



Explanatory Note to Decision 2021/008/R

Amendment of requirements for flight recorders and underwater locating devices

Certification specifications, acceptable means of compliance, and guidance material for locating an aircraft in distress

RELATED NPA/CRD 2020-03 — RMT.0400 (OPS.090)

EXECUTIVE SUMMARY

The objective of this Decision is to facilitate the implementation of point CAT.GEN.MPA.210 ‘Location of an aircraft in distress — Aeroplanes’ of Annex IV (Part-CAT) to Regulation (EU) No 965/2012 (‘Air OPS Regulation’).

This Decision amends certification specifications (CSs), acceptable means of compliance (AMC), and guidance material (GM), to support the implementation of point CAT.GEN.MPA.210. The scope of this Decision includes air operations (Air OPS), initial airworthiness (IAW), and air traffic management (ATM).

The amendments are expected to increase safety as they will facilitate locating an accident scene. This will increase the chances of rescuing accident survivors, and accelerate the collection of evidence that is necessary for determining the accident causes. In addition, these amendments are expected to ensure consistency with the existing requirements on flight recorders, emergency locator transmitters (ELTs), and low-frequency (8.8 kHz) underwater locating devices (ULDs).

Domain:	Aircraft tracking, rescue operations, and accident investigation		
Related rules:	<ul style="list-style-type: none"> — Air OPS: AMC & GM to Annex I (Definitions), Annex IV (Part-CAT), Annex V (Part-SPA), Annex VI (Part-NCC), Annex VII (Part-NCO), and Annex VIII (Part-SPO) to the Air OPS Regulation — IAW: CS-MMEL — ATM/ANS: AMC & GM to Annex VIII (Part-CNS) to Regulation (EU) 2017/373 (‘ATM-ANS Regulation’), and CS-ACNS 		
Affected stakeholders:	Aircraft operators, design organisation approval (DOA) holders, ATM/air navigation services (ANS) providers		
Driver:	Safety	Rulemaking group:	No
Impact assessment:	Yes	Rulemaking Procedure:	Standard

EASA rulemaking process



Subtask 5: 4.5.2018

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1. About this Decision

The European Union Aviation Safety Agency (EASA) developed ED Decision 2021/008/R in line with Regulation (EU) 2018/1139¹ ('Basic Regulation') and the Rulemaking Procedure².

This rulemaking activity is included in the [European Plan for Aviation Safety \(EPAS\) 2021-2025](#) under rulemaking task (RMT).0400 (OPS.090). The scope and timescales of the task were defined in the related Terms of Reference³.

The *draft* text of this Decision has been developed by EASA. All interested parties were consulted through [Notice of Proposed Amendment \(NPA\) 2020-03](#)⁴. 471 numbered comments were received from all interested parties, including aircraft and equipment manufacturers, operators, air traffic management (ATM) service / air navigation service (ANS) providers, national aviation authorities (NAAs), search and rescue (SAR) authorities, and international organisations.

EASA reviewed the comments received during the public consultation. A summary of the comments is presented in Section 2.4. The Comment-Response Document (CRD) that contains the comments received and EASA's responses to them will be published at a later stage on the EASA website⁵.

The *final* text of this Decision with the certification specifications (CSs), acceptable means of compliance (AMC), and guidance material (GM) has been developed by EASA.

The major milestones of this rulemaking activity are presented on the title page.

¹ Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91 (OJ L 212, 22.8.2018, p. 1) (<https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1535612134845&uri=CELEX:32018R1139>).

² EASA is bound to follow a structured rulemaking process as required by Article 115(1) of Regulation (EU) 2018/1139. Such a process has been adopted by the EASA Management Board (MB) and is referred to as the 'Rulemaking Procedure'. See MB Decision No 18-2015 of 15 December 2015 replacing Decision 01/2012 concerning the procedure to be applied by EASA for the issuing of opinions, certification specifications and guidance material (<http://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-18-2015-rulemaking-procedure>).

³ <https://www.easa.europa.eu/document-library/terms-of-reference/tor-ops090-rmt0400-rmt0401-issue-1>

⁴ In accordance with Article 115 of Regulation (EU) 2018/1139 and Articles 6(3) and 7 of the Rulemaking Procedure.

⁵ <https://www.easa.europa.eu/document-library/comment-response-documents>



2. In summary — why and what

2.1. Why we need to amend the CS, AMC & GM — issue/rationale

Point CAT.GEN.MPA.210 ('Location of an aircraft in distress') was laid down in Regulation (EU) 2015/2338, amending Regulation (EU) No 965/2012⁶ ('Air OPS Regulation'). Point CAT.GEN.MPA.210 is applicable to some categories of large aeroplanes⁷ if the aeroplane is first issued with an individual certificate of airworthiness (CofA) on or after 1 January 2023.

This Decision provides for the so far missing acceptable means of compliance (AMC) and guidance material (GM) to point CAT.GEN.MPA.210. It also lays down the missing certification specifications (CSs) to address the performance of the airborne system and the conditions applicable to the transmission service provider when that transmitter is not an emergency locator transmitter (ELT)⁸. Finally, this Decision addresses the continued operation of the aeroplane when the equipment used to comply with point CAT.GEN.MPA.210 is temporarily inoperative.

Furthermore, EASA determined that the AMC and GM on emergency locator transmitters (ELTs) to the Air OPS Regulation need to be amended so that also new types of ELTs may be used to comply with point CAT.GEN.MPA.210.

In addition, GM2 SPA.HOFO.145 that provides references to guidance for the establishment of a flight data monitoring programme needs to be updated.

2.2. What we want to achieve — objectives

The overall objectives of the EASA system are defined in Article 1 of the Basic Regulation. This Decision will contribute to the achievement of the overall objectives by addressing the issues outlined in Section 2.1.

The specific objective of this Decision is, therefore, to ensure that industry implements acceptable solutions to comply with point CAT.GEN.MPA.210 so that:

- all solutions are at least as effective as the current system, which is based on ELTs and on the international COSPAS-SARSAT programme for providing information to search and rescue points of contact (SPOC) that are designated by States, in order not to degrade the survivability of aircraft accidents;
- whenever an accident that requires search and rescue (SAR) operations occurs to an aeroplane within the scope of point CAT.GEN.MPA.210, these SAR operations are accurately and quickly directed to the accident site;
- whenever an accident occurs to an aeroplane within the scope of point CAT.GEN.MPA.210, the aeroplane or its wreckage is quickly located in order to retrieve evidence and identify the accident causes without significant delay;

⁶ Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1) (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0965&qid=1616595324075>).

