: Urban planning, public acceptance, funding, cybersecurity, airspace integration.
g) Opportunities: Regional leadership, job creation, safe BVLOS operations, smart mobility.

7.3.2 Dominican Republic aims to be a regional leader in AAM, leveraging innovation, collaboration, and infrastructure modernization.

7.4 Guatemala

7.4.1 The General Directorate of Civil Aeronautics (DGAC) of Guatemala oversees the regulation of Remotely Piloted Aircraft Systems (RPAS) and is actively working to update its regulatory framework:

a) Current Regulation: RAC 101 (from 2013) governs unmanned aircraft and has not been revised.
b) New Framework (Pending): RAC 107 will regulate domestic RPAS operations, pilot certification (open and specific categories), and prohibit passenger transport.
c) Operational Directives: Guidelines for special RPAS operations and certification processes (CORPAS).
d) Use Cases: Agriculture, topography, security/surveillance, photography, and videography.
e) Key Challenges: Outdated regulations, need for public awareness, certification costs, and managing emerging technologies.

7.4.2 DGAC is committed to modernizing RPAS oversight and enabling safe and regulated UAS operations in Guatemala.

7.5 **Honduras**

7.5.1 The National Autonomous University of Honduras (UNAH) has led national efforts to build a sustainable ecosystem for RPAS through regulation, training, and innovation. Principle archives:

a) Foundations: Initiated RPAS regulation in 2017 with support from AHAC (Agencia Hondureña de Aeronautica Civil), COCESNA, and UTP.
b) Training Achievements:
    - Over 490 theoretical and 190 practical graduates across UNAH and certified centers (Elite Aviators, Hondudrone).
    - First certified RPAS pilots in Honduras received licenses through UNAH-led programs.
c) Education Initiatives:
    - Drone Kids outreach.
    - A postgraduate RPAS specialty aligned with ICAO standards.
d) Innovation:
    - Educational wind tunnel.
    - Research in geomatics, agriculture, risk management, and heritage monitoring.
e) Future Needs: Certification of RPAS-operating companies to strengthen the ecosystem.

7.5.2 UNAH is part of the training Centres working with ICAO, which plays a central role in advancing RPAS education, regulation, and innovation in Honduras.

7.6 ICAO SAM (Regional Safety Oversight Cooperation System (SRVSOP) UAS)

7.6.1 The SRVSOP supports its 12 member States in strengthening aviation safety oversight, including the regulation of UAS/RPAS. Principle activities:

a) developed UAS-specific regulations, procedures, checklists, and guidance materials for aviation authorities and service providers
b) goal: help all member States achieve over 80% Effective Implementation (EI) in safety audits
c) supports the implementation of SSP/SMS (State Safety Program / Safety Management System)
d) promotes a risk-based oversight culture across the region.

7.6.2 SRVSOP plays a key role in harmonizing and enhancing UAS regulatory frameworks in Latin America.

8. United Nations Agencies working with RPAS/UAS

8.1 The United Nations Department of Operational Support (UNDOS) outlines strategy for managing UAS/RPAS and airborne ISR (Intelligence, Surveillance, Reconnaissance) operations in field missions. Principle actions:

a) Strategic Pillars: Regulatory alignment with ICAO, operational support, responsible sourcing, risk management, and partnerships.
b) Use Cases: Cargo delivery, medical support (MEDEVAC, vaccines), engineering, surveillance, telemedicine, and emergency response.
c) Implementation: Two phases (2025–2026), increasing payload (15–200+ kg) and range (50–250 km), with 24/7 tasking capability.
d) Challenges: Host nation regulations, airspace integration, logistics, liability, cybersecurity, and contract management.
e) Training: Modular, global training programs (remote and in-person) for UN staff and partners.
f) Example: UNDOS in Somalia is the pilot for UAS-based medical and mission logistics.

8.2 The strategy emphasizes compliance, safety, adaptability, and innovation to enhance UN peacekeeping and humanitarian operations.

