



OACI

Organización de Aviación Civil Internacional
Oficina para Norteamérica, Centroamérica y Caribe

NOTA DE ESTUDIO

ANI/WG/SAR/TF/1 — NE/04
16/08/19

Primera Reunión del Grupo de Tarea de Búsqueda y Salvamento (SAR) del Grupo de Trabajo sobre implementación de Navegación Aérea para las Regiones NAM/CAR (ANI/WG/SAR/TF/1)
Ciudad de México, México, 17 – 19 de septiembre de 2019

Cuestión 4 del

Orden del Día:

Programa de Trabajo y Actividades del Grupo de Tarea de Implementación de Búsqueda y Salvamento (SAR) del ANI/WG

4.2 Seguimiento a las recomendaciones de la Reunión de implementación de Búsqueda y Salvamento (SAR) y Coordinación Cívico-militar NAM/CAR 2018

APÉNDICE DEL GADSS AL PLAN REGIONAL SAR PARA LA REGIÓN CAR – COSPAS-SARSAT

(Presentada por Estados Unidos)

RESUMEN EJECUTIVO	
Esta Nota de Estudio presenta acción de seguimiento a la Conclusión SAR/CM/2 del Informe de la Reunión de implementación de Búsqueda y Salvamento (SAR) y Coordinación Cívico-militar NAM/CAR, llevada a cabo en la Ciudad de México, México, del 5 al 7 de noviembre de 2018.	
Acción:	Las acciones sugeridas se presentan en la Sección 3.
Objetivos Estratégicos:	<ul style="list-style-type: none">• Seguridad Operacional
Referencias:	<ul style="list-style-type: none">• Informe de la Reunión de implementación de Búsqueda y Salvamento (SAR) y Coordinación Cívico-militar NAM/CAR, Ciudad de México, México, 5 – 7 de noviembre de 2018

1. Introducción

1.1 El Informe de la Reunión de implementación de Búsqueda y Salvamento (SAR) y Coordinación Cívico-militar NAM/CAR, llevada a cabo en la Ciudad de México, México, del 5 al 7 de noviembre de 2018, contenía:

CONCLUSIÓN SAR/CM/2

Que, con el fin de apoyar las funciones del Sistema Mundial de Socorro y Seguridad Operacional (GADSS),

- a) *el Grupo de Trabajo de Búsqueda y Salvamento del ANI/WG desarrolle directrices básicas para definir los requerimientos e interacción de los servicios de búsqueda y salvamento para apoyar al GADSS, que deberán ser incluidas como Apéndice en el Plan CAR de Búsqueda y Salvamento; y*

1.2 Varios foros regionales y mundiales de la OACI están trabajando en la implementación de las funciones del GADSS en general y Seguimiento Autónomo en Situaciones de Peligro (ADT) en particular debido a su fecha de implementación del 1 de enero de 2021. Se ha vuelto obvio que hay dos niveles de preocupación: (1) informar a las partes interesadas, y (2) desarrollar procedimientos operacionales. Esta Nota de Estudio tiene un **Apéndice** (*disponible únicamente en inglés*) con contenido para considerar su inclusión en el Apéndice al Plan Regional SAR para la Región CAR.

2. Antecedentes

2.1 El Grupo de trabajo conjunto OACI/Organización Marítima Internacional (IMO) sobre Búsqueda y Salvamento (ICAO/IMO JWG) generalmente se reúne en septiembre o principios de octubre de cada año. Se ha presentado una nota de estudio al ICAO/IMO JWG sobre la "Orientación básica inicial y lista de verificación del Centro coordinador de salvamento (CCS) para la fase de seguimiento autónomo en situaciones de peligro". Esta nota del ICAO/IMO JWG se ha presentado como parte de una nota de estudio separada a la Reunión ANI/WG/SAR/TF/1 y propone que su "Orientación básica de la fase ADT del GADSS" sea la base del Apéndice del Plan Regional SAR para la Región CAR recomendado.

