The European Organisation for Civil Aviation Equipment
L'Organisation Européenne pour l'Equipement de l'Aviation Civile

MINIMUM AVIATION SYSTEM PERFORMANCE SPECIFICATION

FOR IN-FLIGHT EVENT DETECTION AND TRIGGERING CRITERIA

The following provides an overview and selected extracts of draft EUROCAE Document ED-237 'Minimum Aviation System Performance Specification for in-flight event detection and triggering criteria', currently under development by EUROCAE WG-98 'Aircraft Emergency Locator Transmitters'.

The draft is expected to be submitted to the EUROCAE Open Consultation in September 2015, and finalized before the end of the year. EUROCAE Council approval and publication are expected in January/February 2016

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ED-237

[Month Year]

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FOREWORD

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TABLE OF CONTENTS

DRAFT

LIST OF FIGURES

LIST OF TABLES

DRAFT

CHAPTER 1

INTRODUCTION

1.1 PURPOSE AND SCOPE

This document defines the minimum specification to be met for all aircraft required to carry a system which can be used to trigger, from on-board equipment in-flight, the transmission of sufficient information for the purpose of locating an accident site.

This document contains minimum aviation system performance specifications for in-flight event detection and triggering criteria. They specify characteristics that should be useful as guidance material to regulatory authorities, designers, installers, manufacturers, service providers and users of systems intended for operation.

Compliance with these specifications is recommended as one means of assuring that the system and each subsystem will perform its intended function(s) satisfactorily under conditions normally encountered in routine aeronautical operations for the environments intended. The MASPS may be implemented by one or more regulatory documents and/or advisory documents (for example certifications, authorisations, approvals, commissioning, advisory circulars, notices) and may be implemented in part or in total. Any regulatory application of this document is the sole responsibility of appropriate governmental authorities.

1.2 GENERAL

A number of fatal accidents have occurred in which:

- ELTs have not operated efficiently (i.e. antenna disconnected from the ELT or not oriented properly e.g, aircraft upside down), have been destroyed during the crash or just after due to a post-crash fire or have been submerged into water. Such situations strongly jeopardize the efficiency of the Rescue mission as no distress position is provided by the ELTs. Given the unpredictable nature of aircraft accidents and the inherent difficulty of reliably providing a distress signal once an aeroplane or helicopter has impacted a surface, the transmission of a distress signal prior to the accident has therefore been considered as a way to significantly improve the reliability of ELTs.
- It has taken a significant amount of time to recover flight recorders, or they have been unrecoverable. This delay in recovery or loss of recorders greatly reduces the likelihood of the actual cause of these accidents being discovered. For this reason, in order to improve the recovery of wreckage and flight recorders following an accident or incident, the concept of in-flight event detection and triggered transmission of sufficient information to locate the accident site is deemed worthwhile.

1.2.1 ICAO ACTIVITIES

In 2015, ICAO published a Concept of Operations (ConOps) document that specifies the high level requirements and objectives for a Global Aeronautical Distress and Safety System (GADSS). It was intended to apply to commercial air transport operations (Annex 6 Part 1 applicability) initially. However, the GADSS document takes an overall system approach and consequently is not restrictive to a particular type of operation. The implementation of this target concept has implications for the provision of services such as air traffic control, search and rescue and accident investigation.

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Responding to the requirements and objectives, the GADSS specifies a high level system with a description of users and usages of flight track information during all phases of flight, both normal and abnormal flight conditions including timely and accurate positioning of an aircraft in distress. The GADSS does not prescribe specific technical solutions for Aircraft tracking but provides a framework of scenarios that can be used to verify whether a specific solution complies with the Concept. The GADSS includes a roadmap outlining the steps necessary to move from today's system to the target concept.

The implementation of this GADSS shall in particular enhance the ability to rescue survivors and ensure that the location of an accident site can be identified to a degree of accuracy, in a timeframe and to a level of confidence acceptable to the stakeholders.

As a consequence, the GADSS shall be capable of transmitting aircraft tracking data from the aircraft under all circumstances and assist the Search And Rescue services and accident investigation authorities in locating the wreckage and flight data recorders.

One of the main system components is the development of Autonomous Distress Tracking (ADT) System. The intent of this ADT System is to use on board systems that can broadcast 4D position, or distinctive distress signals from which the 4D position can be derived, on protected frequencies and, depending on its application on each aircraft, to be automatically activated or manually activated at any time.

