International Civil Aviation Organization

Fifth Meeting of the Asia/Pacific Regional Search and Rescue Working Group (APSARWG/5)

Bangkok, Thailand, 9 – 11 June 2020

Agenda Item 3: Global update

Papers will be confined to discussion on:

- *Global Air Navigation Plan (GANP) GADSS - ADT Implementation and Location of Aircraft in Distress Repository (LADR) elements*
- *Cospas-Sarsat Q and A session (e.g.: reporting false alerts)*

AUTONOMOUS DISTRESS TRACKING IMPLEMENTATION

(Presented by United States)

SUMMARY

The attachment to this paper is the International Maritime Organization's guidance for SAR services regarding implementation of autonomous distress tracking of aircraft in flight. It is based on the guidance developed by the fourth meeting of the Asia/Pacific Regional SAR Working Group. States are encouraged to have their aeronautical and maritime SAR services coordinate together in developing national and regional response procedures for ADT.

1. INTRODUCTION

1.1 The report of the fourth meeting of the Asia/Pacific Regional SAR Working Group contained Appendix C, *GADSS ADT Phase Basic Guidance*. Based on this ICAO Bangkok document, the International Maritime Organization (IMO) published the circular (a type of State letter) COMSAR.1/Circ.59 dated 13 February 2020 *Interim Guidance for Search and Rescue Services Regarding Implementation of Autonomous Distress Tracking (ADT) of Aircraft in Flight*. The IMO circular, a one-page cover letter with a four-page annex, is Attachment A to this paper. The IMO document contains recent updates and specific information from the Cospas-Sarsat program.

2. DISCUSSION

2.1 The IMO circular COMSAR.1/Circ.59 was distributed to all Member States with the intention it would be brought to the attention of SAR authorities and services. The guidance is very similar to that developed by APSAR WG 4 but there are substantive differences, including:

- Focus is on the joint RCC and the maritime RCC so it is missing some of the aeronautical guidance and facts;
- ADT implementation (equipage) date changed to 1 January 2023. The IMO circular does not specify a date since ICAO Council made that decision in March 2020; and
- Section added regarding ADT devices.

2.2 As of May 2020 the only announced ADT device is the Cospas-Sarsat ELT Distress Tracking (ELT DT)). Cospas-Sarsat will distribute the ADT notifications from the ELT(DT) to RCCs and ICAO's Location of an Aircraft in Distress Repository (LADR). The LADR is a secure web-based repository to store and provide access to ADT data to notify and assist stakeholders such as ATSUs and RCCs. The ELT(DT) is an ADT device activated in flight, it is not an ELT which is activated upon impact.

2.3 ICAO considers the ADT device to provide a 'notification' but Cospas-Sarsat distributes the ELT(DT) transmission via its 406 MHz distribution network directly to the RCC and the LADR. National and regional discussions may be needed to ensure efficient handling of the ELT(DT) as an ADT notification or a distress alert.

2.4 Of particular concern is for an aircraft that remains in flight across multiple FIRs and SAR regions. For example, does the RCC react to an ELT(DT) ADT transmission as a distress alert or does it consider it a 'notification' and follow the established procedures as specified in ICAO Annex 11 *Air Traffic Services*, Chapter 5 *Alerting Service*?

2.5 Aeronautical, Maritime and Joint RCCs need to be informed about the ADT capability and that aircraft could remain in flight across multiple FIRs and SAR regions. RCCs may need to update SAR practices and procedures before 1 January 2023 for concerns such as:

- accurate delimitation of SAR regions to ensure proper transfer of the SAR operation to the next responsible RCC;
- effective and efficient coordination between the ATS unit (or aeronautical RCC) and the maritime RCC;
- harmonized operations between aeronautical and maritime SAR services; and
- initial RCC reaction to an ELT(DT) ADT transmission.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) encourage States to use **Attachment A** as a means to have their aeronautical and maritime SAR services coordinate together in developing national and regional response procedures for autonomous distress tracking.

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ATTACHMENT A: INTERNATIONAL MARITIME ORGANIZATION COMSAR.1/Circ.59

INTERNATIONAL MARITIME ORGANIZATION

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COMSAR.1/Circ.59
13 February 2020

INTERIM GUIDANCE FOR SEARCH AND RESCUE SERVICES REGARDING IMPLEMENTATION OF AUTONOMOUS DISTRESS TRACKING (ADT) OF AIRCRAFT IN FLIGHT

1 The Sub-Committee on Navigation, Communications and Search and Rescue (NCSR), at its seventh session (15 to 24 January 2020), noted the implementation of Autonomous Distress Tracking (ADT) of aircraft in flight as part of the International Civil Aviation Organization (ICAO) Global Aeronautical Distress and Safety System (GADSS).

2 The Sub-Committee noted also that relevant information on this matter would be included in the 2022 edition of the IAMSAR Manual.