2.2 El Programa Cospas-Sarsat presentó una nota de estudio al ICAO/IMO JWG sobre el tema "Informe sobre la implementación de los Transmisores de localización de emergencia ELT (DT) de Cospas-Sarsat y el apoyo al GADSS de la OACI" (presentado como Apéndice a esta Nota de Estudio). Cospas-Sarsat proporciona información histórica y antecedentes relacionados con el desarrollo de GADSS, el esfuerzo continuo de la OACI para desarrollar su Repositorio sobre localización de aeronaves en peligro (LADR) y el ELT de Cospas-Sarsat para el seguimiento de socorro (ELT (DT)). La OACI no ha especificado intencionalmente una tecnología para el dispositivo ADT, pero Cospas-Sarsat está en una etapa avanzada para su dispositivo ADT conocido como ELT (DT). Airbus indicó anteriormente que incorporará el ELT (DT) en su registrador de vuelo desplegable automático instalado en aeronaves de nueva construcción a partir de julio de 2020. Como se indica en el Apéndice a esta Nota de Estudio, Cospas-Sarsat distribuirá las notificaciones ADT del ELT (DT) al repositorio LADR y también directamente a los Centros coordinadores de salvamento (RCC) relevantes según sus procedimientos existentes.

2.3 El Apéndice contiene información importante para los RCC, particularmente sobre la LADR y la distribución de notificaciones ELT (DT) que van directamente a los RCC relevantes. La información y puntos de vista en el Apéndice deben considerarse para el apéndice del Plan Regional SAR para la Región CAR propuesto sobre GADSS. Se recomienda que esta nota de estudio se considere al mismo tiempo que otras notas de estudio del ANI/WG/SAR/TF/1 se discutan sobre este tema.

3. Acciones Sugeridas

3.1 Se invita a la Reunión a:

- a) tomar nota de la información proporcionada en esta Nota de Estudios; y
- b) considerar las Secciones 2.3 y 2.4 del Apéndice en simultáneo con otras notas de estudio relacionadas al asunto del Apéndice del GADSS al Plan Regional SAR para la Región CAR.



International Civil Aviation Organization

WORKING PAPERICAO/IMO JWG-SAR/26-WP.15
26 July 2019
ENGLISH ONLY

Agenda item 7



**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 COMMUNICATIONS

**Report on Cospas-Sarsat Implementation of ELT(DT)s and Support for ICAO's Global
Aeronautical Distress and Safety System (GADSS)**

Presented by Cospas-Sarsat

SUMMARY

***Executive
summary:***

This paper provides a description of work undertaken by Cospas-Sarsat to develop and distribute data from ELT(DT)s to support the ICAO Global Aeronautical Distress and Safety System (GADSS) and the associated development of a Location of an Aircraft in Distress Repository (LADR). The JWG is invited to consider appropriate actions to take at the RCC level in response to GADSS developments

Action to be taken: Paragraph 3.1

1 INTRODUCTION

1.1 ICAO's Global Aeronautical Distress and Safety System (GADSS)

1.1.1 In March 2016, in response to recent airliner disasters, ICAO amended Annex 6 (Operation of Aircraft) to the Convention on International Civil Aviation ("Chicago Convention") to address improvements to the effectiveness of alerting critical stakeholders, including search and rescue (SAR) services, of aircraft in distress. Cospas-Sarsat has developed specifications for an ELT to track aircraft in-flight during specified distress situations, the ELT for distress tracking

(ELT(DT)), and associated procedures for distributing data from ELT(DT)s within the Cospas-Sarsat System and to the LADR, as ICAO may decide. Historical information on GADSS development is in annex.

1.1.2 In December 2017, the ICAO Secretariat provided a "white paper" entitled "Autonomous Distress Tracking Repository". This document has since evolved into the Functional Specifications for a "Location of an Aircraft in Distress Repository (LADR), with a draft version 2.0 dated 3 May 2019. The purpose of the LADR is to "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."