In case of false alarm or recovery from a distress phase the ADT needs to be de-activated, however, the deactivation can only be done by the activating mechanism.

Autonomous Distress Tracking (ADT) operates independently from aircraft tracking and may be activated in case of failure or risk of failure of the related aircraft tracking systems.

The performance specifications for the in-flight event detection and triggering criteria to be used are detailed in this MASPS ED-237.

The triggered transmission of flight information based on real time analysis of flight parameters by on-board equipment is a well-established mechanism. Such systems have already been developed and deployed with airlines for maintenance and monitoring purposes.

The concept of in-flight event detection and triggering of transmission of flight information consists of:

- Detecting, using flight parameters, whether an accident situation is likely. If so,
- Broadcasting aircraft position, or distinctive distress signals from which the position can be derived, until either the emergency situation ends, or the aircraft impacts the surface, to localize the position of the aircraft in distress.

The overall objective of this specification is to make sure that the criteria used to trigger in-flight transmission maximises the probability of in-flight detection of an upcoming catastrophic event and minimises the probability of nuisance triggered transmission.

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This MASPS is intended to define in-flight event detection and triggering criteria that can be used to activate the transmission of information used to locate an aircraft that is experiencing an event that, if left uncorrected, would likely result in an accident. Similar logic also applies to the detection of the return to normal flight and triggering the notification of the end of the distress condition.

However, this MASPS does not define the mechanism or technology used to perform the transmission, or the content of that information. It is performance based and does not preclude the development of new architecture.

1.2.2 SECOND GENERATION ELT

Cospas-Sarsat is implementing a new MEOSAR system based on the use of search and rescue transponders on new GPS, GLONASS, and GALILEO satellites and accompanied new ground segment. This new MEOSAR system will significantly improve the timeliness and accuracy of alerts provided by ELTs and allow for new services to be provided (e.g. return link services). In conjunction with the new MEOSAR system, Cospas-Sarsat is developing a new second-generation beacon specification which would be designed to better take advantage of the new MEOSAR system. The new location determination methodology used for the MEOSAR System will also allow revisiting some of the current beacon requirements such as first burst delay, burst repetition rates and antenna characteristics, to take advantage of the enhanced capability of MEOSAR to provide an early location.

The MEOSAR system will provide several possible transmission paths for relaying data to the ground segment therefore and therefore be less susceptible to ELT antenna orientation. Furthermore, an ELT transmission containing an encoded location would have a high probability of being relayed to the ground system via at least one of the many satellite paths available even if the aircraft is in an unusual orientation.

Effectively, this means that the MEOSAR system might be able to offer two robust independent methods for forwarding an aircraft position to RCCs and SPOC prior to an aircraft accident i.e. using FOA and TOA measurements and via the transmission of an encoded location. This could significantly reduce the False Negative Rate of ELTs and enhance SAR and recovery operations in many aviation related distress events.

A revision of ED-62A standard for first generation beacons and the creation of specifications for second generation beacons are required in order to ascertain if it is sufficient for application to all aircraft or is under- or over-prescriptive.

A number of recommendations resulted from the studies, in particular it was recommended that EASA and ICAO define the regulatory requirements for a new generation of ELTs that can be triggered in-flight.

GNSS technology allows ELTs to provide accurate accident positioning to first responders. Development of standardized GNSS requirements for use in ELTs will be addressed.

In parallel to these requirements the ED-62A Minimum Operational Performance Specifications have been improved to detail specifications for second generation ELT.

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1.3 DESCRIPTION OF CONTENT

Chapter 1 of this document describes the in-flight activation criteria and provides information helpful to understand the rationale for the system characteristics. This chapter describes typical applications, operational goals and establishes the basis for the specifications provided in Chapters 2 through 4 of the document. Definitions and assumptions essential to a proper understanding of this document are also provided in this chapter.

Chapter 2 describes the overall in-flight event detection and triggering criteria system.

Chapter 3 contains the minimum performance specifications for in-flight event detection and triggering criteria logic and the list of potential in-flight triggering criteria. These specifications specify the required performance under the standard environmental conditions described.

Chapter 4 describes the test procedures to verify system performance compliance and that subsystem performance meets the minimum performance requirements in Chapters 2 and 3.

The word “subsystem” as used in this document includes all components that make up a major independent, necessary and essential functional part of the system so that the system can properly perform its intended function(s).