⁷ CAT.GEN.MPA.210 is applicable to aeroplanes with an MCTOM of more than 27 000 kg and a maximum operational passenger seating configuration (MOPSC) of more than 19, and to aeroplanes with an MCTOM of more than 45 500 kg.

⁸ If the transmitter is an ELT, the transmitted signals are processed by the international COSPAS-SARSAT programme.

- EASA Member States (MSs) save resources and reduce the exposure to risk of their SAR units when those SAR units are searching for the aeroplane and its occupants;
- no solution has an adverse impact on the workload of rescue coordination centres (RCCs) or of air traffic service (ATS) units;
- all solutions are compatible with the current legal responsibilities of RCC and ATS unit personnel; and
- no solution has an adverse impact on other users of the international COSPAS-SARSAT programme (helicopters, ships, individuals carrying personal locator beacons (PLBs)).

Another specific objective of this Decision is to ensure consistency across the CSs, AMC, and GM that are applicable to locating an aircraft in distress, flight recorders, emergency locator transmitters (ELTs), and underwater locating devices (ULDs).

2.3. How we want to achieve it — overview of the amendments

Point CAT.GEN.MPA.210 is a performance-based rule as it does not prescribe any particular solution or technology.

According to this rule, performance objectives were defined, which are presented in [NPA 2020-03](#). From these performance objectives, technical conditions were derived. There are two types of technical conditions:

- technical conditions that are applicable regardless of the solution that is elected to comply with point CAT.GEN.MPA.210 ('common technical conditions'); and
- technical conditions that specifically apply to three types of solutions that are considered mature at the time of issuance of this Decision ('specific technical conditions'), namely a distress tracking ELT (ELT(DT)), an automatic deployable flight recorder (ADFR), and high-rate tracking (HRT).

Based on these technical conditions, CSs and AMC were developed.

In summary, ED Decision 2021/008/R introduces the following amendments:

- new AMC1 CAT.GEN.MPA.210, for operators within the scope of point CAT.GEN.MPA.210;
- new CSs for Airborne Communications, Navigation and Surveillance (CS-ACNS), to provide the conditions applicable to the airborne system that is used to comply with point CAT.GEN.MPA.210 ('airborne system'), and new AMC & GM to these CSs;
- new GM to the CSs for Master Minimum Equipment List (CS-MMEL), to allow for the continued operation of the aircraft when the equipment that is used to comply with point CAT.GEN.MPA.210 is temporarily inoperative;
- a new AMC to point CNS.OR.100 of Annex VIII (Part-CNS) to Regulation (EU) No 2017/373⁹ ('ATM/ANS Regulation'), to provide the conditions applicable to the service provider that

⁹ Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, (EU) No 1035/2011 and (EU) 2016/1377 and amending Regulation (EU) No 677/2011 (OJ L 62, 8.3.2017, p. 1) (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R0373&qid=1616595512787>).

transmits signals from the aircraft to the intended recipients in order to comply with point CAT.GEN.MPA.210;

- amendments to the AMC and GM to the implementing rules (IRs) that require to equip aircraft with ELTs, in Annex IV (Part-CAT), Annex VI (Part-NCC), Annex VII (Part-NCO) and Annex VIII (Part-SPO) to the Air OPS Regulation, to allow for the installation and use of new types of ELTs to comply with point CAT.GEN.MPA.210; and
- an amendment to GM2 SPA.HOFO.145 to Annex V (Part-SPA) to the Air OPS Regulation, to update the references to guidance for the establishment of a flight data monitoring programme.

2.4. What are the stakeholders' views

471 numbered comments were received on [NPA 2020-03](#) from 29 parties. However, some of those numbered comments contained several sub-comments, so that in total, 592 comments were addressed. Table 1 shows the types and names of the organisations that commented on [NPA 2020-03](#). In addition, two individuals provided each one comment. Table 2 shows the distribution of comments per [NPA 2020-03](#) section.

Table 1 — Organisations that commented on [NPA 2020-03](#)

Type of the organisation	Name of the organisation
Aircraft manufacturers	Avions de Transport Régional (ATR), Airbus, Mitsubishi, Boeing, Embraer, Bombardier
Aircraft operators and aircraft operator associations	International Air Transport Association (IATA), Air France, Fédération Nationale de l'Aviation Marchande (FNAM)
National aviation authorities (NAAs) and SAR authorities of EASA MSs	Civil Aviation Authority (CAA) of Sweden, CAA the Netherlands, Direction Générale de l'Aviation Civile (DGAC) France, Luftfahrtbundesamt (LBA) Germany
NAAs and SAR authorities of third countries	Federal Aviation Administration (FAA), CAA UK, Transport Canada Civil Aviation (TCCA), Federal Office of Civil Aviation (FOCA) Switzerland, Maritime and Coastguard Agency (MCA) UK
ATM service/ANS providers	ENAIRES Spain
Equipment manufacturers	ACR Group, Orolia, L3Harris, Leonardo DRS, Thales Group
International organisations	International Civil Aviation Organization (ICAO), COSPAS-SARSAT, European GNSS Agency (GSA)
Other organisations	SENASA Spain



Table 2 — Distribution of comments per [NPA 2020-03](#) section

Section of NPA 2020-03	Number of comments
General comments and comments on the executive summary	18
2. In summary — why and what	3
3. Proposed amendments and rationale in detail — 3.1. General approach to the definition of CSs, AMC and GM	2
3. Proposed amendments and rationale in detail — 3.2. Draft AMC and GM (Draft EASA decision) — 3.2.1. Draft AMC/GM to Definitions	4
3. Proposed amendments and rationale in detail — 3.2. Draft AMC and GM (Draft EASA decision) — 3.2.2. Draft AMC & GM to Part-CAT	97
3. Proposed amendments and rationale in detail — 3.2. Draft AMC and GM (Draft EASA decision) — 3.2.3. Draft AMC & GM to Part-NCC, 3.2.4. Draft AMC & GM to Part-NCO, and 3.2.5. Draft AMC & GM to Part-SPO	15
3. Proposed amendments and rationale in detail — 3.2. Draft AMC and GM (Draft EASA decision) — 3.2.6. Draft AMC & GM to Part-CNS	12
3. Proposed amendments and rationale in detail — 3.3. Draft CSs (Draft EASA decision) — 3.3.1. Draft CS-MMEL	6
3. Proposed amendments and rationale in detail — 3.3. Draft CSs (Draft EASA decision) — 3.3.2. Draft CS-ACNS	268
4. Impact assessment (IA)	41
7. Appendices	5

195 numbered comments triggered changes to the amendments proposed in [NPA 2020-03](#) (comments accepted or partially accepted), and 276 numbered comments did not trigger any change (comments noted or not accepted).