1.1.3 Eurocontrol* has developed an architecture for the LADR (previously known as the Distress Tracking Repository). The document "EUROCONTROL - Distress Tracking Repository (DTR) Architectural Considerations" was sent by email to the GADSS Advisory Group on 23 May 2019 as part of an invitation to an ICAO-convened DTR Architecture Workshop, from 1 to 3 July 2019. ICAO plans to open a bidding process for the development and maintenance of the LADR operational infrastructure in Q3 of 2019 with a view towards providing an operational prototype of the LADR within one year. ICAO has announced an implementation timeline (Figure 1) which includes the planned availability of final LADR specifications in June 2020, the adoption of ICAO provisions for implementation and data contributions to the LADR shortly thereafter, in November 2020, in order to complete preparations to meet the January 2021 applicability date for the distress tracking component of the GADSS.

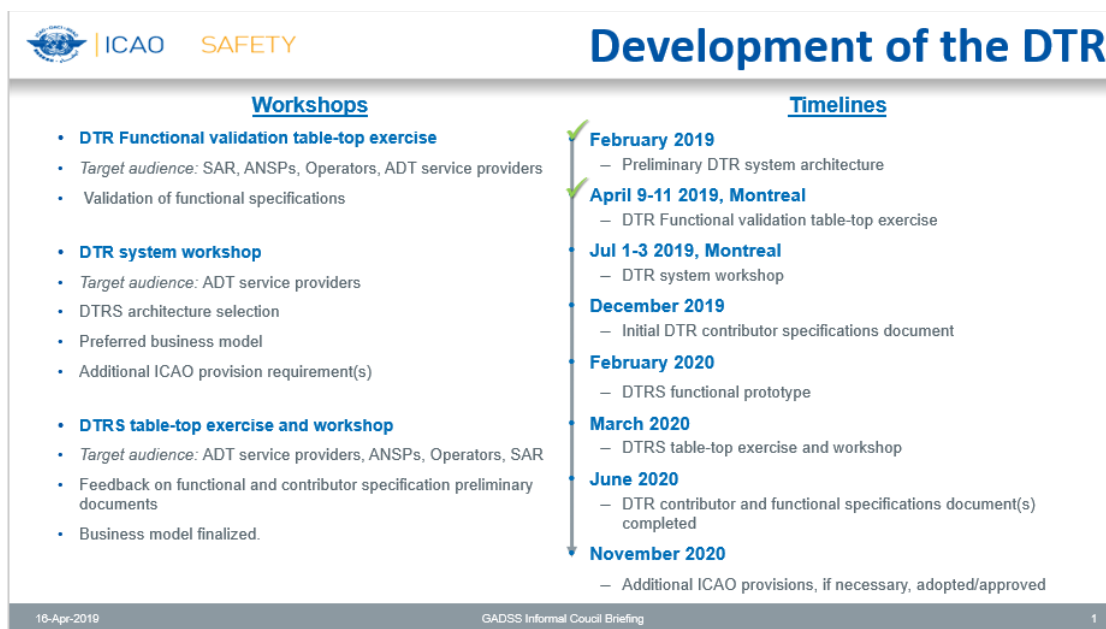


Figure 1: Presented by the ICAO Secretariat DTR Functional Workshop April 2019

* EUROCONTROL is a Brussels-based intergovernmental organisation with 41 Members (and two Comprehensive Agreement) States. [They] are committed to building, together with [their] partners, a Single European Sky that will deliver the air traffic management (ATM) performance required for the twenty-first century and beyond. (Source <https://www.eurocontrol.int/>)

1.2 The Cospas-Sarsat ELT for Distress Tracking – ELT(DT)

1.2.1 In response to recent commercial aviation disasters and new ICAO requirements for autonomous tracking of aircraft in distress, Cospas-Sarsat is finalizing specifications for ELTs for distress tracking (ELT(DTs)). Whereas present ELTs are designed to activate on impact or by manual activation by the flight crew, ELT(DT)s will activate autonomously when an aircraft exhibits threatening flight parameters (e.g., roll, pitch, yaw, ground proximity warnings, etc.) as defined by the European Organisation for Civil Aviation Equipment (EUROCAE) in document ED-237, "Minimum Aviation System Performance Specification for Criteria to Detect In-Flight Aircraft Distress Events to Trigger Transmission of Flight Information", published 1 February 2016. ELT(DT)s will allow a plane in distress to be tracked in-flight, prior to any crash, without human intervention, when the threat criteria autonomously trigger the ELT(DT). ELT(DT)s are being specified using both the existing beacon transmission method (narrowband BPSK) and the second-generation (spread-spectrum OQPSK) modulation schemes. It is anticipated that ELT(DT)s could be commercially available for installation on airframes as early as mid-2020.

