



DOC14004D

Emergency Locator Transmitters
Orolia S.A.S.

OPERATION MANUAL



AP INTEGRA (ER-N) / AP-H INTEGRA (ER-N) ELT With built-in GPS & built-in back-up Antenna and ARINC

Revision 03

First issue: JUN 06/2014

TP PAGE : 1

Date of rev.: MAY 15/2019

Users are kindly requested to notify Orolia S.A.S of any discrepancy, omission or error found in this manual.

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REV. Nb	REVISION DATE	INSERTION DATE	BY
00	JUN 06/2014	JUN 06/2014	J.S.
01	SEP 05/2014	SEP 05/2014	J.S.
02	FEB 12/2015	FEB 12/2015	J.S.
03	MAY 15/2019	MAY 15/2019	C.L.G.

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INTRODUCTION

INTEGRA ELTs are an extension of the range of KANNAD ELTs. The development of this type of ELTs is based on the improvement of safety of flights either for light aircraft, business aircraft or commercial aviation.

The safety of flights is strengthened thanks to a **built-in GPS** giving a more accurate position transmitted within minutes following the distress and a **built-in back-up Antenna** which may replace the main antenna in case on unavailability of this last one.

AP⁽¹⁾ and AP-H INTEGRA (ER-N) are ELTs of Automatic Portable type intended to be rigidly attached to the aircraft before the crash but readily removable from the aircraft after a crash. They function as automatic ELTs (AF) during the crash. The external antenna may be disconnected and an auxiliary antenna (stowed to the ELT's housing) attached to the ELT.

AP INTEGRA (ER-N) is designed for fixed wing aircraft or helicopters, AP-H INTEGRA (ER-N) is designed for flat installation on board helicopters only.

The AP INTEGRA (ER-N) and AP-H INTEGRA (ER-N) ELTs are evolutions of AP INTEGRA (ER) and AP-H INTEGRA (ER) ELTs (Operating temperatures - 40°C to +55°C). **The main evolution consists in the capability to be connected to an External Navigation Device used to store GPS data coming from an on-board GPS ARINC429 or 743 output.**

IMPORTANT: INTEGRA (ER-N) ELTs shall always be connected to an INTEGRA ARINC e-NAV External Navigation Device. Installing an INTEGRA (ER-N) ELT without INTEGRA ARINC e-NAV is not authorized.

The instructions in this manual provide the information necessary for the installation and the operation of AP INTEGRA (ER-N) and AP-H INTEGRA (ER-N) ELTs.

Servicing instructions of ELT are normally performed by shop personnel. For detailed instructions, refer to Service & Support section of Orolia Website.

For the initial installation, please refer to Initial Installation Manual supplied with AP INTEGRA (ER-N) and AP-H INTEGRA (ER-N) ELTs.

FOR REGULATORY REQUIREMENTS, PLEASE CONSULT YOUR NATIONAL AVIATION AUTHORITY.

NOTE: (1) AP for Automatic Portable.

WARRANTY

1. Scope

The equipment is warranted against all material or manufacturing defect for a period of two years from the date of installation on the aircraft or thirty months from the date of shipment from Orolia S.A.S. facilities whichever occurs first.

Work carried out under the warranty shall not have the effect of extending the warranty period.

In respect of this warranty, after a defect has been noted by our services, the sole obligation incumbent upon us shall be the repair of the equipment or the element identified as being defective by our services or possibly its replacement free of charge, to the exclusion of all compensation or damages.

This warranty covers the cost of parts and labour in our factories.

The cost of transportation of the equipment replaced or repaired are the purchaser's exclusive responsibility.

The risks shall be borne by the purchaser.

2. Exclusion

Defects and deterioration caused by natural wear of the product or by external accident (poor maintenance, abnormal conditions of use, etc.) or by modification of the equipment and tools not recommended nor specified by our company, are excluded from the warranty.

Also the warranty shall not cover visible defects which the purchaser wouldn't have formally notified Orolia S.A.S. within 48 hours of receipt of the equipment.

SYSTEM OVERVIEW

1. COSPAS-SARSAT System

A. Description

Launched in the early eighties by the four founder countries (Canada, France, Russia, USA), the COSPAS-SARSAT system provides satellite aid to search and rescue (SAR) operations for maritime, aeronautical and terrestrial vehicles anywhere in the world.

It uses distress beacons fitted on mobiles and a constellation of LEO, MEO and GEO satellites which relay and process the 406 MHz signal to ground stations (LUT) where the beacon positions are determined.

Several types of beacons are designed to match the various user needs of the COSPAS-SARSAT system:

- EPIRB (Emergency Position Indicating Radio Beacon) for maritime applications.
- ELT (Emergency Locator Transmitter) for aeronautical applications.
- PLB (Personal Locator Beacon) for land expeditions.

