

TECHNICAL GUIDANCE MATERIAL

for

Location of an Aeroplane In Distress

SUBJECT: LOCATION OF AN AEROPLANE IN DISTRESS

EFFECTIVE DATE: 17 February 2023

APPLICABILITY

The aviation community to the potential hazards of inadvertent mixing or contamination of turbine and piston fuels and provides recommended fuel control and servicing procedures.

PURPOSE

This TGM alerts the aviation community with the location of an aeroplane in distress aims at establishing, to a reasonable extent, the location of an accident site within a 6 NM radius.

When an aeroplane has an accident into water and becomes submerged, the location of the accident site within a 6 NM radius on the surface becomes more important. Starting the initial search area beyond a 6 NM radius reduces the amount of time available to search for and locate the aeroplane.

At current estimated underwater search capabilities of 100 km²/day, an area with a 6 NM radius could be searched in four days. Allowing for naval assets to reach the search area and conduct the search, it is estimated that an area of 2 300 km², equivalent to a radius of 14 NM, will be able to be searched before the ULD battery degrades. Starting at an area of more than 6 NM radius reduces the probability of a successful location during an initial search, whilst extending the location requirement beyond 6 NM radius reduces the time available to search with no appreciable gain in the probability of recovery.

REQUIREMENTS

South African Civil Aviation Regulations (SACAR) for aircraft under 91, 93, 121, 127, 135.

1. REFERENCE:

- i. ICAO ANNEX 6 for Operation of Aircraft
- ii. ICAO ANNEX 11 for Emergency phase criteria
- iii. ICAO ANNEX 12, for Required notifications in the event of an emergency phase
- iv. EUROCAE ED-237 for minimum aviation system performance specification for criteria to detect in-flight aircraft distress events to trigger transmission of flight information.

2. TERMS AND ABBREVIATIONS:

ABBREVIATION	DESCRIPTION
ELT	Emergency Locator Transmitter
MASPS	Minimum Aviation System Performance Specification
RCC	rescue coordination centre(s)
SAR	Search and Rescue
ULD	Underwater Locator Device

3. GENERAL

3.1 BACKGROUND.

- 3.1.1 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.
- 3.1.2 It shall also be possible for this transmission to be activated manually.
- 3.1.3 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.
- 3.1.4 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.
- 3.1.5 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.
- 3.1.6 The operator shall be alerted when an aircraft is in a distress condition with an acceptable low rate of false alerts.
- 3.1.7 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.

- 3.1.8 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.
- 3.1.9 South Africa has identified the organizations that will require the position information of an aircraft in an emergency phase. These are, as a minimum:
- Air Traffic Service Unit(s) (ATSU); and
 - 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.

- 3.1.10 When autonomous transmission of position information has been activated, it shall only be able to be deactivated using the same mechanism that activated it.
- 3.1.11 The accuracy of position information shall, as a minimum, meet the position accuracy requirements established for ELTs.

3.2 CLARIFICATION OF PURPOSE OF EQUIPMENT




- 3.2.1 Information from which a position can be determined: Information from an aircraft system which either is active or, when automatically or manually activated, can provide position information which includes a time stamp. This performance-based requirement is not system-specific and may also bring operational benefits.
- 3.2.2 Emergency locator transmitter (ELT): The current generation of ELTs was designed to provide the position of impact for a survivable accident. The next generation of ELTs may have the capability to activate a transmission in flight when any of the conditions detailed in EUROCAE ED-237, Minimum Aviation System Performance Specification (MASPS) for Criteria to Detect In-Flight Aircraft Distress Events to Trigger Transmission of Flight Information are met. When an ELT sinks below the surface of water, its signal is not detectable.
- 3.2.3 Automatic deployable flight recorder (ADFR): The purpose of an ADFR is to have flight recorder data available soon after an accident, in particular for accidents over water. The integrated ELT provides for both locating the accident site for accident investigation and search and rescue purposes. Being floatable, it will assist in locating the accident site by providing an ELT signal when the wreckage sinks below the surface of the water. It also ensures redundancy for one ELT.
- 3.2.4 Underwater locator device (ULD): A ULD operating at a frequency of 8.8 kHz is attached to the airframe to locate aeroplane wreckage below the surface of the water when an ELT signal is not possible to detect. The ULDs operating at 37.5 kHz are attached to the flight recorders and are used for locating the flight recorders underwater.

3.3 EQUIPAGE COMPLIANCE

- 3.3.1 The advancement of technology has made it possible to meet the equipage requirements by different means. Table below provides examples of compliance.
- 3.3.2 In such potential installations, the cost will be minimized, and the effectiveness of the current installation improved.

Table. Examples of compliance

Current In-service	After 1 January 2021
Two ELTs Two fixed recorders	<p data-bbox="810 264 1441 331">Application for type certification is submitted to a Contracting State</p> <p data-bbox="810 342 922 371">Example:</p> <p data-bbox="810 416 1445 517">A system from which a position can be determined; and one ADFR with an integrated ELT; and one combined recorder.</p> <p data-bbox="810 562 842 591">Or</p> <p data-bbox="810 636 1445 772">A system from which a position can be determined and one ELT and two fixed recorders and an additional means to retrieve flight recorder data in a timely manner.</p>

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