2 COSPAS-SARSAT "GADSS-COMPLIANT" DATA DISTRIBUTION PLAN

2.1 Cospas-Sarsat has committed to sending all ELT(DT) data to the LADR, as may be decided by ICAO. Cospas-Sarsat document C/S A.001, the Data Distribution Plan, was updated in 2017 to address providing ELT(DT) data to the DTR (now LADR), in anticipation of a future ICAO requirement for distress-alert data to be entered into a central repository.

2.2 In addition, Cospas-Sarsat will distribute all ELT(DT) alerts to the relevant RCC(s), consistent with existing procedures for other alerts transmitted at 406 MHz (Figure 2). Cospas-Sarsat chose to maintain alert distribution of ELT(DT) data directly to RCCs, as available data about aviation distress incidents indicate that after the ED-237 triggering criteria are met (aircraft distress), 85% of aircraft will impact the ground within 3 minutes and 95% within 6 minutes[†].

[†] Report of the Triggered Transmission of Flight Data working group, March 2011, <https://www.bea.aero/enquetes/vol.af.447/flight.data.recovery.working.group.final.report.pdf>

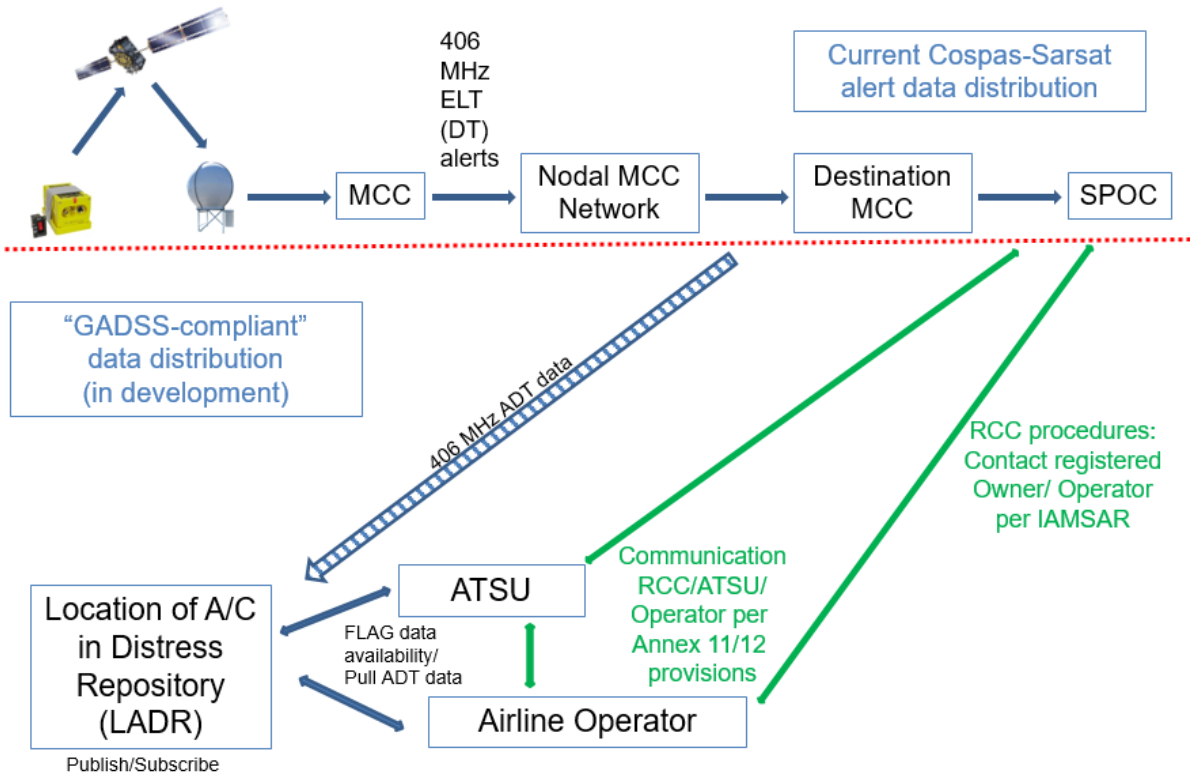


Figure 2: Cospas-Sarsat ELT(DT) data distribution plan, per document C/S A.001 (DDP)

