



ICAO

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WORKING PAPER

ANI/WG/SAR/TF/1 — WP/02
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First NAM/CAR Air Navigation Implementation Working Group (ANI/WG) Search and Rescue (SAR) Implementation Task Force Meeting (ANI/WG/SAR/TF/1)
Mexico City, Mexico, 17 – 19 September 2019

- Agenda Item 4:** ANI/WG Search and Rescue (SAR) Implementation Task Force Work Programme and Activities
- 4.2 Follow-up to recommendations of 2018 NAM/CAR Search and Rescue (SAR) Implementation and Civil-military Coordination Meeting**

GADSS APPENDIX TO THE CAR REGIONAL SEARCH AND RESCUE PLAN – UNITED STATES

(Presented by United States)

EXECUTIVE SUMMARY	
This Working Paper presents follow-up action on Conclusion SAR/CM/2 of the Report of the NAM/CAR Search and Rescue (SAR) Implementation and Civil-military Coordination Meeting, held in Mexico City, Mexico, from 5 to 7 November 2018.	
Action:	Suggested actions are presented in Section 3
<i>Strategic Objectives:</i>	<ul style="list-style-type: none">• Safety
<i>References:</i>	<ul style="list-style-type: none">• Report of the NAM/CAR Search and Rescue (SAR) Implementation and Civil-military Coordination Meeting, Mexico City, Mexico, 5-7 November 2018

1. Introduction

1.1 The Report of the NAM/CAR Search and Rescue (SAR) Implementation and Civil-military Coordination Meeting, held in Mexico City, Mexico, from 5 to 7 November 2018, contained:

CONCLUSION SAR/CM/2

That, in order to support the functions of the Global Aeronautical Distress and Safety System (GADSS),

- a) *the ANI/WG Search and Rescue Task Force develop basic guidelines to define search and rescue services requirements and interactions to support Global Aeronautical Distress and Safety System (GADSS), which shall be included as an Appendix to the CAR Search and Rescue Plan.*

1.2 Various ICAO regional and global forums are working on implementation of GADSS functions in general, and Autonomous Distress Tracking (ADT) in particular due to its 1 January 2021 implementation date. It has become obvious that there are two levels of concern: (1) informing the stakeholders, and (2) developing operational procedures. This Working Paper has an **Appendix** with content which could form the basis for the Appendix to the CAR Regional SAR Plan.

2. Background

2.1 The ICAO/International Maritime Organization (IMO) Joint Working Group on Search and Rescue (ICAO/IMO JWG) typically meets around September or early October of each year. A working paper has been submitted to the ICAO/IMO JWG on the topic of “Initial basic guidance and Rescue Coordination Centre (RCC) checklist for the autonomous distress tracking phase” (presented as Appendix to this Working Paper). It is proposed that the “GADSS ADT Phase Basic Guidance” contained in the Appendix to this Working Paper be the basis for the recommended CAR Regional SAR Plan Appendix.

2.2 The Appendix to this Working Paper contains United States views towards preparations for ADT implementation and also guidance material developed by the SAR Working Group under the ICAO Regional Office for the Asia and Pacific Regions, Bangkok, Thailand. Recently, other specific advice was developed by France and the Cospas-Sarsat Programme. That material will be presented in two other working papers for consideration by the ANI/WG/SAR/TF/1 Meeting.

3 Suggested Actions

3.1 The Meeting is invited to:

- a) note the information provided in this Working Paper; and
- b) consider using the Appendix as the basis for the GADSS Appendix to the CAR Regional SAR Plan.

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International Civil Aviation Organization

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Agenda item 4



**ICAO/IMO JOINT WORKING GROUP
ON HARMONIZATION OF AERONAUTICAL
AND MARITIME SEARCH AND RESCUE (ICAO/IMO JWG-SAR)**

TWENTY-SIXTH MEETING

Viña del Mar, Chile, 9 to 13 September 2019

SAR OPERATIONAL PRINCIPLES, PROCEDURES AND TECHNIQUES

Initial basic guidance and RCC checklist for the autonomous distress tracking phase

Presented by the United States

SUMMARY

***Executive
summary:***

The ICAO Bangkok regional office SAR Working Group report of May 2019 contains appendix C, *GADSS ADT Phase Basic Guidance* that is set out in the annex of this document. The JWG is invited to review the annex as a basis for basic guidance and possible creation of an RCC checklist prior to implementation of autonomous distress tracking on 1 January 2021

Action to be taken: Paragraph 3.1

1 INTRODUCTION

1.1 There is urgent need to better inform all RCCs and other stakeholders of the implementation of autonomous distress tracking (ADT) of aircraft in flight commencing 1 January 2021. The ICAO Asia and Pacific Regional Office in Bangkok, Thailand (ICAO Bangkok), has been particularly proactive in discussing this matter and developing information for its regional stakeholders. This regional effort could be a model for a global effort. Specific guidance, and possibly sample checklist(s) or forms would be appropriate to have in advance of that date.

