*International Civil Aviation Organization*
South American Regional Office
**Seventeenth Meeting of Civil Aviation Authorities of the South American Region (RAAC/17)**
(Santiago, Chile, 10 to 14 April 2023)

RAAC/17-WP/34-Rev
27/03/23

**Agenda Item 1A: Regional situation and priorities**

# DEVELOPMENTS IN THE REGIONAL AND GLOBAL EVOLUTION OF UNMANNED AVIATION AND NEED TO ESTABLISH BODIES IN CHARGE OF UAS/RPAS IN THE STATES TO MANAGE THE IMPLEMENTATION OF THESE OPERATIONS

(Presented by the Secretariat)

**SUMMARY**

This working paper (WP) presents to RAAC/17 the developments in the regional and global evolution of unmanned aviation and the need to establish agencies in charge of UAS/RPAS in SAM States to manage the implementation of these operations.

**References:**

- RPAS standards contained in the related Annexes to the Convention on International Civil Aviation;
- Model regulations and guidance material on UAS issued by ICAO;
- Doc 10019 - Manual on remotely piloted aircraft systems (RPAS);
- Unmanned aircraft systems concept of operations (UAS CONOPS) of the SAM Region;
- UAS traffic management concept of operations (UTM CONOPS) of the SAM Region;
- LAR UAS 100 and 101
- Regulations and guidance material of other ICAO member States

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| ***ICAO strategic objectives:*** | Safety |

## 1. Introduction

1.1 The International Civil Aviation Organization (ICAO) initiated work on unmanned aircraft systems in 2007 when the Air Navigation Commission (ANC) decided during its 175th Session in April 2007 to establish the Unmanned Aircraft Systems Study Group (UASSG). The UASSG served as the ICAO focal point for all Unmanned Aircraft Systems (UAS) related issues until the Remotely Piloted Aircraft Systems Panel (RPASP) superseded it in 2014.

1.2 In March 2012, the Council of ICAO adopted the first major set of standards and recommended practices (SARPs) for remotely piloted aircraft systems (RPAS) in Annexes 2 and 7. Since that date, ICAO has published and is developing a set of SARPs in Annexes 1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, 15 and 19. Appendix A of this working paper describes the standards incorporated and to be incorporated in several of the aforementioned Annexes, as well as their effective dates.

1.3 Likewise, in June 2020, ICAO published a set of model regulations and guidance material to guide its States in the implementation of operations with unmanned aircraft systems (UAS).

1.4 In turn, the SAM Region, as of 26 February 2021, started strategic planning and the development of a regulatory framework and roadmap for UAS/RPAS operations.

1.5 In order to know the situation in SAM States, on 10 November 2022, the SAM Office sent to its States a survey to analyse the requirements for the implementation of UAS/RPAS operations. The purpose of this survey was to support States in identifying their needs and addressing their challenges in implementing a regulatory and safety oversight system for UAS/RPAS operations.

## 2. Developments in the regional and global evolution of unmanned aviation

2.1 In addition to the regulatory development promoted by ICAO, its member States continue to make significant progress in the evolution of their UAS/RPAS regulations and operations, whether remotely-piloted, fully autonomous or a combination of both.

2.2 In order to manage these operations based on safety risk, most SAM and SRVSOP States, in accordance with ICAO guidelines, agreed to develop regional UAS/RPAS regulations (LARs), taking into account the ***open, specific and certified*** categories. It is recognised that RPAS operating under instrument flight rules (IFR) in controlled airspace and aerodromes will be given the highest priority. Accordingly, ICAO global provisions are aimed at facilitating RPAS operations that are considered in the **certified category**.

2.3 Operations in the open category are limited to flights conducted in visual line-of-sight (VLOS). VLOS operations outside the boundaries of the open category and operations conducted beyond visual line-of-sight (BVLOS) are considered in the specific category. For the certified category, operations are considered to be conducted primarily BVLOS, although some parts of the flight (i.e., launch and recovery) may be conducted within VLOS.

2.4 To cope with the global evolution of unmanned aviation, the SAM Region has developed the UAS CONOPS, as well as LAR UAS 100 and 101 to regulate UAS VLOS operations in the **open category**, as well as the UTM CONOPS to guide the UAS VLOS and BVLOS operations in open and specific categories. Likewise, the UAS/RPAS focal points are drafting the structure of LAR UAS 102 to regulate BVLOS operations in the **specific category**. Furthermore, draft Advisory Circular (AC) 101-1 has been developed and AC 102-1 is expected to be developed once LAR UAS 102 is published later this year. According to the UAS CONOPS, **from 2024 to 2026**, it is expected to develop the RPAS CONOPS and the RPAS ATM CONOPS for the SAM Region and start the development of the LAR RPAS and its related material.