2.3 During the ICAO DTR Functional Workshop (April 2019), some concern was expressed by a subgroup of the meeting comprised of SAR/RCC experts regarding Cospas-Sarsat plans to send ELT(DT) data directly to RCCs/SPOCs, per current alert-distribution procedures. This concern was based on questions of:

- aircraft still in flight being the responsibility of ANSPs/ATSUs, not RCCs/SPOCs; and
- a lack of experience of RCCs/SPOCs with handling potential false alerts emanating from aircraft still in flight (despite the statistical imminence of a crash).

2.4 A message emanating from an ELT(DT) in flight is different in principle from that of a traditional ELT; this fact requires close attention to the most appropriate manner of handling the associated ELT(DT) data. The matter of false alerts set aside, the initial receipt by an RCC of ELT(DT) data indicates that an adverse aviation incident may be about to occur, and the cessation of the signal might indicate that an accident has occurred. Conversely, an ELT(AF) alert indicates that an aviation accident has likely already occurred. To assist the RCC decision-making process, Cospas-Sarsat will include in the alert message sent to RCCs the activation method of an ELT(DT). Some ELT(DT)s that may be designed to fulfil both "DT" and "AF" functions will change message configuration and burst timing to conform to the appropriate specification ("DT" prior to crash; "AF" after a crash), and initiate a homing signal after impact.

2.5 Cospas-Sarsat alerts and cancellation messages for ELT(DT)s will appear as shown in Figure 3.

SAMPLE 406 MHz POSITION ALERT (ELT(DT))

1. DISTRESS TRACKING COSPAS-SARSAT ALERT
 2. MSG NO 00192 AUMCC REF B27400F81FD4710
 3. DETECTED AT 03 MAY 19 085310 UTC BY MEOSAR
 4. DETECTION FREQUENCY 406.0500 MHZ
 5. COUNTRY OF BEACON REGISTRATION 403 / SAUDI
 6. USER CLASS SGB – ELT DISTRESS TRACKING
AIRCRAFT 24 BIT ADDRESS 7100CE
TAC 10062 SERIAL NO 509
 7. EMERGENCY CODE NIL
 8. POSITIONS
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B – NIL
DOA - 02 25.1 N 046 06.2 E
ENCODED - 01 54.40 N - 045 37.53 E
 9. ENCODED POSITION PROVIDED BY EXTERNAL DEVICE
 10. NEXT PASS/EXPECTED DATA TIMES
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B – NIL
DOA - NIL
ENCODED - NIL
 11. HEX ID B27400 F81FD4 7100CE 00000 (SGB in this example)
 12. ACTIVATION TYPE NIL
 13. BEACON NUMBER ON AIRCRAFT OR VESSEL 00
 14. OTHER ENCODED INFORMATION
TIME SINCE ENCODED LOCATION 4 SECONDS
ALTITUDE OF ENCODED LOCATION 125 METRES
GNSS RECEIVER STATUS 3D LOCATION (for SGB only)
AIRCRAFT 24-BIT ADDRESS ASSIGNED TO SAUDI
BEACON ACTIVATED BY [AAA] where [AAA] is:
 - "CREW (MANUAL)",
 - "AVIONIC (AUTOMATIC)", or
 - "G-SWITCH/PROBABLE CRASH (AUTOMATIC)"
 15. OPERATIONAL INFORMATION
MEOSAR ALERT LAST DETECTED AT 03 MAY 19 085310 UTC
ELAPSED TIME SINCE ACTIVATION 13 MINUTES
REMAINING BATTERY CAPACITY BETWEEN 75 AND 100 PERCENT%
BEACON CHARACTERISTICS PER TAC DATABASE PROVIDED IN A SEPARATE MESSAGE
 16. REMARKS
THIS DISTRESS TRACKING MESSAGE IS BEING SENT TO APPROPRIATE SAR AUTHORITIES.
PROCESS THIS ALERT ACCORDING TO RELEVANT REQUIREMENTS
- END OF MESSAGE