The most significant comments are summarised per topic in the following sections:

2.4.1 Potential impact of the amendments proposed in [NPA 2020-03](#)

An organisation made many comments on the potential impact of the proposed amendments on the responsibilities and workload of RCCs' personnel. The commenter commented that the data stemming from the airborne system should not be automatically transmitted to SAR authorities, as they were concerned that RCCs might be flooded with false alerts caused by frequent activation of the airborne system.

The amendments do not change the responsibilities of SAR authorities and are consistent with how messages that are received from ELTs are processed today. In addition, unlike ICAO Annex 6 and the concept of operation of the ICAO Global Aeronautical Distress & Safety System, which do not address robustness and reliability aspects, the amendments to CS-ACNS contain several conditions (for

automatic activation, the design reliability of the airborne system, environmental testing, the use of the manual activation capability, etc.) to ensure that erroneous activation of the airborne system, and the continued transmission of activation signals for more than a few minutes will be rare events (refer to the common performance objectives (CPOs) Nos 13, 17, and 18 of Option 2 of the impact assessment (IA) of [NPA 2020-03](#), as presented in Appendix 3 (Section 7.3.)). In addition, 95 % of the thousands of false alerts due to an ELT activation that are received by RCCs every year worldwide are caused by inadvertent activation or inappropriate manipulation of the ELT during maintenance operations: the implementation of point CAT.GEN.MPA.210 will have a very a limited impact on the total number of false alerts received by RCCs.

However, to address several comments asking to specify when it would be appropriate to manually activate the airborne system, AMC1 CAT.GEN.MPA.210 was reworded to clarify that the flight crew should manually activate the airborne system only if a SAR response is needed or anticipated.

Other comments raised concerns about the potential impact of the amendments on ATS units, pointing at the absence of an international system or regulatory framework for automatically making data that is transmitted by an airborne system compliant with point CAT.GEN.MPA.210 available to ATS units. These comments were addressed by removing the corresponding condition from AMC1 CNS.OR.100.

Some commenters confused the ATS unit and the provider of the service that transmits information sent by the airborne system to the relevant stakeholders (e.g. the international COSPAS-SARSAT programme if the transmitter is an ELT).

One commenter stressed that due to the COVID-19 pandemic, shortcomings in the development, certification, and production of equipment and capabilities could make it very challenging to comply with the amendments, and suggested to make a specific analysis to consider the most recent forecast about the recovery of the aviation sector. However, point CAT.GEN.MPA.210 is only applicable to aeroplanes that are first issued with an individual CofA on or after 1 January 2023, so that the airborne equipment necessary to comply with said point is expected to be installed by the manufacturers before delivery of the aeroplanes concerned. Intelligence indicated that the development of such equipment was on track in January 2021. With regard to the transmission of signals to SAR authorities, the international COSPAS-SARSAT programme, funded by States contributions, is already operational. Hence, the economic crisis is not expected to have a significant impact on the transmission of signals through ELT-based solutions (ADFR, ELT(DT)). Finally, the content of AMC1 CAT.GEN.MPA.210 was simplified. As a result, the main impact for an EU-based operator will be to establish flight crew procedures for using the airborne system.

2.4.2 Harmonisation with ICAO standards

Some comments indicated the apparent difference between the objective suggested by the title of point CAT.GEN.MPA.210 ('Location of an aircraft in distress') and its text ('... determine, following an accident during which the aeroplane is severely damaged, the location of the point of end of flight ...'). Other comments suggested that the amendments proposed in [NPA 2020-03](#) do not meet the same objective as ICAO Annex 6, Part I, Section 6.18 and Appendix 9. These comments show several misunderstandings:



- As point CAT.IDE.A.280 ‘Emergency Locator Transmitter (ELT)’ allows to replace the ELT by an ‘aircraft localisation means meeting the requirement of CAT.GEN.MPA.210’, the scope of [NPA 2020-03](#) goes beyond locating an accident site.
- ICAO Annex 6, Part I, Appendix 9 states: ‘Location of an aeroplane in distress aims at establishing, to a reasonable extent, the location of an accident site within a 6 NM radius.’ Hence, the objective of the provisions in ICAO Annex 6, Part I, Section 6.18 is not to locate the aeroplane as soon as it is in distress, but after it had an accident, similar to point CAT.GEN.MPA.210. Solutions that transmit information after reaching the point of end of flight (e.g. solutions based on an ADFR) meet that objective.
- The amendments proposed in [NPA 2020-03](#) are based on Option 2 of the IA, which addresses both the intent of the ICAO standards and the needs of SAR and of safety investigation authorities.
- Changing the title of an IR, e.g. point CAT.GEN.MPA.210, is out the scope of [NPA 2020-03](#) (Subtask 5 of RMT.0400). In addition, the titles of each AMC and each GM to an IR must be the same as the title of that IR. In response to these comments, the subtitles of the AMC and GM to point CAT.GEN.MPA.210 were changed to better reflect their content.

Some comments stated that the amendments would result in solutions that are not compliant with ICAO Annex 6 Part I, Section 6.18 and Appendix 9, as the ICAO standards prescribe that the data is provided to the aircraft operator.

The amendments include solutions that can meet all relevant ICAO standards, such as solutions based on an ELT(DT) or on HRT. Transmitting data to the operator is allowed for by the amendments and recommended in new GM1 CAT.GEN.MPA.210. However, transmitting data to the operator is not required so that ELT-based solutions that are developed by the industry can also be used to comply with point CAT.GEN.MPA.210.

A few comments pointed to the fact that the ICAO project on a Location of an Aircraft in Distress Repository (LADR) was not considered in the assessment of options and that the ICAO LADR would make data stemming from an activated ELT available to the operator. However, the ICAO LADR is not required by any ICAO standard¹⁰ and to this date, is only an ICAO project but not a proven global solution. The ICAO LADR may not be fully operational when point CAT.GEN.MPA.210 becomes applicable on 1 January 2023. In addition, COSPAS-SARSAT system documents only address the transmission of ELT(DT) data to the LADR, so that other solutions, e.g. ADFR or solutions combining HRT and an automatic fixed ELT (ELT(AF)), could not benefit from the LADR.

In addition, activation of the airborne system should be considered as a genuine indication of a distress situation until there is reliable information from the flight crew that this is not a distress situation, as the flight crew is ultimately responsible for the safety of the aircraft occupants. The transmission of

¹⁰ ICAO adopted an amendment to Volume III of the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS). However, as stated in the foreword of PANS-OPS Vol III, Section 5 ‘Publication of differences’: ‘The PANS do not carry the status afforded to Standards adopted by the Council as Annexes to the Convention and, therefore, do not come within the obligation imposed by Article 38 of the Convention to notify differences in the event of non-implementation.’ Hence, introducing provisions into the PANS-OPS is not equivalent to introducing Standards and Recommended Practices (SRPs) into ICAO Annex 6: it does not provide for a mechanism to monitor the level of implementation of the provisions by States, such as the obligation to send a notification of differences with ICAO standards.

activation signals should not be filtered by the operator as this may cause additional delays in recognising a distress situation and in turn reduce the chances to rescue aircraft occupants.

