

The EUROCAE ED-62B contains minimum operational performance specifications for Emergency Locator Transmitters Distress Tracking ELT(DT), to ensure that they will meet the activation specifications, environmental test conditions, Cospas-Sarsat system requirements for satellite processing of a distress signal (primary alert) and not adversely affect aircraft operations.

This type of Distress Tracking ELT(DT) is designed to be activated prior to a crash upon detection of a distress condition by logic such as that defined by EUROCAE MASPS ED-237. This type of ELT(DT) is intended to provide information prior to the crash to aid in locating a crash site and/or survivor(s) and is not required to survive the impact.

GENERAL DESIGN SPECIFICATIONS

Controls and monitoring system on ELT(DT) unit

A means of automatically monitoring the ELT(DT) activation is required.

The ELT(DT) shall have a visual indicator and an aural indicator integral to the ELT(DT) unit indicating that the ELT(DT) system has been activated.

The controls on the ELT(DT) unit shall enable selection of at least the following functions: ON, OFF, ARMED, SELF-TEST, CANCELLATION.

Remote Control and Monitoring System

The flight crew in cockpit shall be informed that the ELT(DT) is activated while in-flight.

The flight crew shall be able to manually trigger the ELT(DT).

The flight crew shall be able to manually launch the ELTself-test. This self-test shall include the GNSS self-test.

The Remote Control shall not have the capability to switch off the ELT(DT) ("OFF" position). The monitoring system can be independent of the Remote Control.

The indicators and remote control should be continuously powered during aircraft operation. For this purpose, the indicators and remote control shall have a dedicated power source. An alternate power source (e.g., the aircraft's power source) may also be provided.

Fault tolerance

No combination of short or open circuits between the remote control, indicators, associated wiring and the airframe shall deactivate once the ELT(DT) unit has been activated.

Position source

ELT(DT) requires to transmit a GNSS position in the distress signal provided by either an internal/integral GNSS receiver or by an external one.

Power Source

The ELT(DT) unit shall have its own integral or internal power source and shall not be dependent upon any external power source for operation when transmitting. The ELT(DT) system shall be capable of activation and transmission transmission for the required duration without an external power source.

If designed to be user-replaceable, the power source shall not require any special tools, fixtures or soldering for installation in the field, and any interface connections shall be accomplished in a manner to ensure maximum reliability and preclude reversed polarity or incorrect installation. Provision shall be made to ensure the waterproofness of the ELT(DT) unit upon replacement of the power source.

The ELT(DT) may use aircraft electrical power source when available (ELT(DT) system minimum duration of continuous operation shall however be demonstrated with the ELT(DT) own internal/integral power source). The ELT(DT) performance for trigger transmission shall not be affected when the aircraft electrical power source is lost.

The ELT(DT) manufacturer shall establish a useful life and an expiration date for batteries.

For non-rechargeable Lithium batteries refer to RTCA DO-227().

The use of rechargeable batteries and their related charging system are not addressed in this standard. Manufacturers wishing to propose their use should refer to the appropriate approval authority. Relevant standards may include the following: For nickel-cadmium or lead acid batteries refer to RTCA DO-293(), For rechargeable lithium batteries refer to RTCA DO-311().

For all Lithium batteries, the composition, quantities and potential toxicity of gases produced by a full thermal runaway failure of the battery should be understood and considered in the battery selection and ELT(DT) design.

The manufacturer may provide for the use of the aircraft battery or any other supplemental power supply for remote control and/or monitor functions provided that other specifications of this document are not compromised.

The battery source shall provide sufficient capacity for a self-test to be conducted at least every 6 months.

Temperature and Altitude Ranges

The ELT(DT) shall meet the performance requirements of one of the following classes and altitude ranges for ELTs:

	<u>Class 0</u>	<u>Class 1</u>	<u>Class 2</u>
Low Operating Temperature	-55°C	-40°C	-20°C
High Operating Temperature	+70°C	+55°C	+55°C
Non-operating (stowed) Temperature range	-55°C to +85°C		
High Operating Altitude for ELT(DT)	15 200m (50 000ft)		
High Non-operating Altitude	15 200m (50 000ft)		

Waterproofness

The ELT(DT) unit, exclusive of water-activated batteries, shall be waterproof.

Software Control and Electronic hardware

Software design shall follow the guidelines specified in document ED-12()/DO-178().

Electronic hardware design shall follow the guidelines of ED-80/DO-254.

ELT(DT) functional specifications

The ELT(DT) shall only be triggered in flight phase.

The ELT(DT) shall be armed/disarmed upon reception of the corresponding signal from the automatic triggering system. Once armed, it shall have the means to automatically activate the ELT(DT) transmitter upon command from the automatic triggering system and radiate a signal through an antenna. ELT(DT) shall stop transmitting an alert signal and shall start transmitting a cancellation signal only when the cancellation command is from the same mechanism that activated it, as specified per C/S T.018 and T.001.

There shall be a means provided to disarm the ELT(DT) by authorized personnel when an aircraft is not moving, such that a signal from the automatic triggering system when the aircraft is stationary does not result in the activation of the ELT(DT), to avoid inadvertent activation during maintenance operation or flight tests for example.