SAMPLE 406 MHz CANCELLATION MESSAGE (ELT(DT))

1. DISTRESS TRACKING COSPAS-SARSAT USER CANCELLATION ALERT
 2. MSG NO 00192 AUMCC REF B27400F81FD4710
 3. DETECTED AT 03 MAY 19 085810 UTC BY MEOSAR
 4. DETECTION FREQUENCY 406.0500 MHZ
 5. COUNTRY OF BEACON REGISTRATION 403 / SAUDI
 6. USER CLASS SGB – ELT DISTRESS TRACKING
AIRCRAFT 24 BIT ADDRESS 7100CE
TAC 10062 SERIAL NO 509
 7. EMERGENCY CODE NIL
 8. POSITIONS
CONFIRMED - NIL
DOA – 02 25.1 N 046 06.2 E
ENCODED - NIL
 9. ENCODED POSITION PROVIDED BY EXTERNAL DEVICE
 10. NEXT PASS/EXPECTED DATA TIMES - NIL
 11. HEX ID B27400 F81FD4 7100CE 00000 (SGB in this example)
 12. ACTIVATION TYPE NIL
 13. BEACON NUMBER ON AIRCRAFT OR VESSEL 00
 14. OTHER ENCODED INFORMATION
AIRCRAFT 24-BIT ADDRESS ASSIGNED TO SAUDI
 15. OPERATIONAL INFORMATION NIL
MEOSAR ALERT LAST DETECTED AT 03 MAY 19 085310 UTC
ELAPSED TIME SINCE ACTIVATION 13 MINUTES (SGB only)
REMAINING BATTERY CAPACITY BETWEEN 75 AND 100 PERCENT% (SGB only)
BEACON CHARACTERISTICS PER TAC DATABASE PROVIDED IN A SEPARATE
MESSAGE (SGB only)
 16. REMARKS NIL
MEOSAR ALERT LAST DETECTED AT 03 MAY 19 085810 UTC
THIS DISTRESS TRACKING MESSAGE IS BEING SENT TO APPROPRIATE SAR
AUTHORITIES
PROCESS THIS ALERT ACCORDING TO RELEVANT REQUIREMENTS
ELT(DT) POSITION DOES NOT REFERENCE ANY PREVIOUS POSITION
CANCELLATION CONFIRMED
- END OF MESSAGE

**Figure 3: Cospas-Sarsat ELT(DT) alert and cancellation message
in the SIT 185 format, per document C/S A.002**

2.6 The JWG should consider developing guidance that might be required for the global SAR community to understand distress alerts emanating from an ELT activated in-flight, and which might cease operating on impact, or might be augmented to include a traditional ELT homing signal.

3 ACTION REQUESTED OF THE JWG

3.1 The JWG is invited to:

- .1 note the information provided on the ICAO Global Aeronautical Distress and Safety System (GADSS) and developments within the Cospas-Sarsat System to support this ICAO initiative; and
- .2 consider developing guidance that might be required for the global SAR community regarding distress alerts emanating from an ELT activated in-flight (ELT(DT)).

ANNEX

HISTORICAL DEVELOPMENT OF GADSS AND THE REPOSITORY

1 AMENDMENT TO ANNEX 6 OF THE CHICAGO CONVENTION

In response to air incidents, specifically Malaysia Airlines 370 (8 March 2014) and Air France 447 (1 June 2009), ICAO amended Annex 6 to the Convention on International Civil Aviation ("Chicago Convention") to address improvements to the effectiveness of alerting of search and rescue services.

1.1 Location of Aircraft in Distress

Amendment 40 to the International Standards and Recommended Practices OPERATION OF AIRCRAFT (Annex 6, Part I to the Convention on International Civil Aviation) was adopted by the ICAO Council to include the tracking of aeroplanes in distress (ADT – Autonomous Distress Tracking) on March 2, 2016 with an effective date of July 11, 2016, and an applicability date of January 1, 2021.

