International Civil Aviation Organization

MIDANPIRG/22 & RASG-MID/12 Meetings

(Doha, Qatar, 4 – 8 May 2025)

Agenda Item 5.3: ANS (AIM, PBN, AGA-AOP, ATM-SAR, CNS and MET)

AUTONOMOUS DISTRESS TRACKING (ADT) IMPLEMENTATION

(Presented by Saudi Arabia)

SUMMARY

The Global Aeronautical Distress and Safety System (GADSS) aims to enhance aircraft tracking, distress alerting, and post-accident search and rescue capabilities, thereby significantly improving identification of aircraft in distress and the SAR operations. A cornerstone of GADSS is Autonomous Distress Tracking (ADT) requirements, which mandate that aircraft automatically transmit location information in distress situations, independent of crew action and relying on onboard systems.

This paper provides an overview of the main components of the GADSS, the benefits, and challenges that may be faced during the implementation of ADT.

Action by the meeting is at paragraph 3.

REFERENCE(S)

- ICAO State Letter AN 11/1.3.35-22/75 dated 29 July 2022
- Doc 10150, Manual on the Functional Specifications for the Location of an Aircraft in Distress Repository (LADR).
- Doc 10165, Manual on Global Aeronautical Distress and Safety System (GADSS)

1. INTRODUCTION

1.1 The Global Aeronautical Distress and Safety System (GADSS) aims to enhance aircraft tracking, distress alerting, and post-accident search and rescue capabilities, thereby significantly improving identification of aircraft in distress and the SAR operations. A cornerstone of GADSS is Autonomous Distress Tracking (ADT) requirements, which mandate that aircraft automatically transmit location information in distress situations, independent of crew action and relying on onboard systems. This ensures timely and accurate distress alerting and tracking even in unforeseen circumstances.

1.2 The ICAO Global Aeronautical Distress and Safety System (GADSS) has four elements:

- **Aircraft tracking** is the first element of GADSS, it relies on existing aircraft technology, such as the use of ADS-B. The Aircraft Tracking function is intended to provide a regular update on the progress of the aircraft and to provide some degree of certainty that either the Air Navigation Service Provider (ANSP) or the Operator was receiving regular position reports from an aircraft in flight. The ICAO OPS CTRL Directory provides direct operational contact details for both Operators and ANSPs to ensure they can quickly establish contact regarding any possible safety concerns relating to aircraft tracking, regardless of where in the world they are located.

- **Autonomous Distress Tracking (ADT)** allows the aircraft to activate autonomously on detection of the condition, transmissions of position reports at least every minute and be able to be self-powered in the event that the aircraft electrical system failed. The aim of the ADT is to determine, to a reasonable extent, the

location of an accident site within a 6 NM radius. This significantly reduces the search area that would be needed to be covered, dramatically increasing the chances of locating it in a timely manner.

- **Post flight localization and data recovery** allows the determination of accurate aircraft position information by means of an Emergency Locator Transmitter (ELT) and homing signals to guide SAR services directly to the site. To assist the localization of the wreckage, this function specifies a number of requirements for ELTs and additionally for underwater locating devices (ULDs) to assist with reaching the accident site as soon as possible.

- **GADSS Information Management** element allows effective information sharing to ensure efficient emergency handling and SAR. It comprises the following two services:

  a) **The OPS Control Directory** enables timely coordination between an ATS unit and an operator, initially in response to the aircraft tracking requirements. The OPS Control Directory provides the ATS unit (ACC) and operator OCC operational contact information to facilitate communication. The Ops Control Directory will also include the contact details of RCCs and other users such as other State nominated agencies.

  b) **Location of an Aircraft in Distress Repository (LADR)** allows Aircraft position information to be available to RCCs, ATS units and operators by means of the LADR, which can be accessed through an identified website that will be continuously available. Eurocontrol is hosting the operational system on behalf of ICAO since March 2024.

2. DISCUSSION

2.1. ADT implementation

2.1 The ADT provisions of Annex 6 Operation of Aircraft Part I section 6.18 were adopted through the Amendment 48 to the Annex (ICAO State Letter AN 11/1.3.35-22/75 dated 29 July 2022 refers.). **As of 1 January 2025, all aeroplanes** of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2024, shall autonomously transmit information from which a position can be determined by the operator at least once every minute, when in distress.

2.2 Some aircraft manufacturers have chosen the Emergency Locator Transmitter (Distress Tracking) - ELT(DT) – as their ADT solution, and it is expected that aircraft fitted with the ELT(DT) will increase in number gradually. ELT(DT) alerts will be processed via the COSPAS-SARSAT system, and the information related to the location will be available through the LADR. Therefore, State SAR Services and ATSUs must be prepared to respond to ELT(DT) alerts as increasing numbers of aircraft fitted with this system may become operational.

2.3 GADSS and ADT directly contribute to improved aviation safety by:

- significantly reducing the time to detect and respond to distress situations during flights;
- providing more accurate and timely location information for SAR operations, increasing the chances of a successful rescue; and
- facilitating more effective accident investigation by providing crucial flight data and location information.

2.4 However, the ADT implementation may face several challenges, such as:

- availability and interoperability of suitable ADT technologies and systems across different aircraft types and operational environments;
- development of clear operational procedures and workflows for utilizing ADT data in ATM and SAR operations;

- training requirements for aircrew, air traffic controllers, and SAR personnel on GADSS and ADT procedures and technologies;

- integration of ADT procedures into existing emergency response plans and exercises; and

- validation of the transmission by aircraft and access to the LADR system to check the accuracy and the level of integrity.

2.5 Therefore, there is a need to organize regional events on GADSS and ADT, collect information on the status of implementation of ADT, and conduct a regional exercise to validate the aircraft transmissions and the processes and procedures to access the LADR. Based on the outcome of these activities, ICAO MID should develop regional guidance on the utilization of ADT data in ATM and SAR operations.

2.6 Conclusion:

2.6.1 The ADT implementation will streamline SAR operations by providing precise last known position data, reducing search areas and time, enhancing coordination between different SAR agencies and stakeholders, and potentially reducing the overall resources required for SAR missions.

2.6.2 The sharing of information on the status of implementation of ADT within the ICAO MID will ensure a coordinated and effective approach for distress management and timely response during unusual situations in-flight.

2.6.3 The organization of regional events, such as workshops and seminars on GADSS and ADT, will support States in progressing the implementation of ADT requirements and in setting effective working arrangements for SAR operations based on ADT information and access to LADR.

2.6.4 Moreover, the organization of regional exercise on GADSS/ADT will demonstrate the accuracy of ADT signals transmissions on aircraft positions and the effectiveness of the LADR in processing such information and allowing MID States access to real-time information on the positions of aircraft in distress within the MID region.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information provided in this WP;

b) adopt a conclusion inviting ICAO MID to organize regional events (e.g, workshops, seminars) on GADSS and ADT; and

c) invite States to share information on the implementation of ADT and the adopted regulatory framework, operational, and SAR procedures.

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