Some commenters asked how the operator can be made aware in a timely manner that one of their aircraft is in distress. The communication and coordination principles that are established in ICAO Annex 11 'Air Traffic Services', Chapter 5 'Alerting Service', and in ICAO Annex 12 'Search and Rescue', Chapter 5 'Operating Procedures' are such that if an aircraft is in a state of emergency, whether an ATS unit or an RCC is first informed, the operator concerned will be notified. Furthermore, CS ACNS.E.LAD.140 requires that the activation signals contain sufficient information to identify the individual aircraft from which the activation signals are sent. Furthermore, to facilitate notification of any emergency to the operator by the ATS unit, GM6 CAT.GEN.MPA.205 was corrected to recommend registering to the global OPS Control Directory of ICAO.

Some comments stated that the operator should receive the data from an activated system, as they consider the operator a 'competent authority'. Authorities are official organisations (usually national or international administrations) with legal power to make decisions or impose the law in a particular area. Neither the operator nor the flight crew are authorities in that sense.

Some commenters proposed to require that the operator informs the competent RCC both when they believe that one of their aircraft is in distress and when they believe that it is not anymore in distress. In fact, according to ICAO Annex 11, Chapter 5, this is a responsibility of the ATS unit that provides the alerting service.

Some comments stated that the CPOs stated under Option 2 of the IA and the amendments proposed in [NPA 2020-03](#) are more demanding than the standards of ICAO Annex 6, Part I and favour ELTs over other technologies. On some aspects, such as the accuracy required for locating the point of end of flight, or the robustness of the airborne system, and of the transmission service, which were considered insufficiently addressed in ICAO Annex 6, Part I, the amendments introduce more specific and/or stringent conditions. These differences with the ICAO standards are not caused by a technology preference. The amendments allow for the use of ELT-based solutions (ELT(DT), ADFR) because these solutions are mature and addressed in the CSs issued by EASA. In addition, 406-MHz ELT signals are transmitted by the international COSPAS-SARSAT programme, a global, well-established, and effective system. However, the amendments also allow for the use of non-ELT-based solutions, such as HRT.

Some comments confused requirements on aircraft tracking (ICAO Annex 6, Part I, Section 3.5, and Part-CAT, point CAT.GEN.MPA.205) and requirements on locating an aircraft in distress (ICAO Annex 6, Part I, Section 6.18 and Appendix 9, and Part-CAT, point CAT.GEN.MPA.210). Point CAT.GEN.MPA.205 requires that aircraft tracking is part of the operational control over the flights, and not intended to help the operator locate an aircraft in distress or the point of end of flight after an accident. With time intervals of up to 15 minutes between two successive position reports, aircraft tracking cannot provide accurate information on the location of the point of end of flight.

2.4.3 Transmission service

Several comments referred to the conditions for ensuring sufficient performance of the transmission service in AMC1 CAT.GEN.MPA.210 as being too demanding for an operator. Based on these comments, the conditions for the transmission service in said AMC were significantly simplified. As a result, the operator is not anymore required to verify the transmission service when the airborne system solely relies on ELTs for transmitting the necessary information to comply with



point CAT.GEN.MPA.210. When the airborne system relies on other means than ELTs for transmitting that information, the operator needs to ensure that the transmission service is provided by a provider of surveillance services certified in accordance with the ATM/ANS Regulation (the conditions to be met by such a provider are specified in AMC1 CNS.OR.100).

Some comments indicated an issue with the term ‘competent SAR centre’. ELT messages are not required to be delivered by the international COSPAS-SARSAT programme to the RCC responsible for the SAR region where the ELT is indicated to be, but only to entities designated by States. Consequently, the term ‘SAR centre’ was replaced by:

- ‘SAR point of contact (SPOC)’ when it designates the SPOC that is appointed by a State to comply with ICAO Annex 12 and
- ‘RCC’ when it designates the unit responsible for coordinating SAR operations within a SAR region.

Some comments questioned whether conditions on the performance of the transmission service are required when the transmission service is provided by the international COSPAS-SARSAT programme (when an airborne system solely relies on ELTs for transmitting the necessary information to comply with point CAT.GEN.MPA.210). This is because the international COSPAS-SARSAT programme is active since 1979 and overseen by its 43 participating States. The performance of the international COSPAS-SARSAT programme was tailored to the SAR needs of those States and has been constantly monitored by them ever since. Therefore, no performance objectives for the transmission of data by the international COSPAS-SARSAT programme need to be specified.

Some comments stated that the terms ‘receipt of data on the ground’ and ‘transmission to the ground’ were vague, as [NPA 2020-03](#) does not explain the meaning of ‘the ground’ in that context. These comments triggered changes throughout the amendments. In particular, the transmission time condition in new AMC1 CNS.OR.100 was changed to specify a maximum transmission time from the airborne system to the competent SPOC. In addition, the provisions for distribution of data to stakeholders were removed from Subpart E, Section 3 of CS-ACNS, as they address aspects that are out of scope of CS-ACNS: these aspects are now only addressed in new AMC1 CNS.OR.100.

2.4.4 Operational procedures

Some comments questioned the condition for an operator to define flight crew procedures for manually activating the airborne system. While a condition was maintained in AMC1 CAT.GEN.MPA.210, the conditions that justify manual activation were further specified.

Other commenters expressed the view that the operator’s procedures for informing the ATS unit should not be restricted to potential distress situations: these procedures should cover cases where an aircraft is believed to be in an state of emergency (as described in ICAO Annex 11, Chapter 5) and where an aircraft is not anymore in a state of emergency.

2.4.5 Certification specifications applicable to the airborne system

Note: the comments summarised in this subsection are related to the new CS-ACNS, Subpart E, Section 3, which is presented in [NPA 2020-03](#), Section 3.3.2.



Scope and definition of concepts

Some comments indicated that the scope and applicability of CS ACNS.E.LAD.001 were not fully consistent with point CAT.GEN.MPA.210, and subsequently that CS was reworded for clarity.