LOCATION OF AN AEROPLANE IN DISTRESS

6.18.1 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 2021, shall autonomously transmit information from which a position can be determined by the operator at least once every minute, when in distress, in accordance with Appendix 9[‡].

6.18.2 Recommendation. All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2021, should autonomously transmit information from which a position can be determined at least once every minute, when in distress, in accordance with Appendix 9.

6.18.3 The operator shall make position information of a flight in distress available to the appropriate organizations, as established by the State of the Operator.

Note.— Refer to 4.2.1.3.1[§] for operator responsibilities when using third parties.

Triggers for distress tracking are defined by the European Organisation for Civil Aviation Equipment (EUROCAE) document ED-237, "Minimum Aviation System Performance Specification for Criteria to Detect In-Flight Aircraft Distress Events to Trigger Transmission of Flight Information", published 1 February 2016.

[‡] See Appendix to the annex of this document.

[§] 4.2.1.3.1 The operator shall develop policies and procedures for third parties that perform work on its behalf.

1.2 ELT Carriage

With a view towards providing an incentive to retrofit older aircraft with the ADT required by section 6.18, section 6.17 of Annex 6 was amended to add a note as shown below, allowing an ADT to replace the automatic ELT. The possible unintended consequence was that some aircraft may no longer be equipped with a homing transmitter.

6.17.3 All aeroplanes authorized to carry more than 19 passengers for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with either:

- a) at least two ELTs, one of which shall be automatic; or
- b) at least one ELT and a capability that meets the requirements of 6.18.

Note.— In the case where the requirements for 6.18 are met by another system no automatic ELT is required.

1.3 Distress Tracking Solutions other than the ELT(DT)

One proposed distress-tracking solution is the Spaced-Based Automatic Dependent Surveillance – Broadcast (SB ADS-B) based on the Iridium NEXT constellation - the Aireon ALERT solution will provide GPS location and real-time tracking data. Others include a SATCOM-based Tracker (Inmarsat), a SATCOM-based Tracker (Iridium), and possible stand-alone solutions (Boeing). Details on most of these, in particular the means for data distribution, are not readily available.

1.4 Interpretation

The amendments to Annex 6 are structured such that Aircraft tracking during abnormal operations provide a "forewarning" of a distress situation to the aircraft operator whenever the aeroplane is in an uncertain situation. It is envisaged that the operator's operations control centre could assist in resolving the abnormal condition before it escalates into a distress situation. If the abnormal condition cannot be resolved, the operator could facilitate timely assistance by coordinating with the relevant Air Traffic Services (ATS) / Search and Rescue (SAR) entities.

It is possible that this vision does not fit well with available data about aviation distress incidents, where after triggering criteria are met, 85% of aircraft impact the ground within 3 minutes and 95% within 6 minutes**.

2 GADSS CONOPS

In May 2014, ICAO convened a special meeting comprising States, industry and related specialists to develop proposals for the global tracking of flights as a matter of priority. That meeting recommended that a concept of operations be developed that would clarify the objectives of aircraft tracking, namely, to ensure that timely information would be available in support of search and rescue, recovery and accident investigation activities.

** Report of the Triggered Transmission of Flight Data working group, March 2011, <https://www.bea.aero/enquetes/vol.af.447/flight.data.recovery.working.group.final.report.pdf>

The concept of operations, also known as the Global Aeronautical Distress and Safety System (GADSS), was subsequently developed and endorsed by the ICAO High Level Safety Conference in February 2015. The GADSS consists of the following system components related to aircraft tracking and locating:

- Normal Aircraft Tracking - during normal operations, at 15-minute intervals, and
- Autonomous Distress Tracking (ADT) – transmission at one-minute intervals, in a manner resilient to failures of the aircraft electrical power, navigation and communication systems.

Amendment 40 to ICAO Annex 6, Part 1, addressing Autonomous Distress Tracking will become applicable only to aeroplanes for which the certificate of airworthiness is first issued on or after 1 January 2021.

