International Civil Aviation Organization

A42-WP/494[1]
TE/192
28/7/25

WORKING PAPER

ASSEMBLY — 42ND SESSION

TECHNICAL COMMISSION

Agenda Item 24: Aviation Safety and Air Navigation Priority Initiatives

ENTERING AIRSPACE THAT REQUIRES ACAS II/TCAS 7.1 WITH INOPERATIVE EQUIPMENT

(Presented by Cuba and supported by Latin American Civil Aviation Commission (LACAC) Member States[2])

EXECUTIVE SUMMARY

The airborne collision avoidance system II (ACAS II) provides traffic advisories (TA) and resolution advisories (RAs) in vertical mode. The Standards and Recommended Practices (SARPs) on ACAS II are contained in Annex 10 — *Aeronautical Telecommunications*, Volume IV — *Surveillance and Collision Avoidance Systems*. The ACAS II concept is implemented through traffic alert and collision avoidance system (TCAS II), versions 7.0 and 7.1. All aircraft are required to be equipped with ACAS II, version 7.1 as of 1 January 2017.

The applicable procedures are contained in ICAO Doc 8168, *Procedures for Air Navigation Services* (PANS-OPS), Volume III — *Aircraft Operating Procedures*, Chapter 3, and Doc 4444, *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM), Chapter 15. TCAS operational status or failures do not have to be reported to ATC unless required by local regulations or when air traffic controllers' situational awareness could be compromised.

Action: The Assembly is invited to:

a) note the information contained in this paper; and
b) request ICAO to consider the adoption of SARPs establishing mandatory reporting of TCAS operational status or failures by air operators to air traffic services, through filed flight plan (FPL) and in-flight notification, as appropriate.

Strategic Goals:	This working paper relates to Strategic Goals *Every Flight is Safe and Secure;* and *Aviation Delivers Seamless, Accessible, and Reliable Mobility for All.*
Financial implications:	None.

[1] Spanish version provided by Cuba.

[2] Belize, Bolivia (Plurinational State of), Chile, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela (Bolivarian Republic of)

References:	Doc 7300, *Convention on International Civil Aviation* Annex 6 — *Operation of Aircraft* Annex 10 — *Aeronautical Telecommunications* Doc 8168, *Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS)* Doc 4444, *Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM)* FAA Booklet *Introduction to TCAS II Version 7.1*, 28 February 2011 Eurocontrol *ACAS Guide,* March 2022

1. INTRODUCTION

1.1 Like any other aircraft equipment, traffic alert and collision avoidance system (TCAS) is included in the minimum equipment list (MEL), which allows aircraft to operate with temporarily inoperative equipment under certain conditions. For example, EASA generally authorizes such operations for up to 10 days. Cuban inspectors have detected cases where a second 10-day extension was authorized by the relevant aviation authority.

1.2 Aircraft operators must ensure that aircraft are dispatched in accordance with established and published requirements. However, according to ICAO Standards, it is not necessary to report TCAS operational status or failures to air traffic control (ATC), unless required by local regulations.

1.3 While aircraft operators and pilots must comply with regulatory and internal requirements on TCAS II equipment and serviceability, the question arises as to the role of air traffic controllers. Should they be concerned about TCAS equipment status and aircraft serviceability within their airspace? Unless specifically required by local regulations, all aircraft, regardless of TCAS equipment status, should be treated the same way and subject to the same separation standards. ATC is not required to monitor TCAS equipment.

1.4 Some States with high traffic volumes and operational complexity have established requirements to report inoperative TCAS in the relevant flight plan box, or on initial contact if a failure occurs in flight. This is considered to have a positive impact on both air traffic controller and pilot situational awareness.

2. DISCUSSION

2.1 Doc 4444, *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM), 15.7.3, states that the procedures to be applied for the provision of air traffic services to aircraft equipped with ACAS shall be identical to those applicable to non-ACAS equipped aircraft. In particular, collision prevention procedures, the establishment of appropriate separation and any information on conflicting traffic and possible evasive action shall conform with the normal ATS procedures and shall not take account of ACAS-dependent aircraft capabilities.

2.1.1 It follows that the critical benefit of ACAS as the last barrier to mitigate the risk of mid-air collisions (MAC) is compromised if air traffic services (ATS) units in the States where the aircraft is operating are not aware of the situation, unless a specific requirement has been established and published in the Aeronautical Information Publication (AIP), and both pilots and operators are duly informed and in compliance.

2.2 TCAS II is the last resort to prevent and significantly reduce mid-air collisions. ICAO mandated the use of TCAS II by all member States as of 1 January 2003 for all turboprop aircraft with a maximum take-off mass of over 15 000 kg or authorized to carry more than 30 passengers. The mandate was extended until 1 January 2005 for turboprop aircraft with a maximum take-off mass of more than 5 700 kg or authorized to carry more than 19 passengers. As early as 2011, approximately 25 000 TCAS II units were operating worldwide.

2.3 It should be emphasized that TCAS II cannot prevent all mid-air or near mid-air collisions, which may still occur under certain circumstances. Consequently, it is essential that ATC procedures are designed to ensure flight safety without reliance on TCAS II and that both pilots and controllers are well versed in its use.

2.4 While this operational concept remains valid, it must be considered that if an aircraft flies with an inoperative TCAS, the normal protection will be reduced by approximately 50 per cent, the remaining effectiveness depending on the capabilities of the conflicting aircraft, which might be constrained.

2.5 In adverse weather conditions, pilots may request a diversion, potentially leading the aircraft into an adjacent sector, which will then experience an increase in traffic density. In such cases, controllers may need to take additional measures to ensure separation minima. Based on experience, it is advisable to slightly segregate aircraft with equipment limitations. Climate change and sustained traffic growth are likely to intensify situations such as these.

2.6 Pilots focused on their roles and flying aircraft with operative ACAS II contribute to maintaining separation minima, and feel safer, which may also be reassuring for controllers.

2.7 Some final accident investigation reports produced under Annex 13 to the *Convention on International Civil Aviation* (Doc 7300), identified inoperative TCAS or transponders, as well as lapses on the part of the controller, among causal factors. In such cases, multiple lives and material assets could have been spared if the last mitigation barrier had been available, or if prioritized attention had been given.

2.8 *2023-2025 Global Aviation Safety Plan* (Doc 10004, GASP) defines MAC as high-risk category (HRC) and therefore a mitigation priority. The need should be considered to enhance controller situational awareness regarding inoperative TCASs within their area of responsibility.

2.9 ACAS II is designed for traffic densities of up to 24 aircraft within 5 square NM. Automatic dependent surveillance — broadcast (ADS-B) capabilities provide ATC with information on ACAS II status.

2.10 Innovations in air navigation and new concepts for flight plan submission will require heightened safety for these processes. No loose ends or details can be left to chance. Any hazard identified, with its inherent risks, must be managed.

3. CONCLUSION

3.1 Doc 10004 considers mid-air collisions (MAC) as a high-risk category (HRC), which makes it necessary to maximize the benefits of ACAS II. This can be achieved by optimizing human performance, enhancing the situational awareness of air traffic controllers and pilots, as well as decision-making by air traffic services on behalf of the State in which the operation is conducted.

— END —