Some comments raised the issue of ‘hybrid’ or ‘combined’ solutions, i.e. solutions that use more than one of the types of solutions that are specifically addressed in CS-ACNS (ADFR, ELT(DT), and HRT). An example would be a solution where an ADFR and an ELT(DT) are installed on board the aircraft. Subsequently, new GM1 ACNS.E.LAD.001 was amended to address solutions that are different from the types of solutions specifically addressed in CS-ACNS or that are a combination of several types of solutions.

To respond to several comments asking to clarify concepts, definitions were inserted or changed in new CS ACNS.E.LAD.010. The definitions of ‘accident during which the aircraft is severely damaged’, ‘distress situation’, ‘manual activation’, ‘automatic activation’, ‘erroneous automatic activation’, ‘deactivation signals’ were introduced, and the definitions of ‘survivable accident’, ‘solution based on HRT’, ‘functions of the system’, ‘automatic triggering function’ were amended. The definitions of ‘competent SAR centre’ and ‘relevant ATS unit’ were removed from CS ACNS.E.LAD.010, as part of removing from CS-ACNS the elements related to the distribution of data to stakeholders.

Several comments referred to unnecessary repetitions of conditions and some ill-placed GM. In response, new CS ACNS.E.LAD.020 was introduced to address system approval conditions. The minimum conditions to be met by solutions based on an ADFR, an ELT(DT) or an HRT are specified in the AMC to CS ACNS.E.LAD.020. This in turn allowed to remove several GM (GM to CS ACNS.E.LAD.010, to CS ACNS.E.LAD.110, to CS ACNS.E.LAD.170, and to CS ACNS.E.LAD.420), and remove or simplify several AMC (AMC to CS ACNS.E.LAD.170, to CS ACNS.E.LAD.420, and to CS ACNS.E.LAD.650).

Several comments suggested to require a 406-MHz homing signal capability. They were not accepted as this capability is not yet addressed by the COSPAS-SARSAT technical documents, and as many States have not equipped their mobile SAR facilities with a 406-MHz homing direction finder.

Transmission

One comment led to the identification of a missing condition: the characteristics of activation and deactivation signals should be such to be detected by the communication infrastructure that is assumed to be used by the airborne system. Corresponding conditions were inserted in the CSs relating to transmission aspects (CS ACNS.E.LAD.110, CS ACNS.E.LAD.130).

Several comments stated that an ELT(DT) cannot be manually activated. However, EUROCAE ED-62B specifies the manual activation of an ELT(DT) as well as the controls to manually activate the ELT(DT) from the cockpit.

One commenter questioned the requirement for a 121.5-MHz homing signal capability and stated that such a requirement is not performance-based. The comment was not accepted, as the 121.5-MHz homing signal capability is considered essential to SAR missions and because point CAT.IDE.A.280 allows to replace an automatic ELT (which always has a 121.5-MHz homing signal capability) by means compliant with point CAT.GEN.MPA.210.

A comment indicated that the condition for the ELT(DT) to be of class 0 or 1 would have a significant impact on the design and that the ELT(DT) class should be determined by the ELT(DT) installation. The comment was not accepted, as aeroplanes within the scope of point CAT.GEN.MPA.210 have such a



flying range that they could have an accident over a mountainous or polar area where the local temperatures are extremely low, even if their normal area of operation does not include such areas.

Several comments were made on the position source for an ELT(DT) (integral/internal global navigation satellite system (GNSS) receiver or external position source). GM1 ACNS.E.LAD.140 recommends using an aircraft position source that is certified for navigation purposes when available and to automatically revert to the internal/integral GNSS receiver when such source is lost. However, this is only guidance and not a requirement.

Some commenters requested that the latitude and longitude data that are transmitted through the activation signals are expressed in the geographic reference system of the ICAO LADR. To this date, the functional specifications of the ICAO LADR do not include any geographic reference system.

Some comments asked whether ELTs are capable of sending 'deactivation signals', as specified in CS ACNS.E.LAD.160. An ELT(DT) should be able to send cancellation messages according to EUROCAE ED-62B. The ELT integrated in the ADFR does not need to be automatically deactivated after deployment of the deployable package of the ADFR.

Operation, activation, and deactivation

Several commenters questioned the CS ACNS.E.LAD.280 requirement to provide an indication to the flight crew when a failure affects the airborne system performance. In their view, the indication of a degraded system performance would have little added value for the flight crew in normal operation or during a distress situation. Consequently, the requirement, as corrected, only stipulates that the airborne system has a self-monitoring capability.

Several comments questioned the CS ACNS.E.LAD.280 requirement to provide an indication to the flight crew when the airborne system is activated or is transmitting a homing signal. Other commenters considered overly demanding the AMC1 ACNS.E.LAD.280 condition that the indication to the flight crew should be a caution alert. The flight crew needs the indication that the airborne system is activated or is transmitting a homing signal to receive confirmation that the manual activation of the airborne system was successful and to be informed of an erroneous automatic activation. The requirement was maintained in the CS but the AMC was changed to specify that this indication should only be an (advisory) alert.

Several commenters requested to clarify the implementation of automatic activation for ELT(DT)- or HRT-based solutions. It was clarified that for these solutions, automatic activation encompasses:

- an automatic triggering function with criteria based on EUROCAE ED-237; and
- the detection of a condition that disables the automatic triggering function and that is unlikely during normal aircraft operation (to address accident scenarios whereby the automatic triggering function is disabled before it can activate the transmission of activation signals, such as in-flight fire, uncontained engine failure, explosive decompression).

Several comments requested that manual deactivation of the airborne system is allowed when the aircraft is on the ground. This was not accepted, because the flight crew can disable the airborne system using circuit protective devices, as provided for by CS ACNS.E.LAD.350 if they need to stop the transmission of activation signals after landing.



Several comments pointed to the risk of misinterpreting the term ‘normal electrical power’ in CS ACNS.E.LAD.230. Therefore, this term was replaced by ‘systems generating normal electrical power’.

Several commenters misunderstood the conditions on the installation of an automatic ELT in the AMC to CS ACNS.E.LAD.170, to CS ACNS.E.LAD.230, and to CS ACNS.E.LAD.250, as they considered that an automatic ELT is required to comply with these CSs paragraphs, which is not the case. The related content was moved to GM (GM1 ACNS.E.LAD.230 and GM1 ACNS.E.LAD.250) where that aspect is clarified.

Robustness

Based on some comments, the automatic activation function was removed from the scope of the environmental and crash-testing conditions. This in turn led to several corrections in CS ACNS.E.LAD.310 and AMC1 ACNS.E.LAD.310.

One comment led to clarifying paragraph (a) of CS ACNS.E.LAD.310 by splitting it in two: the first paragraph covers environmental conditions that are encountered during the flight of a non-survivable accident (caused by events occurring prior to a crash impact), and the second one covers crash conditions.