8.3 The World Food Programme (WFP) highlighted the growing use of UAS on humanitarian logistics, focusing on cargo delivery and data collection. Important activities:

a) UAS Use Cases:
    - Data collection (e.g., damage assessment, mapping)
    - Small (1–5 kg), mid-size (5–100 kg), and heavy-lift (100+ kg) cargo delivery
b) Heavy-Lift Pilot Project:
    - Started in Madagascar (Feb 2025) with 160 kg airdrop over 200 km
    - Addresses flood-affected, remote areas with predictable needs
c) Implementation Needs:
    - National UAS regulations
    - Civil aviation authority training (ICAO UAS iPack)
    - Safety evaluations (e.g., JARUS SORA)
    - BVLOS authorization processes
d) Challenges:
    - Regulatory gaps
    - Weather forecasting and command/control limitations
e) Benefits:
    - Faster, more reliable last-mile delivery
    - Reduced risks for aid workers
    - Scalable logistics service for multiple agencies

8.4 WFP promotes UAS as a transformative tool for efficient and safe humanitarian aid delivery.

8.5 The United Nations Office on Drugs and Crime **(UNODC)** presentation outlines strategies for integrating Unmanned Aircraft Systems (UAS) into law enforcement operations. Key Points:

a) Objective: Support law enforcement agencies in using UAS for surveillance, border monitoring, crime prevention, and emergency response.
b) Enablers:
    - Regulatory compliance aligned with national and international laws.
    - Inter-agency coordination and community trust-building.
    - Training in UAS operation, data protection, and ethical use.
c) Operational Considerations:
    - Clear mission objectives.
    - Risk and privacy assessments.
    - Secure data handling and evidence management.
d) Challenges:
    - Legal and privacy concerns.
    - Technical capacity gaps.
    - Need for standard procedures and oversight.

8.6 UNODC emphasizes the importance of legal frameworks, transparency, and inter-agency collaboration to ensure safe and effective UAS use in law enforcement missions.

9. ICAO Presentation on BVLOS UAS Operations

9.1 The Secretariat explained key considerations for BVLOS operations using UAS:

a) BVLOS Use Cases: Infrastructure inspection, humanitarian aid, cargo delivery, surveillance, search and rescue, and agriculture.
b) Risks: Loss of situational awareness, airspace intrusion, command & control (C2) failures, weather hazards, and privacy concerns.
c) Airspace Integration: Categorized as segregated, accommodated, or fully integrated with manned aviation.
d) Operational Profiles: Range from remote areas and high seas to cargo delivery and integrated urban flights.
e) Requirements:
    - Certified operators and aircraft
    - Risk assessments, emergency plans, robust C2 links
    - Detect & avoid systems, global navigation satellite system (GNSS) reliability
f) Regulatory Guidance: States are encouraged to use ICAO SARPs (Annex 6, Part IV), Part 102, UTM framework, and other resources.

9.2 ICAO emphasized safety, risk management, and harmonized regulation as critical for enabling BVLOS UAS operations globally.

10. UAS Operations Over the High Seas

10.1 The Secretariat explained regulatory and operational considerations for Unmanned Aircraft Systems (UAS) operating over the high seas:

a) Use Cases: Include search and rescue, environmental monitoring, remote sensing, maritime logistics, and wind farm inspections.
b) Legal Framework:
    - The 1982 United Nations Convention on the Law of the Sea (UNCLOS) establishes the limits for maritime zones (territorial sea, Exclusive Economic Zone (EEZ), high seas).
    - The Chicago Convention (1944) applies to UAS over high seas, including requirements for certificates, coordination with ATS, and compliance with ICAO SARPs. For instance, article 31 of the Convention.
c) Annexes Referenced: Annex 2 (Rules of the Air), Annex 8 (Airworthiness), Annex 11 (ATS), and others emphasize airworthiness, flight rules, and required coordination.
d) Future Considerations:
    - ICAO is studying authorization models for non-certificated UAS over high seas.
    - Legal groups (e.g., SSG-LIPA) address sovereignty, liability, and compliance challenges.

10.2 Safe and compliant UAS operations over international waters require harmonized legal interpretation, coordinated ATS responsibilities, and evolving ICAO guidance.

11. UAS Transport of Dangerous Goods

11.1 The Secretariat explained how UAS can be used to safely transport Dangerous Goods (DGs) for humanitarian and emergency response missions:

a) Reference Material: ICAO Annex 18, Doc 9284 (Technical Instructions), AC-102-37 and U-AID guidance.
b) Examples of DG: Infectious substances, lithium batteries, compressed gases, flammable liquids, and dry ice.
c) Use Cases: Rapid delivery in disaster zones, public health crises, and hard-to-reach areas.
d) Safety Requirements:
    - Risk assessments
    - Training and SOPs
    - Emergency response plans
    - Clear labeling and documentation
e) Stakeholders:
    - Aviation Authorities: Approve operations and monitor compliance.
    - Operators: Must be trained, certified, and follow strict safety procedures.
    - Receivers: Must understand handling and risks of DG.