1.4 OPERATIONAL APPLICATIONS

In addition to supporting Search And Rescue operations and accident investigations, triggered or regular transmission of flight information can also assist aircraft operators to improve their flight operations procedures, increase efficiency and save cost.

The benefit for airlines of such systems may be to establish location of the aircraft almost instantaneously while in distress.

1.5 TRIGGERING SYSTEM

The list of systems that could potentially transmit the flight information could include but are not limited to second-generation ELT or other systems (e.g. ACARS, ADS-C…).

The system use to transmit the flight information while an aircraft is in distress may have to comply with requirements defined in regulatory documents like ICAO Annex 6.

1.6 VERIFICATION PROCEDURES

The verification procedures specified in this document are intended to be used as guidance for demonstrating that the in-flight event detection and triggering logic meets the performance requirements. Although specific test procedures are cited, it is recognised that other methods may be used. Alternate procedures may be used if it can be demonstrated that they provide at least equivalent performance.

1.7 MANDATING AND RECOMMENDATION PHRASES

Normal EUROCAE statements

1.8 COMMON DEFINITIONS AND ABBREVIATIONS

The definitions and abbreviations of ICAO Annex 5, Annex 6 and Annex 10 are applicable.

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1.8.1 DEFINITION OF TERMS

List of definition included

1.8.2 ABBREVIATIONS

List of abbreviations included

1.8.3 LIST OF REFERENCE DOCUMENTS

List of reference documents

1.8.4 RELATED DOCUMENTS

BEA Triggered Transmission of Flight Data Report dated 18 March 2011

ICAO Global Aeronautical Distress & Safety System (GADSS), 2015

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CHAPTER 2

OVERALL SYSTEM

2.1 INTRODUCTION

This chapter identifies general specifications and design considerations for the in-flight event detection and triggering criteria logic.

The model description below does not imply any particular system architecture employed on board the aircraft.

2.2 MODEL DESCRIPTION

The components of an in-flight event detection and triggering criteria system can be broken down into individual functional blocks that have unique inputs and outputs. Each functional block is depicted in Figure 2-1 and is defined in paragraph 2.2.1. This MASPS deals primarily with the "In-flight event detection and triggering criteria" functional block.