A commenter indicated a missing requirement: to provide documentation showing the minimum performance of a communication infrastructure, which is required for meeting transmission and position accuracy requirements under flight trajectory parameter values representative of abrupt manoeuvres, aircraft upset, and loss of control in flight, as specified in CS ACNS.E.LAD.320. The requirement was introduced in CS ACNS.E.LAD.320, while the first point of that CS was moved to AMC1 ACNS.E.LAD.320.

Based on several comments, the purpose of Appendix A to CS-ACNS was clarified: verify, through the simulation of a representative flight trajectory (and, if necessary, through ground tests) that the position accuracy objective of CS ACNS.E.LAD.410 is met on typical aircraft trajectories. No flight test or adaptation to the actual aircraft performance is required for implementing Appendix A.

One commenter found the scope of CS ACNS.E.LAD.360 too vague. Therefore, communication means were included in the scope of that CS, and GM1 ACNS.E.LAD.360 was introduced to explain the terms ‘airborne resource’ and ‘communication means’.

Two commenters considered excessively demanding the AMC2 ACNS.E.LAD.320 condition for testing the successful transmission by the ELT that is integrated in an ADFR, and referred to ED-112A, where the crash-testing specifications for such an ELT are less stringent. ETSO-2C517 is indeed more stringent than ED-112A regarding the crash testing specifications applicable to such an ELT. The content of the condition in AMC2 ACNS.E.LAD.320 was aligned with Appendix 2 of ETSO-2C517, i.e. a horizontal deceleration distance of 70 meters may be assumed for the deployable package.

AMC1 ACNS.E.LAD.350 was amended based on a comment requesting to address more specifically the instructions for the flight crew related to undesirable activation.

A commenter explained that most occurrences of undesirable activation of ELTs are due to lack of guidance or good practice during maintenance activities and that disabling the airborne system in such cases would be desirable. Therefore, new GM1 ACNS.E.LAD.350 was created to indicate that means to disarm or disable the airborne system during maintenance activities are allowed.



Position accuracy of the point of end of flight

A comment recommended introducing as GM the explanation of the factors that affect the position accuracy of the point of end of flight when a solution is used that relies on the transmission of position reports in flight (see the rationale for AMC2 ACNS.E.LAD.410 in [NPA 2020-03](#)). GM1 CAT.GEN.MPA.410 was therefore created to include that explanation.

A commenter requested to simplify the AMC to CS ACNS.E.LAD.420 by combining under AMC1 ACNS.E.LAD.420 the conditions applicable to an ELT when used to meet CS ACNS.E.LAD.420, regardless of its type (ELT(AF), (ELT)(AP), ELT(DT), ELT integrated in an ADFR). This resulted in removing AMC2 ACNS.E.LAD.420, AMC3 ACNS.E.LAD.420, GM1 ACNS.E.LAD.420, and GM2 ACNS.E.LAD.420.

System performance

Several commenters disagreed with CS ACNS.E.LAD.620. They found that considering erroneous automatic activation a major failure condition is overly demanding and not consistent with CS ACNS.E.LAD.610 that required to consider the loss of a function of the airborne system a minor failure condition. On the one hand, considering the loss of a function of the airborne system a minor failure condition is consistent with the objectives set for the equipment that supports the recovery of accident survivors, aircraft wreckage, and accident data (e.g. ELTs, recorders, ULDs). On the other hand, considering an erroneous automatic activation a major failure condition is mainly driven by the need to not significantly increase the frequency of false alerts that are received by RCCs. However, if errors in the design of the software or of the electronic hardware of the equipment used by the airborne system do not cause undesirable automatic activation when the system is not activated, that software and electronic hardware could be developed in accordance with design assurance level (DAL) D.

In response to these comments, the content of CS ACNS.E.LAD.620 and CS ACNS.E.LAD.630 was moved to AMC1 ACNS.E.LAD.620, and the new CS ACNS.E.LAD.620 contains a system integrity requirement. The integrity of a system is defined in CS ACNS.A.GEN.005 'Definitions' of Subpart A 'General' as follows:

'Integrity (system integrity) is measured as the probability per operating hour of an undetected failure of a functional element that results in corrupted (erroneous) data, or a failure in the processing as specified, leading to the (partial) loss of otherwise available data.'

Similarly, the content of CS ACNS.E.LAD.610 was moved to AMC1 ACNS.E.LAD.610 and the new CS ACNS.E.LAD.610 contains a system continuity requirement. The continuity of a system is defined in CS ACNS.A.GEN.005 'Definitions' of Subpart A 'General' as follows:

'Continuity (system continuity) is the probability that a system will perform its required function without unscheduled interruption, assuming that the system is available at the initiation of the intended operation.'

In addition, new text was introduced into GM1 ACNS.E.LAD.620 to explain why erroneous automatic activation of the airborne system should be considered a major failure condition and that this condition could be met with software and hardware that is developed in accordance with DAL D.

2.4.6 Remote activation

Several comments were received in response to the question to stakeholders regarding the capability to remotely activate and deactivate the airborne system (see Section 4.3.3.2 of [NPA 2020-03](#)). This capability is actively promoted by the European GNSS Agency (GSA) for ELT(DT), and a concept of operation is described in draft EUROCAE ED-277.

The views of the commenters varied considerably. An operator and an operator association were in favour of implementing such capability, while three SAR authorities were reserved or even against it because they feared a negative impact on the SAR service. They were opposed to allowing the operator to remotely deactivate the airborne system. An equipment manufacturer pointed out the potential impact of such capability on the design of the airborne equipment and another one the need to train operators to avoid misuse of this capability. ICAO and an NAA raised the issue of integrating this capability with the other modes of activation/deactivation (automatic activation and manual activation by the flight crew) in a consistent manner. The GSA explained why, in their opinion, draft EUROCAE ED-277 answers the questions asked in Section 4.3.3.2 of [NPA 2020-03](#).

Today, there seems to be no convincing case in which a remote activation and deactivation capability would bring a significant benefit to aviation safety or accident survivability. None of the comments included any new argument or data in favour of or against this capability.

In addition, draft EUROCAE ED-277 only provides specifications for the remote activation and deactivation of an ELT(DT), while the scope of point CAT.GEN.MPA.210 is broader, as it is a performance-based IR that does not prescribe a particular technology. The new CSs in CS-ACNS (see Section 3.3.2 of [NPA 2020-03](#)) are compliant with this performance-based approach by introducing detailed conditions to facilitate the approval of other than ELT(DT)-based solutions, such as ADFR- or HRT-based solutions.

Therefore, EASA decided not to address the remote activation and deactivation capability in the CSs, AMC, and GM contained in ED Decision 2021/008/R. EASA will define the conditions for approving airborne systems with such a capability on a case-by-case basis.