11.2 DG transport by UAS is feasible and valuable but must be carefully managed under ICAO guidance and national regulations to ensure safety.

12. ICAO UAS Toolkit & Resources Presentation

12.1 This presentation describes a comprehensive set of resources to support States and aviation professionals in implementing safe and effective Unmanned Aircraft Systems (UAS) frameworks. The tool provides:

a) Guidance Materials:
   - Model UAS Regulations (Parts 101, 102, 149)
   - U-AID (Humanitarian ops)
   - UTM framework, RPAS CONOPS, safety manuals

b) Self-Paced Online Courses:
   - UAS Fundamentals, Operations, Regulations, and SMS

c) In-Person/Virtual Training:
   - Fundamentals of Unmanned Aviation

d) ICAO iPack:
   - Turnkey regulatory implementation package for UAS oversight

e) ICAO TV:
   - Free access to expert videos on BVLOS, UAS regulation, UTM, safety, and more.

12.2 This set of resources, available on the ICAO Unmanned Aviation public webpage, empowers States and Civil Aviation Authorities (CAAs) with training, templates, and regulatory models to foster safe, harmonized UAS integration globally. The website is: UAS Toolkit Home

13. ICAO AAM Environment and UTM Framework

13.1 This ICAO presentation outlines global efforts to implement Advanced Air Mobility (AAM) and Unmanned Aircraft System Traffic Management (UTM) to support safe and efficient integration of UAS and eVTOLs into airspace. Important points:

a) AAM Overview:
   - Involves passenger and cargo operations using eVTOLs and UAS.
   - Encompasses services like airport shuttles, urban delivery, medical response, and air taxis.

b) UTM Framework:
   - Defining centralized and federated architectures with UAS Service Providers (USPs), data providers, and remote ID systems.
   - Covers tracking, registration, airspace deconfliction, and risk mitigation.
   - Supports safe integration with manned aviation.

c) Global Use Cases:
    - Brazil (Eve Air Mobility), India, Korea, Miami, and Switzerland developing UAM ecosystems.
    - Operational demonstrations in Spain (U-ELCOME) and Malaysia's UTM platform by Q4 2025.
d) Challenges & Opportunities:
    - States, industry awareness and coordination
    - Regulatory gaps, infrastructure needs, and public acceptance.
    - High economic potential, reduced emissions, and improved mobility access.
e) ICAO's Role:
    - Through the AAM Study Group and the work developed by UAS Advisory Group, ICAO is leading efforts to develop global standards, guidance, training, and regulatory tools.

13.2 ICAO calls for global collaboration to shape the future of aviation through innovative, inclusive, and harmonized AAM and UTM systems.

14. AVSEC

14.1 Ms. Sonia Hifdi, Chief, Aviation Security Policy Section at ICAO Headquarters, shared a presentation from the AVSEC perspective in which she highlighted the following:

a) UAS have emerged as a dynamic and growing threat to civil aviation. Their accessibility, low cost, and the anonymity of their purchase make them particularly attractive for malicious use. Reports from several States confirm that drones have been considered for attacks on civilian targets, and recent airport disruptions have shown just how easily drone incursions can occur. The threat is further compounded by increasing interest from terrorist groups in using drones as delivery systems for biological or chemical agents or Improvised Explosive Devices (IEDs).
b) These developments demand an updated risk assessment approach. The likelihood of drone-related incidents is high, largely due to the difficulty in restricting access to UAS technology and preventing its misuse. The vulnerability of aviation systems is also significant, as tracking and neutralizing drones near airports remains a technical and operational challenge. With drones gaining greater range and payload capacity, the potential consequences of an attack — particularly involving large aircraft — could be catastrophic.
c) In response, ICAO has adopted a comprehensive strategy to address this evolving threat landscape. This includes the development of security requirements specific to UAS and (AAM operations, as well as the integration of these new standards within existing ICAO Annexes and regulatory frameworks. Tools like the UAS Toolkit and updated provisions in the ICAO Aviation Security Manual provide practical guidance to States and operators alike.