2.5 At the global level, States continue to move ahead at an accelerated pace in the regulatory development and implementation of UAS operations in the urban environment (urban air mobility), with electric vertical take-off and landing (eVTOL) aircraft that will operate from vertiports.

2.6 UAS operations for **urban logistics** would mainly take place in very low level (VLL) airspace, involving BVLOS automated flights of light UAS with small rotors in densely populated areas and below 400 ft, the threshold established to separate UAS operations from manned aircraft. Various concepts of operations (CONOPS) are currently being developed to integrate these operations in a safe and controlled manner.

2.7 In Europe, **urban air mobility**[1] is expected to become a reality within three (3) to five (5) years. New technologies, such as electric propulsion and improved batteries capacity, applied to vertical take-off and landing systems, will make these operations possible. The first commercial operations are expected to involve the delivery of goods by drones (UAS) and the transport of passengers, initially with a pilot on board and later by remote piloting or autonomously.

2.8 With the leadership of ICAO, contracting States are currently considering global harmonisation and interoperability of advanced air mobility (AAM). It is expected that ongoing ICAO activities related to AAM and UAS will be **addressed collectively** to facilitate their integration into national and regional aviation systems.

2.9 In order to manage UAS VLOS and BVLOS operations below 400 ft, ICAO, the Regions and the States are developing and continuously updating their UAS traffic management CONOPS (UTM CONOPS). The UTM CONOPS, which is envisaged as a subsystem of air traffic management (ATM), will enable safe and efficient integration of UAS operations into VLL airspace and, in turn, with ATM. The SAM Region has already developed the first edition of its UTM CONOPS, which will be published in April this year.

2.10 Regarding **autonomous flights**[2] **(aircraft flights with no pilot on board) in civil aviation**, in the United States of North America, aircraft manufacturers are already working on this new concept, airlines are looking forward to this change, and the Federal Aviation Administration (FAA) is already getting ready to take this evolution forward. Therefore, it is becoming increasingly clear that autonomous aircraft are coming to civil aviation.

2.11 To cope with this new aviation reality, the FAA has established an unmanned aircraft office that will be in charge of certifying autonomous aircraft and is already working together with their operators in the testing of these aircraft. It is expected that, in the United States, between **2025-2026**, the first autonomous cargo planes would enter civil aviation, sharing the skies with manned aircraft. Between **2030-2035**, small autonomous aircraft would begin carrying passengers on short and regional flights. And, between **2040-2050**, large passenger aircraft would begin operations with no pilot on board.

## 3. Discussion

3.1 Unmanned aviation is already a reality. Every day, States, industry and stakeholders are making progress in the development of UAS/RPAS operations and their integration into non-segregated airspace, and it is up to civil aviation authorities (CAAs) to take the necessary steps to regulate and oversee these operations.

3.2 In order for States to cope with the accelerated development of unmanned aviation, they need to strengthen their safety management systems, with an agency or office in charge of driving national regulatory development, certifications, authorisations, and risk-based surveillance (RBS) of UAS/RPAS operations. These entities could be the same as, or located within, the CAA and AIA safety bodies. Likewise, AIA investigators must acquire the necessary competencies to conduct investigations of accidents and incidents occurring in unmanned aviation.

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[1] Information taken from the EASA Urban Air Mobility (UAM) website (easa.europa.ua/en/domains/urban-air-mobility-uam)

[2] Information taken for the article published by FORBES – *No pilot, no problem? Here´s how soon self-flying planes will take off.*

3.3 In the survey completed by SAM States on the needs analysis for the implementation of UAS/RPAS operations, **eight (8) States** noted that they did have an agency in charge of issuing UAS/RPAS authorisations and certificates and a mechanism to continuously monitor, when necessary, the validity of the UAS/RPAS authorisations and certificates granted, taking into account the safety risk analysis conducted and the mitigation measures proposed by the UAS/RPAS operator (Question 24). However, only **one (1) State** responded positively to Question 34 regarding whether States had competent inspectors and investigators in sufficient numbers to manage the addition of a regulatory framework, inspections, authorizations, certifications, risk-based surveillance and accidents and incidents investigations of UAS/RPAS.

3.4 Considering that unprecedented technological and operational changes in the civil and commercial domain are expected in the short to medium term (5 to 10 years), it is recommended that SAM States establish, as soon as possible, agencies in charge of UAS/RPAS with competent inspectors and investigators to carry out their new roles and responsibilities. Accordingly, the following proposed recommendation is submitted to RAAC/17 for consideration and approval:

<table>
<tr><td colspan="2">RECOMMENDATION RAAC17/C0X</td><td colspan="2">Establishment of bodies in charge of UAS/RPAS in the civil aviation administrations and accident and incident investigation authorities of SAM States</td></tr>
<tr><td colspan="3">What:<br><br>The Seventeenth Meeting of Civil Aviation Authorities of the South American Region (RAAC/17) agrees to:<br><br>a) Recommend to SAM States to establish bodies in charge of UAS/RPAS in the civil aviation administrations and accident and incident investigation authorities (AIAs), with a sufficient number of competent inspectors and investigators.</td><td>Expected impact:<br><br>☐ Political/Global<br>☐ Inter-regional<br>☐ Economic<br>☐ Environmental<br>☒ Operational/Technical</td></tr>
<tr><td colspan="4">Why: To enable States to regulate UAS/RPAS operations, grant authorisations and certifications and conduct risk-based surveillance (RBS) and unmanned aviation accident and incident investigations.</td></tr>
<tr><td>When:</td><td>As of the approval of the recommendation</td><td>Status:</td><td>☒ Valid<br>☐ Superseded<br>☐ Completed</td></tr>
<tr><td>Who:</td><td colspan="3">☒ States ☐ Secretariat ☐ Other (specify):</td></tr>
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4. **Suggested action**

4.1 The RAAC/17 Meeting is invited to:

a) take note of the information contained in this working paper and its **Appendix A**; and

b) analyse, comment on, and, if appropriate, approve the recommendation aimed at strengthening the implementation of UAS/RPAS operations in SAM States.

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# ATTACHMENT A

## RPAS STANDARDS STATUS IN THE CHICAGO CONVENTION ANNEXES

**Annex 1 – Personnel Licensing:** SARPs for the remote pilot licence (focused on remote pilots conducting IFR operations with certificated RPAS) and Class 3 medical expanded to include remote pilots (previously only for ATCOs); complemented by PANS-TRG. SARPs become **applicable 3 November 2022**.

**Annex 2 – Rules of the air:** high level Standards in Appendix 4 mandating approvals, certifications and licence **applicable since November 2012**. Minor consequential amendments adopted for applicability in November 2026. Most of the work for Annex 2 is in development and should enter the review/approval process 2nd Qtr 2023 for 2026 applicability.

**Annex 4 - Aeronautical Charts:** Standards update in Annex 4 to reflect the new RPAS-related ATM that is under development for application in November 2026.

**Annex 6, Part IV – International operations, remotely piloted aircraft systems:** Proposed new Part IV has been sent out for States comments. The States should send their comments to ICAO no later than Anticipated adoption in March 2024 with **applicability in November 2026**. Part IV is based on Annex 6, Parts I and III, and addresses aeroplanes and helicopters without distinction between commercial and general aviation. Aerial work is included. The provisions were developed to support IFR type operations, but it is not exclusive to IFR.

**Annex 7 – Nationality and registration marks:** Standards **applicable since 2012** that cover any type of aircraft, regardless of size or configuration.

**Annex 8 – Airworthiness:** SARPs have been adopted for RP aeroplanes, RP helicopters and remote pilot stations (RPS) with applicability of **26 November 2026**. The intent is for Annex 8 SARPs to complement Annex 6, Part IV operations, i.e. primary focus is the certification of RPA/RPS for international IFR operations, in controlled airspace/aerodromes and with no persons on board.

**Annex 10, Vol IV Part II – Aeronautical telecommunications:** detect and avoid (DAA) systems for conflicting traffic will enter review/approval process 2nd Qtr 2023 for Nov 2026 applicability. DAA for other hazards will be developed next…

**Annex 10, Vol V – Aeronautical telecommunications, frequency spectrum:** SARPs for C2 Link spectrum adopted, **applicable Nov 2026**.

**Annex 10, Vol VI – Aeronautical telecommunications, communications systems and procedures relating to RPAS C2 Link:** general, non-technology-specific SARPs and PANS have been adopted; technology-specific SARPs will enter review/approval process 2nd Qtr 2023 for **Nov 2026 applicability**.

**Annex 11 – Air traffic services:** in development and should enter the review/approval process 2nd Qtr 2023 for **Nov 2026 applicability**.

**Annex 12 – Search and rescue:** until there are persons on board RPA, the focus is only on RPA/UA engaged in SAR operations; in development for **Nov 2026 applicability**.

**Annex 13 – Accident investigation:** definition of accident and serious incident expanded to include unmanned aircraft applicable since November 2010. Specific SARPs to address accidents/incidents involving RPAS is in development. Perhaps 2028 applicability.

**Annex 14 – Aerodromes:** in development, possibly for Nov 2026 applicability, more likely Nov 2028. Will include vertiports as a new type of aerodrome.

**Annex 19 – Safety management:** includes RPAS operators and manufacturers; proposed amendment ready to enter review/approval process for **Nov 2026 applicability**.

## ICAO UAS model regulations and guidance material

**Model regulations**

Part 101
Part 102
Part 149

**Guidance material**

Advisory circular 101-1
Advisory circular 102-1
Advisory circular 102-37
Advisory circular draft 922-001