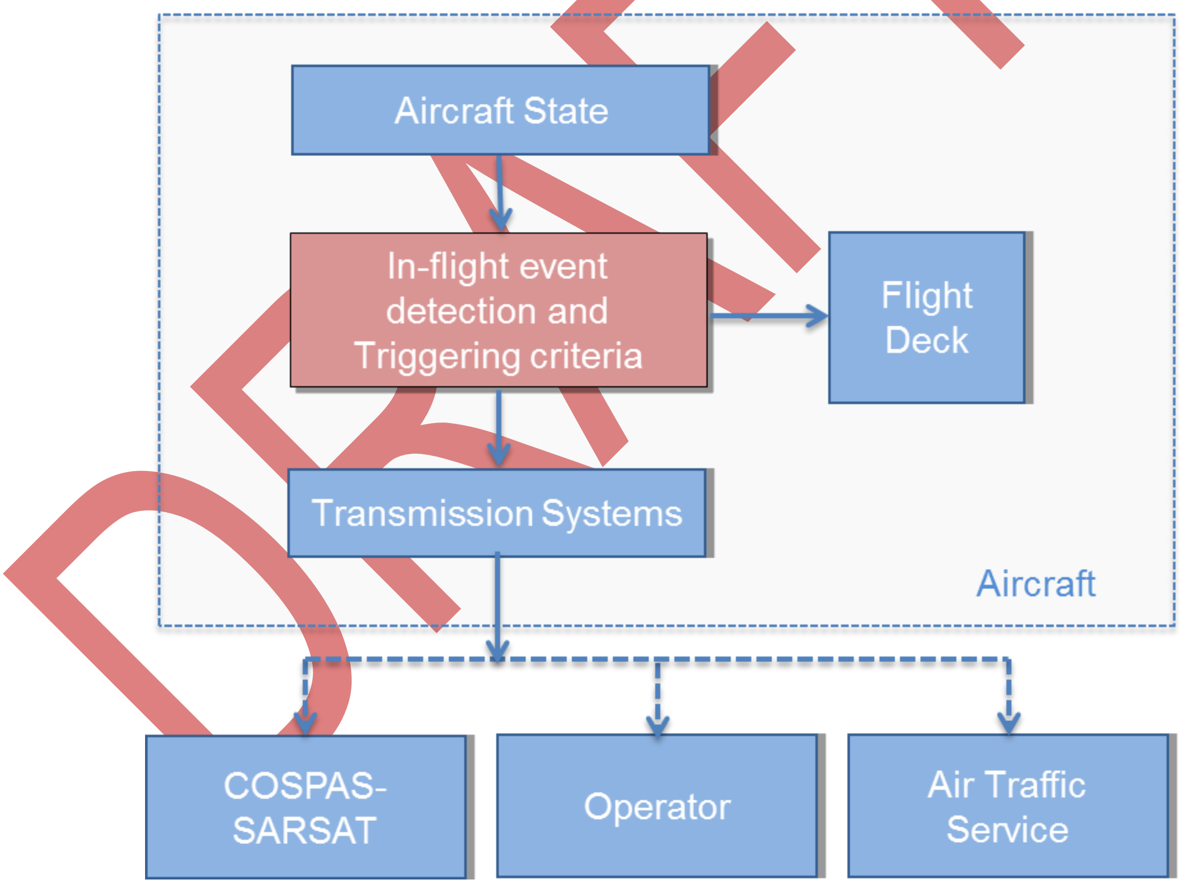

Figure 2-1: In-flight event detection and triggering criteria System Model

2.2.1 DESCRIPTION OF THE FUNCTION BLOCKS

2.2.1.1 Aircraft State

This block includes inputs to the triggering logic which can be used to identify a change of state of the aircraft. These can include, but are not limited to, airspeed or attitude. Sources of the inputs are on-board avionic/electronic systems.

2.2.1.2 In-Flight Event Detection and Triggering Criteria

This block comprises the algorithms which perform logic operations to apply the triggering criteria upon the information received pertaining to the aircraft state. The result is to trigger activation of transmission, to trigger the notification of deactivation of transmission, or to take no action.

2.2.1.3 Flight Deck

These include all flight crew indications which inform the crew of the trigger activation status and/or transmission status.

2.2.1.4 Transmission Systems

This block represents the various communication systems which may exist on the aircraft that are used to communicate with the outside world. It may include, but is not limited to HF, ELT, VHF, Satcom,...

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CHAPTER 3

TRIGGERING LOGIC PERFORMANCE

3.1 INTRODUCTION

The purpose of this section is to define the in-flight event detection and triggering criteria logic performance. Compliance with this specification is recommended as one means of assuring the logic will perform its intended function satisfactorily under normal operating conditions.

The in-flight event detection and triggering criteria logic shall be designed to process data pertaining to aircraft status and provide output(s) information to transmission system(s). The specification provides a minimum set of scenarios to be detected by a triggering logic.

Automatic cancellation triggering criteria system logic shall be designed to stop transmitting information to transmission system(s).

3.2 TRIGGERING CRITERIA

The set of triggering criteria should maximize the detection of potential accidents, while limiting nuisance triggering during normal flight conditions. Examples of parametric conditions are detailed in Appendix 2.

The following set of scenarios is an estimation of what may constitute an impending accident. Manufacturers may decide to create additional scenarios. Nuisance triggers shall be evaluated for each of them and these scenarios should not impair the overall efficiency and/or reliability of the system which may discredit the system.

3.2.1 SCENARIO

A scenario can be defined by one or more criteria.

A wide range of situations can be precursors to accidents.

The scenarios listed below represent the minimum set of situations which should be detected by an algorithm, individually and/or in combination, and used to trigger the transmission of sufficient information for the purpose of locating an accident site.

Each scenario can be identified by a set of conditions that, if left uncorrected, would likely result in an accident. Persistence time for each condition shall be assessed to help limit nuisance triggers.

Different parametric value maybe selected depending of the type of aircraft.

Scenario 1: Unusual attitude beyond which the recovering of a safe attitude is unlikely: This scenario may comprise excessive roll value or excessive pitch value or yaw rate or combination of roll/pitch value and roll/pitch rate.

Scenario 2: Unusual speed conditions: this scenario may comprise excessive vertical speed or stall condition or low airspeed or overspeed or combination of various speed condition.

Scenario 3: Unusual Altitude: Inadvertent closure to terrain that, if left uncorrected, would likely result in an accident.

