



WORKING PAPER

ASSEMBLY — 42ND SESSION

TECHNICAL COMMISSION

Agenda Item 24: Aviation Safety and Air Navigation Priority Initiatives

**USE OF STATE-OF-THE-ART TECHNOLOGIES FOR FLIGHT INSPECTION
(DRONES/UAS – RPAS)**

(Submitted by Honduras on behalf of the Central American Corporation for Air Navigation Services (COCESNA) Member States²)

EXECUTIVE SUMMARY

The Central American Corporation for Air Navigation Services (COCESNA), as an entity mandated by its Member States to provide air navigation services in Central America, seeks to take advantage of technological advances to optimize the provision of its services. With regard specifically to flight inspection, considering that the flight tests carried out in accordance with regulations (*Manual on Testing of Radio Navigation Aids*, (Doc 8071)) require significant resources associated with flight hours, it is proposed to take advantage of drone/unmanned aircraft system (UAS) and remotely piloted aircraft system (RPAS) technologies to optimize such resources where permitted by the regulations and as detailed in this working paper.

Action: The Assembly is invited to:

- a) note the information presented in this working paper; and
- b) request ICAO to undertake to update the regulations on the use of drones/UAS, particularly those set out in Doc 8071, specifically in relation to cases in which the use of such technology can support flight tests and have an impact on the periodicity of flight tests by improving data correlation.

<i>Strategic Goals:</i>	This working paper relates to <i>Every Flight is Safe and Secure</i> and <i>The International Civil Aviation Convention and other Treaties, Laws and Regulations address all Challenges</i> .
<i>Financial implications:</i>	
<i>References:</i>	Annex 2 — <i>Rules of the Air</i> Annex 8 — <i>Airworthiness of Aircraft</i> Annex 10 — <i>Aeronautical Telecommunications</i> Annex 14 — <i>Aerodromes</i> Doc 9157, <i>Aerodrome Design Manual</i> Doc 8071, <i>Manual on Testing of Radio Navigation Aids</i>

¹ Spanish version provided by COCESNA.

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1. INTRODUCTION

1.1 As summarized in Figure 1, to evaluate the use of drones/unmanned aircraft systems (UAS) and remotely piloted aircraft systems (RPAS) for flight inspections, the first step is to examine applicable regulations and existing gaps; then, the systems subject to flight testing and related trends are reviewed. In addition, current costs and developments of manufacturers of both flight inspection systems (FIS) and drones/UAS and RPAS are considered.

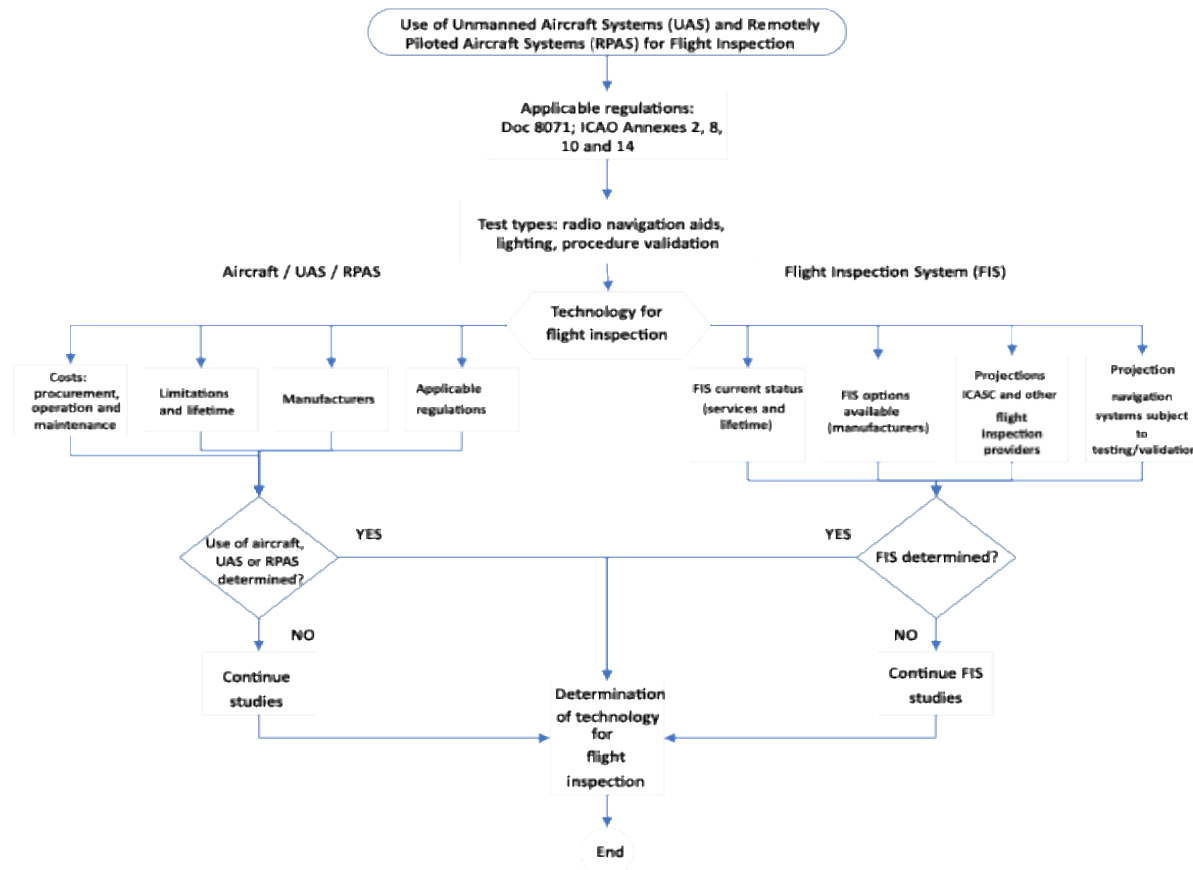


Figure 1.