Whatever its arming state, the ELT(DT) shall activate when manually triggered by the crew.

If the ELT(DT) is capable of being armed manually by the flight crew, this function shall not interfere with the ELT(DT) unit's ability to respond to trigger inputs and to transmit distress information.

For ELT(DT) with crash survivability, upon crash condition detection, the ELT(DT) shall continue 406 MHz satellite transmissions. The required endurance time for 406 MHz transmission shall be 24 hours for the combined flight and post-crash time.

There shall be a means provided to permit an authorized personnel or an external automatic system to disarm the ELT(DT), such that a signal from the automatic triggering system does not result in the activation of the ELT(DT). The intent is to avoid inadvertent activation during maintenance operation or flight tests for example.

An ELT(DT) shall transmit an encoded location.

A means shall be provided to inform the crew in the cockpit if the ELT(DT) is activated.

The ELT(DT) system shall incorporate an antenna for remote mounting. Means shall be provided to prevent antennas from interfering with normal operation of the aircraft or with its occupants. If the antenna is not attached directly to the ELT(DT) unit, it shall be connected to the ELT(DT) unit by means of a suitable RF cable resistant to accidental disconnection.

Required Interface Functions

An ELT(DT) shall be capable to interface to aircraft systems for the following functions (either as separate electrical discrete or coded on a digital bus).

- a) Receive a triggering command from the automatic triggering system.
- b) Provide an indication that an automatic trigger was received.

- c) Receive a cancellation command from the automatic triggering system. Loss of the automatic triggering command indication shall not be interpreted as a cancellation command.
- d) Provide an indication that an automatic trigger cancellation command was received.
- e) Continuously monitor the triggering command communications connection between the automatic triggering system and ELT(DT) unit. If that connection is lost while the ELT(DT) is armed the ELT(DT) shall be activated.
- f) Receive arm/disarm commands so that normal post-flight shutdown of the automatic triggering system will not cause the ELT(DT) to activate and that pre-flight activation of the ELT(DT) cannot occur.
- g) The arm/disarm mode is only applicable to automatic triggering. The manual activation is always available.
- h) Remote control and monitoring functions as described in Remote Control and Monitoring.
- i) Provide an indication that a manually or crash sensor activated trigger was cancelled.

External Antenna Cable

Materials and methods used in the manufacture of antenna cable systems shall meet or exceed the specifications of MIL-DTL-17 or equivalent.

Position Data

The ELT(DT) may provide an encoded position from either an internal, integral or external position source.

If an ELT(DT) provides position data then it shall meet all the encoded position data requirements specified in the Cospas-Sarsat document.

Any cabling used to connect the position source to the ELT(DT) shall meet the flame test specifications.

MINIMUM PERFORMANCE SPECIFICATIONS UNDER ENVIRONMENTAL TEST CONDITIONS

The environmental tests and performance specifications described in this chapter provide a laboratory means of determining the overall performance characteristics of the ELT(DT) system under conditions representative of those which may be encountered in actual operation.

Unless otherwise specified, the test procedures applicable to the determination of ELT(DT) system performance under environmental test conditions are contained in document EUROCAE ED-14G/RTCA DO-160G, "Environmental Conditions and Test Procedures for Airborne Equipment". Where this applies, reference is made to the relevant section of ED-14G/DO-160G.

The ELT(DT) system without crash survivability capability do not have to withstand the crash conditions, but need however to operate without adverse effect on the aircraft operation, and to withstand the normal flight conditions as well as to operate in the degraded environmental conditions experienced between the detection of the distress condition and the crash. As a result, shall meet the minimum conditions listed in the TABLE below, as well as the flame test defined.

MINIMUM ENVIRONMENTAL QUALIFICATION LEVEL TEST SEQUENCE FOR ELT(DT)

TESTS ACCORDING RTCA DO-160G/EUROCAE ED-14G		
CONDITIONS	SECTION	MINIMUM TEST CATEGORIES AND TEST CONDITIONS
Temperature and Altitude	4.0	A1. The ELT(DT) shall be activated before the test and the transmission performances shall not be affected by the test conditions.
Low Temperature	4.5.1	
High Temperature	4.5.2 & 4.5.3	
Altitude	4.6.1	
Decompression	4.6.2	A1. The decompression test to be performed at 50 000ft. The ELT(DT) system may not be transmitting during the test. The ELT(DT) system shall meet the aliveness test after the testing.
Overpressure	4.6.3	
Temperature Variation	5.0	B. the ELT(DT) shall be activated before the test and the transmission performances shall not be affected by the test conditions.
Humidity	6.0	C. The ELT(DT) system may not be transmitting during the test. The ELT(DT) system shall meet the aliveness test after the testing.