d) Beyond regulation, ICAO promotes a multidisciplinary approach that involves clearly defined responsibilities among authorities, preventive measures such as registration and licensing, and the development of technical solutions to detect and disrupt drones in flight. Public awareness campaigns and surveillance of areas near airports where drones could be launched are also key components of this strategy.
e) Regarding counter-UAS technologies, their deployment presents significant challenges. There is currently no universally effective technical solution, and existing systems often face issues related to reliability, interference, and legal compliance — particularly in cross-border contexts. Recognizing this, ICAO encourages States to focus on preparedness: developing incident response plans, establishing safe evacuation procedures, ensuring service continuity, and emphasizing prevention.
f) To support these efforts, ICAO has launched the Aviation Security Provisions and Guidance Bundle, a consolidated resource that includes all relevant security publications — including material on UAS and cybersecurity. Offered in English, French, and Spanish, the bundle is freely available to States and accessible to industry.
g) In summary, while UAS represent a significant and evolving security threat, ICAO is actively working to provide States with the tools, frameworks, and strategies needed to respond effectively. Through a combination of regulatory innovation, operational preparedness, and international cooperation, the Organization aims to ensure that global aviation remains secure in the face of this new generation of risks.

15. Case Studies UAS/RPAS

15.1 The workshop included a working session with UAS and RPAS Case Studies, entitled:

a) Scenario A: UAS to deliver urgent medical supplies and life-saving aid for a Village under the situation of a Dawn Break in the border of two States
b) Scenario B: DRONE SHOW AT MUSICAL CONCERT near an airport provided by a new UAS company
c) Scenario C: RPAS for a WIDE AREA SURVEILLANCE remote sensing of a vast area departure from a different airport flying near another airport
d) Scenario D: RPAS INTERNATIONAL CARGO FLIGHT with fly over cities and terminal control areas (TMAs).

15.2 Four working groups were formed for each of the case studies presented. The analysis included the following objectives:

a) the description of the operational scenario including the level of risk and the regimen of the operation,
b) ICAO documentation, materials, applicable SARPs,
c) specific operations and measures to enable and monitor the development of the operation,
d) actions that should be taken by Civil Aviation Authorities (CAAs), air navigation services providers (ANSPs) and States to support these operations,
e) according to each case, the measures to be used by ANSPs to guarantee the operational safety of the operation
f) the associated risk analysis with mitigations to apply

15.3 At the end, each group presented the analysis and results of each case study. The presentations were very specific and reflected the in-depth analysis carried out by the participants. ICAO was very satisfied with the presentations and supported the results by highlighting the specific details they felt were relevant. This activity was considered very successful by all the participants.

16. Outcomes

16.1 The workshop had the following outcomes:

- Regulatory Frameworks: ICAO has developed model regulations (Parts 101, 102, 149) to guide States in adopting UAS rules tailored to operational risk and scope.

- Several States (e.g., Colombia, Guatemala, Malaysia, Mexico) are updating or implementing UAS-specific regulations to align with ICAO SARPs and evolving operations. SRVSOP supports harmonization across Latin America to help States exceed 80% ICAO compliance in UAS oversight.

16.3 Operational Applications and Use Cases:

16.3.1 Humanitarian and Emergency Response:

a) WFP and ICAO U-AID projects show UAS improve access to remote/disaster areas (e.g., Madagascar heavy-lift UAS project).
b) UNODC and UN Aviation projects enable UAS support in law enforcement, peacekeeping, and public health missions.

16.3.2 Air Navigation and Infrastructure:

a) SENEAM and AeroCivil are using UAS for calibration and surveillance of CNS infrastructure.
b) Guatemala and UNAH are building local RPAS ecosystems through training and research.

16.4 Advanced Air Mobility (AAM):

a) ICAO and States are planning for eVTOL integration (e.g., Brazil, India, United States/Miami).
b) Emphasis on airspace redesign, urban vertiports, and societal engagement.

16.5 UTM and BVLOS

a) ICAO promotes UTM frameworks for UAS operations, enabling BVLOS (Beyond Visual Line of Sight) missions safely and legally.
b) Successful demonstrations have occurred in Europe, the United States, United Arab Emirates, and Latin America, using tools like remote ID, digital approval, and flight planning integration.

c) BVLOS requires risk-based regulation, reliable C2 links, detect-and-avoid systems, and coordination with ATC.

16.6 Dangerous Goods Transport

a) ICAO allows UAS to carry DGs under strict risk and safety protocols.
b) Required: operator policies, training, emergency procedures, and authority oversight (e.g., for lithium batteries, blood samples).

16.7 Training, Tools, and Support

a) ICAO offers self-paced and live courses, UAS Toolkits, and Implementation Packages (iPacks) to help CAAs build institutional capacity.
b) ICAO TV and guidance documents (e.g., U-AID, RPAS CONOPS, UTM principles) support knowledge sharing.