2.5. What are the benefits and drawbacks

The amendments to CSs, AMC, and GM contain the technical conditions necessary to reliably locate the point of end of flight after an accident during which an aeroplane was severely damaged. The means to meet these technical conditions are expected to be robust and to locate the point of end of flight with an accuracy that is sufficient for SAR and safety investigation authorities.

The technical conditions defined in the amendments reduce the economic burden on EASA MSs that is caused by extended SAR operations and/or underwater search operations. Further, these conditions address the public expectations that when a large aeroplane used for commercial air transport has an accident, the accident site is quickly and accurately located, wherever the accident occurs.

In addition, the technical conditions do not prescribe a particular technology, and allow for the use of solutions that are based on ELT technology (ELT(DT) and ADFR). As these technical conditions are not technology-prescriptive, they will need limited adjustment, should new technologies emerge that meet the objective of point CAT.GEN.MPA.210.

Point CAT.GEN.MPA.210 is only applicable to aeroplanes that are first issued with an individual CofA on or after 1 January 2023. As a result, aircraft manufacturers will probably install solutions to comply



with point CAT.GEN.MPA.210 before the first delivery of the aeroplanes concerned, so that the overall economic impact on industry is expected to be low.

The handling of the comments received to [NPA 2020-03](#) (refer to Section 2.4 of this Explanatory Note) led to changes to the amendments proposed in said NPA, which reduce the economic impact on industry by:

- removing the condition for the provider of the transmission service to automatically make the data available to an ATS unit; only automatic transmission of the data to the SPOC that is designated by a State according to ICAO Annex 12 is required;
- removing the condition for the operator to verify the performance of the transmission service that is used by the airborne system to comply with point CAT.GEN.MPA.210; and
- replacing with an integrity requirement the condition for the airborne system design to consider an erroneous automatic activation a major failure condition.

The handling of the comments also resulted in editorial changes to the amendments, to add clarity and facilitate their implementation.



3. How do we monitor and evaluate the rules

The scope of this Chapter includes the implementation and effectiveness of point CAT.GEN.MPA.210.

3.1. Monitoring of the implementation

To monitor the implementation of point CAT.GEN.MPA.210, EASA should examine if the affected stakeholders develop and make available means to comply with the CSs contained in this Decision or other solutions compliant with point CAT.GEN.MPA.210 before its applicability date.

In practice, as point CAT.GEN.MPA.210 is only applicable to aeroplanes that are first issued with an individual Certificate of Airworthiness (CofA) on or after 1 January 2023, it is assumed that the aircraft manufacturers concerned will develop and install airborne systems to comply with point CAT.GEN.MPA.210 before delivery of those aeroplanes (forward-fit). However, to fully comply with point CAT.GEN.MPA.210, other aspects than the design of the airborne system need to be addressed, such as the development of appropriate procedures by operators.

To monitor the timely implementation of point CAT.GEN.MPA.210, the following approach is proposed in Table 3:

Table 3 — Approach to monitoring the timely implementation of point CAT.GEN.MPA.210

	Starting date	Action	Action owner
15 months before the applicability date	1 September 2021	Examine if manufacturers of aeroplane models within the scope of point CAT.GEN.MPA.210 have identified the airborne systems that are used to comply with it.	EASA
9 months before the applicability date	1 March 2022	Inform operators that are based in EASA MSs of the entry into force of point CAT.GEN.MPA.210 and examine if there are issues relating to its implementation.	EASA and the relevant EASA Advisory Bodies (ABs)

3.2. Evaluation of the effectiveness

To evaluate the effectiveness of point CAT.GEN.MPA.210, EASA should examine if its implementation has reached its objectives, namely to assist SAR and safety investigation authorities in quickly and accurately locating the point of end of flight after an accident during which the aeroplane is severely damaged.

The evaluation might rely on safety investigation reports that are produced by safety investigation authorities. The final safety investigation report template that is provided in ICAO Annex 13, Appendix 1 includes items on locating the aircraft wreckage and on SAR.

Another source of information are SAR authorities. SAR authorities could be consulted on elements that affect the effectiveness of point CAT.GEN.MPA.210, e.g. the timely receipt of location information, the rate of false alerts, or any other implementation-related issue.

To evaluate the effectiveness of point CAT.GEN.MPA.210, the following approach is proposed in Table 4.

Table 4 — Approach to evaluating the effectiveness of point CAT.GEN.MPA.210

	Starting date	Action	Action owner
12 months after the applicability date	1 January 2024	Survey SAR authorities and the COSPAS-SARSAT Secretariat on issues related to the implementation of point CAT.GEN.MPA.210.	EASA
3 years after the applicability date	1 January 2026	Study investigation reports on accidents to aeroplanes within the scope of point CAT.GEN.MPA.210 to assess the effectiveness of its implementation for SAR and safety investigation purposes.	EASA



4. References

4.1. Related regulations

- Commission Regulation (EU) No 748/2012 of 3 August 2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations (OJ L 224, 21.8.2012, p. 1).
- Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1).
- Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, (EU) No 1035/2011 and (EU) 2016/1377 and amending Regulation (EU) No 677/2011 (OJ L 62, 8.3.2017, p. 1).

4.2. Related decisions

- Decision No 2012/015/Directorate R of the Executive Director of the Agency of 24th October 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council, 'Guidance Material to Annex I — Definitions'.
- Decision 2014/015/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-CAT of Regulation (EU) No 965/2012 and repealing Decision 2012/018/R of the Executive Director of the Agency of 24 October 2012, 'AMC and GM to Part-CAT — Issue 2'.
- Decision No 2012/019/Directorate R of the Executive Director of the Agency of 24th October 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council, 'Acceptable Means of Compliance and Guidance Material to Part-SPA'.
- Decision N° 2013/021/Directorate R of the Executive Director of the Agency of 23 August 2013 on adopting Acceptable Means of Compliance and Guidance Material for non-commercial operations with complex motor-powered aircraft 'Part-NCC'.
- Decision 2014/016/R of the Executive Director of the European Aviation Safety Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-NCO of Regulation (EU) No 965/2012 and repealing Decision 2013/022/R of the Executive Director of the Agency of 23 August 2013, 'AMC and GM to Part-NCO — Issue 2'.