Scenario 4: Total loss of thrust/propulsion on all engines.

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Scenario 5: in-flight inhibition of the event detection and triggering criteria logic.

3.2.2 PERSISTENCE TIME

The persistence time is the duration for which the condition is true before triggering a transmission signal.

The persistence time for each criteria should be balanced to trigger a transmission in the greatest number of accidents possible while limiting the number of nuisance triggers.

3.2.3 AUTOMATIC CANCELLATION TRIGGER

Work in progress

3.2.4 NUISANCE TRIGGER

Work in progress

3.2.5 INTEGRITY AND AVAILABILITY

Work in progress

3.2.6 SOFTWARE AND HARDWARE DESIGN

Work in progress

3.3 INTERFACE WITH TRIGGERED SYSTEM

3.3.1 INFORMATION IN THE TRIGGER

Work in progress

3.3.2 AUTOMATIC CANCELLATION

Work in progress

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CHAPTER 4

PROCEDURES FOR PERFORMANCE REQUIREMENT VERIFICATION

4.1 INTRODUCTION

Work in progress

4.2 PERFORMANCE VERIFICATION OF TRIGGERING CRITERIA

Work in progress

4.2.1 VERIFICATION OF INTEGRITY AND AVAILABILITY

Work in progress

4.2.2 DATABASE

A database of flight datasets from commercial air transport aeroplanes that contains real accidents and incidents datasets will be available. Accident datasets are referenced in the database as A<number> and incident flights as I<number>.

The accident datasets were provided by official investigation authorities.

The datasets were de-identified, as no date or latitude/longitude parameters were provided. Information about aircraft type, phase of flight and occurrence is available for each file of the database. See Appendix 1 for details

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APPENDIX 1

DATABASE INFORMATION

Num	Flight Phase	Occurrence Category ID	Occurrence Description
A001	Approach	LOC-I	Loss of Control In Flight
A002	Approach	CFIT	Controlled Flight Into Terrain
A003	Climb	CFIT	Controlled Flight Into Terrain
A004	Approach	CFIT	Controlled Flight Into Terrain
A005	Climb	LOC-I	Loss of Control In Flight
A006	Cruise	LOC-I	Loss of Control In Flight
A007	Approach	CFIT	Controlled Flight Into Terrain
A008	Climb	ICE	Icing
A009	Climb	F-NI	Fire/Smoke (Non-Impact)
A010	Climb	SCF-NP	System/Component failure or malfunction (non-powerplant)
A011	Cruise	ICE	Icing
A013	Cruise	SCF-NP	System/Component failure or malfunction (non-powerplant)
A014	Climb	SCF-PP	System/Component failure or malfunction (powerplant)
A015	Climb	CFIT	Controlled Flight Into Terrain
A016	Approach	LOC-I	Loss of Control In Flight
A018	Cruise	LOC-I	Loss of Control In Flight
A019	Climb	LOC-I	Loss of Control In Flight
A020	Climb	LOC-I	Loss of Control In Flight
A021	Climb	LOC-I	Loss of Control In Flight
A022	Cruise	MAC	Airprox/TCAS/Loss of Separation/Mid-Air Collision
A023	Climb	CFIT	Controlled Flight Into Terrain
A024	Takeoff	ICE	Icing
A025	Approach	LOC-I	Loss of Control In Flight
A026	Climb	MAC	Airprox/TCAS/Loss of Separation/Mid-Air Collision
A027	Approach	LOC-I	Loss of Control In Flight
A028	Approach	CFIT	Controlled Flight Into Terrain
A029	Cruise	LOC-I	Loss of Control In Flight
A030	Cruise	LOC-I	Loss of Control In Flight
A031	Approach	LOC-I	Loss of Control In Flight
A032	Climb	CFIT	Controlled Flight Into Terrain
A033	Approach	AMAN	Abrupt Maneuvre
A034	Approach	CFIT	Controlled Flight Into Terrain
A035	Cruise	SCF-NP	System/Component failure or malfunction (non-powerplant)
A036	Approach	CFIT	Controlled Flight Into Terrain
A037	Climb	CFIT	Controlled Flight Into Terrain
A038	Approach	CFIT	Controlled Flight Into Terrain
A039	Climb	LOC-I	Loss of Control In Flight
A040	Approach	LOC-I	Loss of Control In Flight
A041	Cruise	LOC-I	Loss of Control In Flight
A042	Cruise	LOC-I	Loss of Control In Flight
A043	Climb	LOC-I	Loss of Control In Flight
A044	Cruise	SCF-NP	System/Component failure or malfunction (non-powerplant)