16.8 Key Challenges

a) Common regulatory gaps: Outdated or non-harmonized rules across regions.
b) Safety and airspace integration: Especially over high seas and near aerodromes.
c) Technical barriers: C2 link reliability, cybersecurity, weather dependency.
d) Social acceptance: Privacy concerns, low public awareness, and urban planning issues.
e) Resource constraints: Especially in training, certification, and infrastructure.

16.9 Strategic Outcomes and Calls to Action

a) Global cooperation is needed to develop harmonized regulations and technical standards.
b) States are urged to:

- Implement ICAO's model regulations and toolkits.
- Build risk-based certification and UTM capabilities.
- Promote public-private partnerships.
- Prepare for the future of AAM by updating legal, technical, and operational frameworks.

17. Recommendations

17.1 Based on the workshop outcomes/ conclusions the following recommendations were identified:

Regulatory and Institutional Recommendations: States to:

- adopt and adapt ICAO Model UAS Regulations as basic.
- Use ICAO Parts 101, 102, and 149 as a flexible foundation.
- Tailor rules to national needs while ensuring international alignment.

Accelerate Regulatory Updates: States to:
- Modernize outdated RPAS/UAS rules.
- Include provisions for BVLOS, UTM, DG transport, and high seas operations.

Establish Clear Approval and Oversight Procedures. States to:
- Streamline authorization for UAS operations (routine, humanitarian, and emergency).
- Implement certification frameworks for remote pilots and UAS operators.

Coordinate Interagency and Cross-Border Frameworks. States to:
- Strengthen collaboration with police, customs, disaster response agencies, and neighbouring States.
- Facilitate regional agreements for cross-border and high seas UAS operations.

Operational & Safety Recommendations. States to:
- Implement UTM and BVLOS Protocols
- Deploy centralized or federated UTM systems with remote ID, tracking, and automated approvals.
- Mandate risk assessments, C2 link reliability, and detect-and-avoid systems for BVLOS flights.

Enable UAS Use for Humanitarian and Public Services. States to:
- Integrate UAS into disaster relief, medical supply delivery, agricultural monitoring, and infrastructure inspection.
- Use ICAO's U-AID guidance to support emergencies and high-impact deployments.
- Promote a regulatory framework that expedites the approval for UAS employment in support of humanitarian missions.
- Support harmonization of UAS operations in support of humanitarian/emergency relief mission through the UN Unmanned Aviation Coordination Forum

Safely Authorize Transport of Dangerous Goods (DG). States to:
- Ensure DG carried by UAS follow ICAO Annex 18 and Doc 9284.
- Require operator SOPs, emergency response plans, and proper training.

Training & Capacity-Building Recommendations. States and organizations to:
- Utilize ICAO UAS Toolkits and Training Resources
- Offer staff ICAO’s self-paced and instructor-led courses (UAS fundamentals, operations, SMS, regulations).
- Distribute iPacks and advisory circulars to relevant ministries and operators.

Supporting Industry and Academia to:

- Encourage RPAS research, innovation hubs, and certified training organizations.
- Recognize the role of universities (e.g., UNAH) and private operators in system development.

17.2 Advanced Air Mobility (AAM) Planning. States, Aviation partner and industry to:

a) Prepare for Urban and Regional AAM Integration
   - Define vertiport infrastructure, flight corridors, and public engagement strategies.
   - Align urban mobility plans with ICAO AAM and UTM frameworks.

b) Involve Municipal and Private Sectors
   - Engage city planners, telecom providers, manufacturers, and logistics companies in the AAM ecosystem.
   - Incentivize public-private partnerships for UAM demonstrations and infrastructure roll-out.

17.3 Strategic and Global Alignment. States to:

Align with ICAO SARPs and International Best Practices

- Harmonize UAS and AAM policies regionally to ensure interoperability.
- Participate in ICAO working groups, conferences (e.g., Drone Enable), and bilateral dialogues.

Foster Innovation While Maintaining Safety. States and aviation stakeholders to:

- Encourage cooperation in building amongst States for the leverage of a regulatory framework that foster Unmanned Aviation
- Enable sandboxes and pilot projects for new technologies.
- Encourage industry-led innovation balanced with robust oversight mechanisms.
- Participate in ICAO working groups, conferences, multilateral initiatives (e.g., RPASP, AAM SG, Drone Enable, AAM Symposia, UN Unmanned Aviation Coordination Forum), and bilateral dialogues, including through direct participation, provision of relevant data, information, sharing of experiences, best practices and lessons learned for global regulatory convergence, harmonization and interoperability.

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