2 DISCUSSION

2.1 ADT information needed by SAR services would include initial basic guidance and possibly an RCC checklist. ICAO Bangkok developed its *GADSS ADT Phase Basic Guidance*, set out in the annex. This guidance material provides basic information on ADT for the four key stakeholders of air navigation service providers (ANSPs), aircraft operators, ADT service providers, and SAR services.

2.2 The annex was written for all four stakeholders affected by implementation of ADT, and with a focus on Asia-Pacific. It would be appropriate to make the guidance applicable for global use. It is proposed that the JWG review the annex with the goal of developing guidance appropriate for all SAR services and RCCs in advance of 1 January 2021. The JWG could also decide if the primary focus should be only the SAR services or also include other stakeholders.

2.3 An RCC checklist could be a helpful job aid for the initial reaction of an RCC upon receipt of an ADT notification, especially since this is an entirely new concern and process for an RCC. Development of an RCC checklist will likely involve several issues including:

- .1 Unique details. Details such as the need to quickly and clearly indicate that the ADT device provides a notification of a potential distress situation, not a distress alert; may need to consider this initially in the "Uncertainty Phase" until collaboration by ATSU or aircraft operator; advice on how long to wait before contacting the ATSU for collaborating information; etc.
- .2 Coordination processes with other SAR services/RCCs. GADSS ADT notification may require RCC-to-RCC (aeronautical and maritime) coordination as an aircraft potentially continues to transit through multiple SAR regions. The RCC checklist should provide for the seamless coordination and transfer of SMC responsibilities between SAR services.
- .3 Related ICAO forms. ICAO has two forms that could be associated with an RCC checklist for ADT notification. The first form is for notification by the aircraft operator to the relevant ATSU. The second form is the ICAO International ALR Message Form sent from the ATSU to the RCC. Both forms contain similar information but have significant differences. Document ICAO/IMO JWG-SAR/26-WP.8 invites the JWG to make some decisions regarding these two forms. Such a form may be appropriate as an attachment to an RCC checklist.
- .4 IAMSAR Manual Volume II, appendices: Depending on which emergency phase is selected, an RCC checklist could be its own checklist in appendix D Uncertainty phase or appendix E Alert phase or appendix F Distress phase. It may also be appropriate as an attachment to the SAR Briefing Form shown in appendix H, page H-1.

2.4 The two products of (1) ADT Phase Basic Guidance and (2) RCC checklist could be considered as initial outputs from JWG 26 for use in upcoming IMO and ICAO forums as well as other regional and national SAR forums. Based on inputs from these forums the JWG could consider finalizing them at JWG 27 for distribution as appropriate. Due to the urgent need to better

inform all SAR services and RCCs, JWG 26 may want to consider a breakout session to complete work on ADT matters.

3 ACTION REQUESTED OF THE JWG

3.1 The JWG is invited to:

- .1 decide if guidance information needs to be provided to all SAR services; and, if so, can the annex serve this purpose or should it be modified for global use;
- .2 decide if an RCC checklist would be beneficial; and if so, develop an initial draft after considerations from ICAO/IMO JWG-SAR/26-WP.8 and paragraph 2.3 of this working paper; and
- .3 decide what type of content, if any, may be appropriate for inclusion in the 2022 edition of the IAMSAR Manual, Volume II.

GADSS ADT Phase Basic Guidance

Purpose and Scope

1.1 This Guidance Material is intended to provide basic information on the Autonomous Distress Tracking (ADT) as part of the ICAO Global Aeronautical Distress and Safety System (GADSS).

1.2 The key stakeholders of this phase are:

- Air Navigation Service Providers (ANSPs);
- Aircraft Operators;
- ADT Service Providers; and
- Search and Rescue (SAR).

1.3 It should be noted that ADT Service Providers had not yet been determined. The providers of Automatic Dependent Surveillance-Broadcast (ADS-B) surveillance systems and Cospas-Sarsat were potential ADT providers, but the requirements for an autonomous power source for the airborne distress tracking component would need to be taken into account as current ADS-B systems may not meet this requirement.