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Num	Flight Phase	Occurrence Category ID	Occurrence Description
A045	Approach	LOC-I	Loss of Control In Flight
A046	Approach	CFIT	Controlled Flight Into Terrain
I001	Approach	LOC-I	Loss of Control In Flight
I002	Climb	ICE	Icing
I003	Cruise	LOC-I	Loss of Control In Flight
I004	Cruise	TURB	Turbulence Encounter
I005	Cruise	LOC-I	Loss of Control In Flight
I006	Cruise	LOC-I	Loss of Control In Flight
I007	Approach	LOC-I	Loss of Control In Flight
I008	Climb	SCF-NP	System/Component failure or malfunction (non-powerplant)
I009	Approach	ICE	Icing
I010	Approach	FUEL	Fuel related
I011	Approach	ICE	Icing
I012	Approach	TURB	Turbulence Encounter
I013	Approach	LOC-I	Loss of Control In Flight
I014	Cruise	SCF-NP	System/Component failure or malfunction (non-powerplant)
I015	Climb	SCF-NP	System/Component failure or malfunction (non-powerplant)
I016	Cruise	SCF-NP	System/Component failure or malfunction (non-powerplant)
I017	Approach	LOC-I	Loss of Control In Flight
I018	Cruise	ICE	Icing
I019	Approach	LOC-I	Loss of Control In Flight
I020	Approach	UNK	Unknown or undetermined
I021	Approach	UNK	Unknown or undetermined
I022	Approach	MAC	Airprox/TCAS/Loss of Separation/Mid-Air Collision
I023	Climb	MAC	Airprox/TCAS/Loss of Separation/Mid-Air Collision
I024	Cruise	ICE	Icing

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APPENDIX 2

EXAMPLES OF SET OF CRITERIA

The Triggered Transmission of Flight Data WG performed a study proving that criteria based on a limited set of recorded flight parameters can detect 100% of accidents and incidents from the database.

The study also showed that these same criteria can be adjusted so that close to no nuisance transmission would be generated.

Two sets of set of criteria dedicated to fixed-wing commercial air transport aircraft are inserted in this document. The complete study can be downloaded at the following address: http://www.bea.aero/en/enquetes/flight.af.447/reports.php .

An example of set of criteria was provided by a Helicopter manufacturer.

TABLE 1.1: AEROPLANES

Criteria Type	Criteria Name	Equation	Persistence time
Unusual attitude	Excessive Bank	{|Roll|>50°} **OR** {|Roll|>45° **AND** |Roll rate|>10°/s}	2 sec
	Excessive Pitch	{Pitch>30°} **OR** {Pitch<-20°} **OR** {Pitch>20° **AND** Pitch rate>3°/s} **OR** Pitch<-15° **AND** Pitch rate<-3°/s}	2 sec
Unusual speed	STALL	STALL Warning=TRUE	1 sec
	Low CAS	{CAS<100kt(*) **AND** Radio altitude>100 ft} *(*) 60 kt for DHC-6*	2 sec
	Excessive Vertical speed (V/S)	{|V/S|>9000 ft/min}	2 sec
	Overspeed	{IAS>400kt} **OR** {OVERSPEED Warning = TRUE **AND** Alt<15000 ft}	2 sec
Excessive accelerations	Unusual load factors	{ nz>2.6g OR nz<-1.1g } **OR** {|ny|>0.25g}	2 sec
Control command inputs	Excessive roll command	{|Captain Roll cmd|>50 **OR** |F/O Roll cmd|>50 } **AND** {IAS>80 kt}	2 sec
	Excessive use of	{|Rudder position|>6° **AND**	2 sec

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	rudder	IAS>240 kt}	
Ground Proximity	TAWS warning	TAWS warning/alert = TRUE	1 sec
	Too low altitude (poor altitude gain after takeoff)	{40<Radio Altitude<100 **AND** Eng1N1>80% **AND** Eng2N1>80%}	10 sec
Others	TCAS	TCAS RA = TRUE	1 sec
	Cabin Altitude Warning	CABIN ALT WARNING = TRUE	10 sec