3 Having considered the need to circulate advance information to search and rescue (SAR) services regarding the implementation of ADT of aircraft in flight, the Sub-Committee agreed to disseminate interim guidance for SAR services, as set out in the annex.

4 Member States are invited to bring this circular to the attention of SAR authorities and services.

5 This circular should be revoked after the approval of the relevant amendments to the IAMSAR Manual for inclusion in the 2022 edition.

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ANNEX

INTERIM GUIDANCE FOR SEARCH AND RESCUE SERVICES REGARDING IMPLEMENTATION OF AUTONOMOUS DISTRESS TRACKING (ADT) OF AIRCRAFT IN FLIGHT

Purpose and scope

1 This Guidance is intended to provide basic information on Autonomous Distress Tracking (ADT) of aircraft in flight as part of the International Civil Aviation Organization (ICAO) Global Aeronautical Distress and Safety System (GADSS).

2 The key stakeholders involved in ADT implementation are:

1. Air Traffic Service Units (ATSUs);
2. Aircraft Operators (airline companies, not the crew);
3. ADT service providers; and
4. Search and rescue (SAR) services.

Autonomous Distress Tracking

3 ICAO considers the ADT as a notification that an aircraft is in a "distress condition". Then, normally, the Aircraft Operator and the ATSU decide the formal emergency status, if any, of the aircraft. The ADT capability requires the automatic triggering and transmission of distress data when the aircraft enters a state which, if left uncorrected, is likely to result in the crash of the aircraft. Aircraft position information will be transmitted automatically at least once every minute when the aircraft is in a distress condition. The initial transmission should commence no later than five seconds after the detection of the activation event. Pilots may also manually activate an ADT.

4 It is expected that there will be few ADT-generated notifications at the beginning of operations since only newly built commercial aeroplanes (above 27,000 kg) are required to be outfitted. The ADT device is to activate on commercial aeroplanes in flight by automatic triggers that indicate a very high probability of an imminent crash (in addition to manual activation).[1]

[1] A distress notification can be triggered using criteria that may vary as a result of aircraft position and phase of flight. Further guidance regarding in-flight event detection and triggering criteria may be found in the EUROCAE ED-237, Minimum Aviation System Performance Specification (MASPS) for Criteria to Detect In-Flight Aircraft Distress Events to Trigger Transmission of Flight Information.

5 An ADT device can only be deactivated by the same mechanism that activated it (automatically deactivated if activated by automatic means, or crew deactivated if activated by crew).

6 To provide an incentive for ADT installation and to encourage retrofit by older aircraft, ICAO Annex 6 – *Operation of Aircraft, Part I – International Commercial Air Transport – Aeroplanes* was amended to include a note allowing an ADT device to replace the automatic ELT. The possible unintended consequence is that some aircraft may no longer be equipped with a 121.5-MHz homing transmitter since an ADT device is not required to have a homing transmitter.

7 There are two high-level functional objectives for an ADT system. These are to:

.1 receive timely notice of an aeroplane in a ″distress condition″ to facilitate timely SAR operations; and

.2 locate an accident site within a 6 NM radius after a crash, based on last known position of the aircraft.

8 The standards for ADT and their requirements are:

.1 mandate that newly manufactured aircraft over 27,000 kg maximum certificated take-off mass to autonomously transmit information from which a position can be determined by the Aircraft Operator at least once per minute when the aircraft is in distress;

.2 recommend the same requirement be applicable for defined commercial aeroplanes over 5,700 kg maximum certificated take-off mass; and

.3 require the Aircraft Operator to make the position information of a flight in distress available to ATSUs, RCCs, and any additional entity as may be established by the State of the Aircraft Operator.

9 Upon the triggering of an ADT transmission, the Aircraft Operator is responsible for validation of the transmission and initial checks, if possible, including attempted contact with the aircraft to confirm the situation. The Aircraft Operator would then notify the relevant ATSU of the results, including if it was a false activation. The ATSU will declare an emergency phase, as appropriate, and notify the relevant RCC.

10 Even though the Aircraft Operator has the responsibility to receive the ADT notification, it is likely that the responsible ATSU and RCC could already be aware of an in-flight emergency for that aircraft by other alerting means and have already initiated a response. Aircraft Operators, ATSUs and RCCs need to ensure that their staff understand each other's roles, responsibilities and processes to ensure clear communication and coordination, and avoid, where possible, conflicting effort and unnecessarily increased workload. Special training and awareness programmes will be necessary.

11 Typically, an initial ADT notification would go to the Aircraft Operator and the ATSU and RCC associated with the aircraft's position. Once the ATSU identifies the need for an emergency phase, it will alert the aeronautical (or maritime) RCC responsible for the aeronautical SAR region, providing the position of the aircraft and other relevant information.