The GADSS ConOps is meant to provide a road map towards implementation of the provisions of Annex 6 and has not been revised since the posting of Version 6.0 on 7/6/2017.

The GADSS ConOps document can be found on the ICAO website at <https://www.icao.int/safety/globaltracking/Documents/GADSS%20Concept%20of%20Operation%20-%20Version%206.0%20-%202007%20June%202017.pdf>.

3 MANUAL ON LOCATION OF AIRCRAFT IN DISTRESS AND FLIGHT RECORDER DATA RECOVERY, DOCUMENT 10054

ICAO document 10054, Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery is referenced in Annex 6 to the Chicago Convention, specifically in relation to the ADRF (but not distress tracking). Most relevant to distress tracking is Chapter 3, Guidance for Location of Aircraft in Distress.

Document 10054 was published on ICAONET in January 2019.

4 LOCATION OF AN AIRCRAFT IN DISTRESS REPOSITORY

Per Appendix 9 to Annex 6 of the Chicago Convention, section, 2.4, "The State of the Operator shall identify the organizations that will require the position information of an aircraft in an emergency phase. These shall include, as a minimum:

- air traffic service unit(s) (ATSU); and
- SAR rescue coordination centre(s) (RCC) and sub-centres.

The GADSS ConOps envisages a distress tracking repository as the best solution to the requirement of Annex 6 that the data be "made available" (6.18.3). The GADSS ConOps (section 3.4.3) states, "the aircraft position information will be available to RCC, ATS units and the aircraft operator by means of a distress tracking data repository which they can access through an identified access point that will be continuously available. The repository will be SWIM compliant and will serve as the SWIM entry point for additional information...".

In early 2019, ICAO held a series of workshops to develop the Functional Specification for the Location of an Aircraft in Distress Repository (LADR, formerly the DTR). The latest issue is version 2.0, dated 03.05.2019.

APPENDIX

APPENDIX 9 TO ANNEX 6 TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

APPENDIX 9. LOCATION OF AN AEROPLANE IN DISTRESS

(Chapter 6, 6.18, refers)

1. PURPOSE AND SCOPE

Location of an aeroplane in distress aims at establishing, to a reasonable extent, the location of an accident site within a 6 NM radius.

2. OPERATION

2.1 An aeroplane in distress shall automatically activate the transmission of information from which its position can be determined by the operator and the position information shall contain a time stamp. It shall also be possible for this transmission to be activated manually. The system used for the autonomous transmission of position information shall be capable of transmitting that information in the event of aircraft electrical power loss, at least for the expected duration of the entire flight.

Note.— Guidance on the location of an aeroplane in distress is provided in Attachment K.

2.2 An aircraft is in a distress condition when it is in a state that, if the aircraft behaviour event is left uncorrected, can result in an accident. Autonomous transmission of position information shall be active when an aircraft is in a distress condition. This will provide a high probability of locating an accident site to within a 6 NM radius. The operator shall be alerted when an aircraft is in a distress condition with an acceptable low rate of false alerts. In case of a triggered transmission system, initial transmission of position information shall commence immediately or no later than five seconds after the detection of the activation event.

Note 1.— Aircraft behaviour events can include, but are not limited to, unusual attitudes, unusual speed conditions, collision with terrain and total loss of thrust/propulsion on all engines and ground proximity warnings.

Note 2.— A distress alert 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.

2.3 When an aircraft operator or an air traffic service unit (ATSU) has reason to believe that an aircraft is in distress, coordination shall be established between the ATSU and the aircraft operator.

2.4 The State of the Operator shall identify the organizations that will require the position information of an aircraft in an emergency phase. These shall include, as a minimum:

- a) air traffic service unit(s) (ATSU); and
- b) SAR rescue coordination centre(s) (RCC) and sub-centres.

Note 1.— Refer to Annex 11 for emergency phase criteria.

Note 2.— Refer to Annex 12 for required notifications in the event of an emergency phase.

2.5 When autonomous transmission of position information has been activated, it shall only be able to be deactivated using the same mechanism that activated it.

2.6 The accuracy of position information shall, as a minimum, meet the position accuracy requirements established for ELTs.