TABLE 1.2: AEROPLANES

Unsafe event	Corresponding criteria approach
Excessive pitch	{Pitch>30°} **OR** {Pitch<-20°} **OR** {Pitch>20° **AND** Pitch rate>3°/s} **OR** Pitch<-15° **AND** Pitch rate<-3°/s}
Excessive roll	{roll>60°} **OR** {Roll>45° **AND** Roll rate>10°/s} **AND** Roll*RollRate >0
Stall	STALL Warning=TRUE
Low speed	{CAS<100kt(*) **AND** A/C in flight
Excessive Vertical Speed	{|V/S|>10000 ft/min}
Overspeed	{CAS>Diving Speed} **OR** {MACH>Diving Mach}
Excessive accelerations	{nz>2.6g OR nz<-1.1g} **OR** {|ny|>0.4g}
Ineffective command	Captain or F/O Roll (resp pitch) full order recorded for more than 3 s with no associated roll (resp pitch) rate
Undue use of rudder	Rudder Pedal max deflection AND no engine failure
Ground Proximity	TAWS warning/alert = “PULL UP”
Others	TCAS RA = TRUE

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TABLE 1.3: HELICOPTERS

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APPENDIX 3

HISTORY AND TERMS OF REFERENCE OF WG-98

4.3 BACKGROUND AND SCOPE

A number of fatal accidents have occurred overwater, including Air France flight 447, in which flight data and cockpit voice recorders have been very long to recover. As the long or non-recovery of recorders greatly reduces the likelihood of the actual cause of these accidents being discovered, and in order to improve the recovery of wreckage and flight recorders following an accident or incident, ED-62A has defined a performance standard for ELTs. The application and requirement specified in this standard have yet be applied by EASA or industry.

Cospas-Sarsat is implementing a new MEOSAR system based on the use of search and rescue transponders on new GPS, GLONASS, and GALILEO satellites and accompanied new ground segment. This new MEOSAR system will significantly improve the timeliness and accuracy of alerts provided by ELTs and allow for new services to be provided (e.g. return link services). In conjunction with the new MEOSAR system, Cospas-Sarsat is developing a new second generation beacon specification.

A review and possible revision of ED-62A standard for first generation beacons and the creation of specifications for second generation beacons are required in order to ascertain if it is sufficient for application to all aircraft used in commercial operations or is under- or over-prescriptive.

A number of recommendations resulted from the studies, in particular it was recommended that EASA and ICAO define the regulatory requirements for a new generations of ELTs.

GNSS technology allows ELTs to provide accurate accident positioning to first responders. Development of standardized GNSS requirements for use in ELTs will be addressed.

Improvement in technology allows the committee to consider specifications for next generation ELTs able to operate on 406 MHz for the homing device to support search and rescue authorities,

Analysis of recent aircraft accidents shows a trend of ELTs breaking free from flexible mounting designs during accidents, preventing the ELT from performing its intended function.

Prior to these requirements there is a need to improve the ED-62A Minimum Operational Performance Specifications and to create a MASPS defining the triggering criteria.

4.4 WORKING GROUP OBJECTIVES

The working group is to provide a draft revision of ED-62A Minimum Operational Performance Specification for Aircraft Emergency Locator Transmitters as applicable.

A MASPS covering the function that would trigger ELT transmission, defining some high level concepts and the typical functional interface requirements between the ELT and the emergency triggering element.

During the development of these documents, the following areas should be addressed:

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- Invite participation from interested parties, specifically including manufacturers, Search and Rescue Satellite Aided Tracking (SARSAT) agencies, and aircraft operators,
- Review Cospas-Sarsat beacon requirements, and from an aviation perspective, develop technical standards for both first and second generation Cospas-Sarsat 406MHz beacon systems,
- Introduce next generation ELTs specifications,
- GNSS specifications,
- In-flight activation/deactivation specifications,
- Power source specifications,
- Crash safety specifications,
- Return link services specifications,
- Second generation homing specifications Improved Antenna and Cabling Specifications,
- Develop aviation-based 406 MHz MEOSAR distress alerting and location proposals/papers for consideration by Cospas-Sarsat Task Groups and/or Joint committee covering topics related to second generation 406 MHz ELTs as required.
- Define the frequency of transmission of data and applicable parameters.

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APPENDIX 4

WG-98 MEMBERSHIP

Will be updated just before the publication of the document

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