ICAO OPS Control Directory

2.1 An online OPS Control Directory portal had been established at <https://www4.icao.int/opsctrl> by ICAO, to assist the implementation of the Annex 6 Aircraft Tracking standard which became applicable on 8 November 2018. It is provided to facilitate communication and exchange of information between air operators and ANSPs. It also provides a link to a map depicting ANSP surveillance where position reports are received at less than 15 minute intervals to assist air operators with meeting Aircraft Tracking requirements.

Autonomous Distress Tracking (ADT)

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

- a) receive timely notice of an aeroplane in a distress condition to facilitate timely SAR operations, and
- b) locate an accident site with high probability after a crash based on last known position of the aircraft.

2.3 The ADT function would be used to identify the location of an aircraft in distress with the aim of establishing, to a reasonable extent, the location of an accident site within a 6 NM radius. The accuracy of position information shall, as a minimum, meet the position accuracy requirements established for Emergency Locator Transmitters (ELTs).

2.4 It is important to note that there was not expected to be many ADT-generated notifications at the beginning of operations. From 1 January 2021 the Standards and Recommended Practices (SARPs) of ICAO Annex 6 – *Operation of Aircraft, Part I – International Commercial Air Transport – Aeroplanes* (11th Edition, July 2018):

- a) mandated 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 operator at least once per minute when the aircraft is in distress;

- b) recommend the same requirement be applicable for defined aircraft over 5,700 kg maximum certificated take-off mass; and
- c) require the aircraft operator to make the position information of a flight in distress available to Air Traffic Services Units (ATSUs), Rescue Coordination Centres (RCCs) and any additional entity as established by the State of the Operator.

2.5 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 shall commence immediately or no later than five seconds after the detection of the activation event. Pilots may also manually activate the ADT. The ADT will only be able to be deactivated by the same mechanism that activated it.

Distress Tracking Data Repository (DTR)

2.6 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 data repository, the DTR, is considered the preferred means to enable this.

2.7 The DTR is planned by ICAO as a secure web-based storage facility where aircraft ADT data will be communicated and stored to enable the last known position of an aircraft in distress, or potential distress, to be available to authorized stakeholders in a timely manner.

2.8 DTR stakeholders will include DTR Administrators, Contributors and Users. Users will have read-only access. RCCs, as DTR Users, will need to subscribe as an authorized user to access ADT data in the DTR. Other Users will have access to available information according to their profile. For example, Air Operators will only have access to ADT data for their aircraft and ANSPs to ADT data within their Flight Information Region (FIR) and within a planned area 80 NM outside the FIR boundary.

2.9 Subscribers will receive a notification whenever new ADT information relevant to them arrives in the DTR. Subscribers will then need to look in the DTR to access the ADT data. Subscription will be voluntary.

2.10 States will determine who will have access to the DTR data as this is potentially sensitive. For example, an airline will only have access to its own aircraft, and ATSUs will only be able to access information within, or close to their area of responsibility.

End of Flight Localization

2.11 SAR experts had stressed the value of the 121.5 MHz homing signal from real SAR incident experience, as the ADT system had not yet determined whether the 121.5 MHz ELT homing feature would be retained.

Operational Considerations

2.12 Existing Annex 11 and Annex 12 SARPs between ATSUs and RCCs remain unchanged.

2.13 The ADT system was not intended as a distress alerting system like ELTs. It was intended as a means to identify and notify a distress, or potential distress, condition.

2.14 Upon the triggering of an ADT transmission, the aircraft operator was 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 a false activation. The ATSU will declare an emergency phase as appropriate and notify the relevant RCC per existing Annex 11, Chapter 5, *Alerting Service*.

2.15 DTR notifications would be sent to all affected DTR subscribers. Typically an initial ADT notification would go to the aircraft operator and the ATSU and RCC associated with the aircraft's position. This was one of the reasons why the establishment of clear areas of responsibility with non-overlapping or separated SRR boundaries was a priority.

2.16 Notwithstanding the responsibility of the aircraft operator, it was highly 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 would need to ensure their staff understand each other's roles, responsibilities and processes to ensure clear communication and coordination to avoid, where possible, conflicting effort and unnecessarily increasing workload; hence special training and awareness programmes would be necessary.

Note – States may consider this as part of meeting the expectations of Preferred SAR Capability Specification (PSCS) 7.4 (h) of the ICAO Asia/Pacific SAR Plan, which states that all States should facilitate a programme of regular liaison visits between relevant RCCs, ATC units and airline operating centres in order to understand those organizations, facilities and capabilities.

2.17 More detailed information on GADSS and Global Tracking Initiatives is at the following ICAO HQ webpage: <https://www.icao.int/safety/globaltracking/Pages/Homepage.aspx>.

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