TESTS ACCORDING RTCA DO-160G/EUROCAE ED-14G		
CONDITIONS	SECTION	MINIMUM TEST CATEGORIES AND TEST CONDITIONS
Operational Shock and Crash Safety	7.0	Select adequate category for the system. The ELT(DT) system may not be transmitting during the test. The ELT(DT) system shall meet the aliveness test after the testing.
Vibration	8.0	R and H, The ELT(DT) shall be activated before the test and the transmission performances shall not be affected by the test conditions.
Waterproofness	10.0	W. The ELT system shall meet the aliveness test after the testing.
Magnetic Effect	15.0	B
Power Input	16.0	Applicable when supplied with aircraft power. Select adequate category for the system. The ELT(DT) shall be activated before the test and the transmission performances shall not be affected by the test conditions (both normal and abnormal operating conditions).
Voltage Spike	17.0	Applicable when supplied with aircraft power. Select adequate category for the system. The ELT(DT) shall be activated before the test and the transmission performances shall not be affected by the test conditions.
Audio Frequency Susceptibility	18.0	Applicable when supplied with aircraft power. Select adequate category for the system. The ELT(DT) system shall be transmitting and shall meet the aliveness test during the testing.
Induced Signal Susceptibility	19.0	Select adequate category for the system. The ELT(DT) system shall be transmitting and shall meet the aliveness test during the testing.
Radio Frequency Susceptibility	20.0	Select adequate category for the system. The ELT(DT) system shall be transmitting and shall meet the aliveness test during the testing.
Radio Frequency Emission	21.0	Select adequate category for the system. The ELT(DT) system shall be transmitting and shall meet the aliveness test during the testing.
Lightning Induced Transient Susceptibility	22.0	Select adequate category for the system. The ELT(DT) system shall meet the aliveness test after the testing.
Lightning Direct Effects	23.0	Antenna only.
Icing	24.0	Antenna only.
Electrostatic Discharge	25.0	A
Fire, Flammability	26.0	C
Flame	ED-62B §4.5.11	

INSTALLED EQUIPMENT performance

The ELT(DT) must be installed in accordance with the aircraft manufacturer's installation instructions approved by the approving authorities, the ELT(DT) manufacturer's installation instructions and applicable national regulations. Installation guidance can also be found in AMC 27.1470 and AMC 29.1470.

Use of the Installation Manual (IM)

The installation manual must include the statement "Install the ELT(DT) in accordance with this manual or practices approved or accepted by your regulatory authority". This will increase the likelihood that the ELT(DT) system will perform properly and reduce the likelihood of inadvertent activation.

Contacting Authorities Following Inadvertent Activation

The installation manual must state that installers and owners should contact local aviation authorities to report an inadvertent ELT(DT) activation to preclude unnecessary search and rescue activity. These instructions must indicate that the contact list can be found on Cospas-Sarsat website.

Cable Strain Relief

The installation manual must state that when the coaxial cable is installed using acceptable methods, techniques, and practices and the connectors mated, each end have appropriate cable strain relief, which is at least 15 cm, (6 in), of excess cable near to the ELT(DT) and the antenna.

ELT(DT) Antenna Cable Fire Protection

If the ELT(DT) antenna cable does not meet the flame test specifications in § 2.15 and 4.5.12 of this document, the installation manual must recommend adding a fire sleeve to the antenna cable that provides fire protection in accordance with ISO 2685 (Category "Fire resistant"), SAE AS1072/AS1055 (construction/performance) or EN6049-009.

NAVIGATION SYSTEMS

GNSS Cabling

If a GNSS antenna is connected to an ELT(DT) system with an embedded GNSS, the installation manual must state that the cabling meets the cabling specifications outlined in the ELT(DT) antenna and cabling section of this document.

External position source

If the ELT(DT) is capable of receiving position data from an external navigation system, such as one already certified on the aircraft, the installation manual must provide navigation system-ELT(DT) interfacing information to include expected and or required input labels / sentences.

The installation manual must detail measures that should be taken (such as setting the ELT(DT) in OFF mode) to avoid nuisance activation during maintenance operations of the aircraft and to restore the function afterwards.

TESTING OF INSTALLED SYSTEMS

The installation manual must provide post installation inspection and testing procedures which ensure the ELT(DT) system is properly installed and will perform its intended function.

The installation manual must state that the installed ELT(DT) system be tested to verify it is not a source of radiated interference to other aircraft systems and that it not be adversely impacted by radiated interference from other aircraft systems

The installation manual must state that unless otherwise specified, system tests be conducted using the aircraft's power system

ADDITIONAL INTEGRATION CONSIDERATIONS

The Automatic Triggering System should automatically provide to the ELT(DT) system an arming and a disarming signal.

The Automatic Triggering System should send a disarming signal to the ELT(DT) system only after it has determined a safe landing has occurred. Care should be applied to prevent disarming following loss of signals due to accident conditions.

An external autonomous power source should receive its electrical power from the bus that provides the maximum reliability for operation of the ELT(DT) system without jeopardizing service to essential or emergency loads.

To ensure the operator that ELT(DT)'s operations can be conducted safely and reliably in the expected operational environment, there are specific minimum acceptable performance parameters that must be met.

Perform the self-test function according to manufacturer's recommendation.

The periodic inspection must occur at every planned battery replacement unless manufacturer's recommendation.