1.2 The foregoing makes it possible to identify actions to be taken and, ultimately, formulate conclusions and recommendations, mainly aimed at determining the best technology to use for flight inspection and the next steps to take to utilize new technologies in compliance with applicable regulations and in line with users' requirements.

2. STUDIES CONDUCTED

2.1 There has been exponential growth in the use of UAS and RPAS worldwide for applications such as messaging, natural disaster assessment, delivery of medicines, infrastructure

inspection and humanitarian aid, among others, which points to a need to study their application in flight inspection activities.

2.2 Drones/UAS are used for lighting inspections (Airotec DeFI) and in maintenance work for radio navigation aids, since flight testing of the latter still requires the use of aircraft as indicated in the *Manual on Testing of Radio Navigation Aids* (Doc 8071). In the case of radio navigation aids, drones/UAS only take data at specific points, provided the environment and conditions of the specific location allow it, but they do not perform the full flight profile of a flight inspection.

2.3 ICAO Doc 8071, Volume I, Chapter 1, 1.18 provides guidance on assessing the use of remotely piloted aircraft systems (RPAS) or uncrewed aerial vehicles (UAV) to “determine that they provide the payload capability, speed and range necessary to conduct a flight inspection for navigation aids [...] in a cost-effective manner”.

2.4 No reference was found to the use of UAS or RPAS to perform a complete flight profile as required for the tests recommended in Doc 8071 for flight testing of radio navigation aids, nor was such a reference found in relation to validation of procedures.

2.5 In order to move to new technologies, in line with global trends and user demand and in compliance with current regulations, the following will be needed to make use of drones/UAS and RPAS:

- a) harmonized global standards;
- b) analysis of risks (safety/security);
- c) uncrewed aircraft system traffic management (UTM); and
- d) cost-benefit analysis;

3. ACTIONS TAKEN

3.1 In addition to the studies and research conducted, while the studies mentioned in section 2 are underway, and in order to advance in the optimization of resources by taking advantage of new technologies that enable compliance with current regulations, the pilot plan shown in Figure 1 was implemented in Guatemala. The measurement equipment or payload that could be used with a drone/UAS or RPAS is installed in a high place in order to constantly monitor the parameters of a radio navigation aid. The data obtained are then transferred to and processed at a management centre, where findings and trends are analysed with the aid of AI-based maintenance management programmes with a view to ensuring that in future inspections:

- a) flight inspection aircraft invest flight hours only to confirm that the parameters are within tolerances; and
- b) the results obtained are correlated and there is no divergence between flight inspections. In addition to optimizing flight inspection flight hours, this approach will allow for more accurate scheduling of radio navigation aid flight inspections, which in turn will optimize resources and pave the way for the use of drones/UAS to obtain readings at specific points without performing the flight profile for all the tests as suggested in Doc 8071.

3.2 The development of technologies and regulations for flight testing of radio navigation aids and of regulations for the deployment of UAS and remotely piloted aircraft has been monitored through active participation in international events in which these topics are discussed.

3.3 The International Flight Inspection Symposium (IFIS 2026) will be held from from 4 to 6 May 2026 in El Salvador. At this event, experts and international organizations will look at the current situation and future expectations for flight inspection utilizing state-of-the-art technologies as permitted by regulations and oriented towards the optimization of resources.



Figure 2

4. CONCLUSIONS

4.1 Discussions on updating the regulations on the use of drones/UAS, primarily those in Doc 8071, should be promoted, based on studies conducted by specialized entities such as the International Committee for Airspace Standards and Calibration (ICASC), providers of flight inspection systems and others, specifically in relation to cases in which such technology can support flight inspections and their impact on the frequency of flight tests by improving data correlation, even when drones can only be used to support maintenance work.

4.2 Current regulations do not seem to make room for the use of drones/UAS or RPAS to optimize flight testing resources (fewer flight hours) by completely replacing flight inspection aircraft.

4.3 Pilot tests, such as described in section 3.1 above for automation of radio navigation aid maintenance, take advantage of the latest generation technologies in line with the applicable regulations (Doc 8071) and provide evidence to demonstrate the stability and correlation of radio navigation aid readings and envision longer flight test intervals with a view to optimizing costs associated with flight hours, while advancing in the analysis of the issues raised in section 2.5 of this paper.

4.4 The evolution of regulations and global trends associated with the use of UAS and RPAS, including the work of ICAO's technical panels and study groups and the development of standards and recommended practices (SARPs), approval procedures and other associated material, should continue to be monitored.

4.5 Studies should proceed to identify the most suitable application for flight inspection, first by defining the type of operation: visual line-of-sight (VLOS) and beyond visual line-of-sight (BVLOS).