12 The actions to consider if ADT data shows that the aircraft is still flying are:

.1 responsible ATSUs to forward necessary flight plan and control information from unit to unit as the flight progresses;

.2 each ATSU remains responsible for alerting the responsible RCC; and

.3 RCCs alerted by the ATSUs must coordinate together to identify the appropriate SAR response.

13 An RCC may wish to create a checklist to ensure efficient coordination and transfer of SAR mission coordinator (SMC) responsibilities between SAR services.

Location of an Aircraft in Distress Repository

14 The GADSS Concept of Operations (CONOPS) identified the need to collect, store and provide access to ADT data to notify and assist appropriate stakeholders such as ATSUs and RCCs to locate an aircraft in distress and enhance SAR and recovery capabilities. A centrally managed Location of an Aircraft in Distress Repository (LADR) will be established in 2020.

15 The repository, a secure web-based storage facility, will house position/location information of aircraft in distress or potentially in distress and will be the means to make the last known position of an aircraft in distress available to stakeholders in a timely manner and in a standard format.

16 The LADR does not provide alerting of distress conditions; this will be done by the ATSUs using the existing provisions of Annexes 6 and 11 of the ICAO Convention. The LADR is an evolving capability with some technical details still to be decided by ICAO.

17 The LADR will allow maintaining the consistency of coordination procedures between Aircraft Operators and ATSUs, and between ATSUs and RCCs when an emergency phase is declared. Management and administrative procedures for the LADR are still being developed. The discussion below provides some details but could be modified in the future based upon developments.

18 The LADR stakeholders will include the LADR Administrator (i.e. ICAO), and Contributors and Users as Subscribers. Users will have read-only access. RCCs, as LADR Users, will need to subscribe as an authorized user to access ADT data in the LADR. Users will have access to available information according to their profile. Subscribers can elect to receive a notification whenever new ADT information relevant to them arrives in the LADR. Subscribers will then need to look in the LADR to access the ADT data.

19 Subscribing to the LADR is voluntary. States should determine who in their government could have access to the LADR and for which categories of data. For example, an ATSU will have access only to ADT data within its FIR (plus a buffer zone around it).

ADT devices

20 ICAO intentionally did not specify a technology for the ADT capability.

21 Cospas-Sarsat has developed specifications for an ELT Distress tracking (ELT(DT)) device, which may be used as an ADT device.

22 Cospas-Sarsat will distribute the ADT notifications from the ELT(DT) to the LADR, and also directly to the relevant RCCs under its existing procedures for ELT alerts transmitted at 406 MHz.

> **Note:** The triggering at impact with ground or sea of an automatic ELT or the triggering of an ELT-S (survival) will be routed to RCCs according to the established Cospas-Sarsat Data Distribution Plan.

23 To assist the RCC decision-making process, Cospas-Sarsat will include in the ELT(DT) report sent to RCCs the 3D position, aircraft ID, country of origin and whether triggered manually or automatically. There will be a part in the subject-indicator-type (SIT) report which states the age of the latest report received (e.g. "position 23-34.44N 070-33.55W is less than 1 minute old").[1]

24 The ELT(DT) specified duration of operation is a minimum of 370 minutes (6.2 hours) while in flight, using an independent power supply, and transmitting a message with encoded location:

.1 every 5 seconds for the first 2 minutes following activation;

.2 every 10 seconds after 2 minutes until 5 minutes following activation; and

.3 every 30 seconds after 5 minutes following activation.

25 All ELT(DT) products should comply with the specification above. An ELT(DT) may also include the following post-crash capabilities, provided that it has a 121.5-MHz direction-finding (DF) homing transmitter, with both the 406-MHz message and the DF signal having a minimum 24-hour operating (battery) lifetime after crash:

.1 an ELT(DT) that is crash survivable;

.2 an ELT(DT) combined with the function of an ELT(AF) automatic fixed;

.3 an ELT(AD) that is automatically deployable; and

.4 an ELT(S) survival.

[1] Document C/S A.002, pages C-38 and C-42, provides sample ELT(DT) messages (alert + cancellation).

26 All ELT(DT) beacons should comply with the specification above. An ELT(DT) may also include the following post-crash capabilities, provided that it has a minimum total operating (battery) lifetime as indicated:

.1 24 hours for the 406-MHz message transmissions, and 48 hours for the 121.5-MHz direction-finding signal[1]:

.1 an ELT(DT) that is crash survivable,

.2 30 hours plus 10 minutes for the 406-MHz message transmissions, and 48 hours for the 121.5-MHz direction-finding signal:

.1 an ELT(DT) combined with the function of an ELT(AF), automatic fixed;

.2 an ELT(DT) combined with the function of an ELT(AP), automatic portable;

.3 an ELT(DT) combined with the function of an ELT(AD), automatic deployable; and

.4 an ELT(AD), automatically deployable.

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[1] This standard is still under consideration by Cospas-Sarsat.