- Decision 2014/018/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-SPO of Regulation (EU) No 965/2012, ‘AMC and GM to Part-SPO’.
- Executive Director Decision 2017/001/R of 8 March 2017 issuing Acceptable Means of Compliance and Guidance Material to Commission Implementing Regulation (EU) 2017/373 ‘Common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight’.
- Decision 2014/004/R of the Executive Director of the Agency of 31 January 2014 adopting Certification Specifications and Guidance Material for Master Minimum Equipment List, ‘CS-MMEL — Initial issue’.
- Decision 2013/031/R of the Executive Director of the Agency of 17 December 2013 adopting Certification Specifications for Airborne Communications Navigation and Surveillance (CS ACNS), ‘CS-ACNS Initial Issue’.

4.3. Other reference documents

- Commission Regulation (EU) No 452/2014 of 29 April 2014 laying down technical requirements and administrative procedures related to air operations of third country operators pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 133, 6.5.2014, p. 12).
- Decision No. 2003/2/RM of the Executive Director of the Agency of 17 October 2003 on certification specifications, including airworthiness codes and acceptable means of compliance, for large aeroplanes (‘CS-25’).
- ICAO Annex 6, Operation of aircraft, Part I International commercial air transport — Aeroplanes, incorporating amendments 1 to 43, July 2018.
- ICAO Annex 11, Air traffic services (Air traffic control service, flight information service, alerting service), incorporating amendments 1 to 51, July 2018.
- ICAO Annex 12, Search and rescue, incorporating amendments 1 to 17, July 2004.
- ICAO Annex 13, Aircraft accident and incident investigation, incorporating amendments 1 to 18, July 2020.
- ICAO Doc 10054, Manual on location of aircraft in distress and flight recorder data recovery, 1st edition, 2019.
- ICAO Working paper — Multidisciplinary meeting regarding Global tracking, Montreal, 12-13 May 2014 (<https://www.icao.int/safety/globaltracking/Pages/Homepage.aspx>).
- ICAO Global Aeronautical Distress & Safety System, Concept of Operations (GADSS ConOps), Version 6.0, 7 June 2017 (<https://www.icao.int/safety/globaltracking/Pages/Homepage.aspx>).
- ICAO Location of an aircraft in distress repository, functional specification, draft version 3.1, 15 August 2019 (<https://www.icao.int/safety/globaltracking/Pages/Homepage.aspx>).
- FAA Part 91, general operating and flight rules, 4 March 2021 (https://www.faa.gov/regulations_policies/faa_regulations/).



- FAA Advisory Circular 91-44A including Change 1, Installation and inspection procedures for emergency locator transmitters and receivers, 1 February 2018 (https://www.faa.gov/regulations_policies/advisory_circulars/).
- Canadian Aviation Regulations (CARs), Part V (Airworthiness), Standard 571 (Maintenance), 1 December 2010 (<https://www.tc.gc.ca/en/transport-canada/corporate/acts-regulations/regulations/sor-96-433/part5-standards-571s-1827.htm>).
- BEA report — Triggered transmission of flight data working group, 18 March 2011 (https://www.bea.aero/uploads/tx_elyextendttnews/triggered.transmission.of.flight.data.pdf).
- ATSB Transport safety report — MH370 — Definition of underwater search areas, 18 August 2014, and update of 3 December 2015 (<https://www.atsb.gov.au/mh370/>).
- ATSB Transport safety report — MH370 — Flight path analysis, update, 8 October 2014 (<https://www.atsb.gov.au/mh370/>).
- ATSB Transport safety report — The operational search for MH370, 3 October 2017 (<https://www.atsb.gov.au/mh370/>).
- Ministry of Transport of Malaysia, Safety investigation report, Malaysia Airlines Boeing B777-200ER (9M-MRO), 8 March 2014, by the Malaysian ICAO Annex 13 safety investigation team for MH370, 2 July 2018 (<http://www.mot.gov.my/en/>).
- BEA sea search operations — Accident on 1st June 2009 to the Airbus A330-203 registered F-GZCP (<https://www.bea.aero/en/investigation-reports/notified-events/detail/event/accident-de-lairbus-a330-203-immatricule-f-gzcp-et-exploite-par-air-france-survenu-le-01062009-da/>).
- EUROCAE Document 112A — Minimum operational performance specification for crash protected airborne recorder systems, September 2013.
- EUROCAE Document 237 — Minimum aviation system performance specification for criteria to detect in-flight aircraft distress events to trigger transmission of flight information, February 2016.
- EUROCAE Document 62B including Change 1 — Minimum operational performance standard for aircraft emergency locator transmitters, 406 MHz, June 2020.
- RTCA DO 204B — Minimum operational performance standard for aircraft emergency locator transmitters, 406 MHz, December 2018.
- COSPAS-SARSAT C/S T.001 — Specification for COSPAS-SARSAT 406 MHz distress beacons, issue 4, revision 6, May 2020 (<http://www.cospas-sarsat.int/en/documents-pro/system-documents>).
- COSPAS-SARSAT C/S T.007 — COSPAS-SARSAT 406 MHz distress beacon type approval standard, issue 5, revision 5, May 2020 (<http://www.cospas-sarsat.int/en/documents-pro/system-documents>).
- COSPAS-SARSAT C/S T.018 — Specification for second-generation COSPAS-SARSAT 406-MHz distress beacons, issue 1, revision 6, May 2020 (<http://www.cospas-sarsat.int/en/documents-pro/system-documents>).



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- COSPAS-SARSAT C/S T.019 — COSPAS-SARSAT MEOLUT performance specification and design guidelines, issue 2, revision 4, November 2019 (<http://www.cospas-sarsat.int/en/documents-pro/system-documents>).
 - COSPAS-SARSAT C/S A.001 — COSPAS-SARSAT data distribution plan (DDP), issue 8, revision 3, May 2020 (<http://www.cospas-sarsat.int/en/documents-pro/system-documents>).
 - COSPAS-SARSAT C/S A.003 — COSPAS-SARSAT system monitoring and reporting, issue 3, revision 2, November 2019 (<http://www.cospas-sarsat.int/en/documents-pro/system-documents>).
 - COSPAS-SARSAT C/S A.005 — COSPAS-SARSAT Mission control centre (MCC) performance specification and design guidelines, issue 5, revision 2, May 2020 (<http://www.cospas-sarsat.int/en/documents-pro/system-documents>).
 - COSPAS-SARSAT R.007 — Report on System Status and Operations, issue 35, November 2019 (<http://www.cospas-sarsat.int/en/documents-pro/system-documents>).
 - COSPAS-SARSAT C/S R.012 — COSPAS-SARSAT 406 MHz MEOSAR implementation plan, issue 1, revision 15, November 2019 (<http://www.cospas-sarsat.int/en/documents-pro/system-documents>).



5. Related document

CRD 2020-03 'Amendment of requirements for flight recorders and underwater locating devices — Certification specifications, acceptable means of compliance, and guidance material for locating an aircraft in distress' will be published at a later stage.