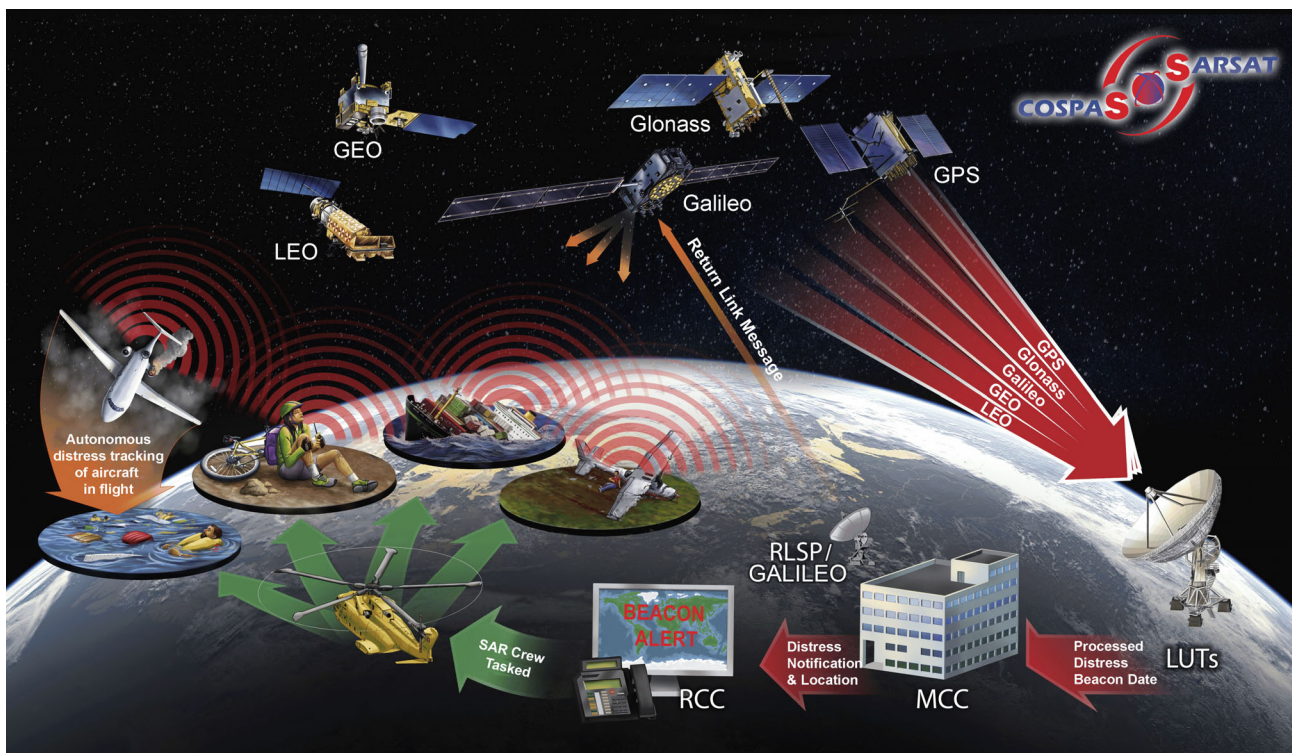


Figure 1: COSPAS-SARSAT System

B. Worldwide coverage with the COSPAS-SARSAT system

The major improvement is the use of the COSPAS-SARSAT system for processing aeronautical emergencies.

The 406 MHz transmission carries digital data which enable the identification of the aircraft in distress and facilitate SAR operation (type of the aircraft, number of passengers, type of emergency).

The 406 MHz message is transmitted to the COSPAS-SARSAT satellites. This message is downloaded to one of the 64 ground stations (44 LEOLUTs and 20 GEOLUTS).

The aircraft is located by an independent location capability from the LEO and MEO system.

Thanks to the built-in GPS receiver, the encoded position will be transmitted in the distress message by the ELT within minutes following the distress.

The 121.5 MHz frequency is used by SAR services for homing in the final stage of rescue operations.

C. Operation

In the event of a crash, the ELT activates automatically and transmits a sweep tone on 121.5 MHz and the 406 MHz signal in space.

In a crash, a G-Switch (crash sensor) activates the ELT when the ELT is subjected to an important change of velocity (or deceleration).

Activation may also be accomplished by manual means of a Remote Control Panel (RCP) from the cockpit or directly from a switch of the ELT's front panel.

In the event the external antenna is unavailable due to the crash conditions, the built in back-up antenna will replace it to transmit the 406 MHz signal to the Cospas-Sarsat satellites.

D. Environmental improvements of ELTs

The certification of an ELT includes a range of severe mechanical tests:

- resistance to flame;
- impact and crush tests;
- resistance up to 500 G shocks;
- watertightness;
- anti-deflagration;
- extreme temperatures .

2. INTEGRA ELT System Presentation

AP INTEGRA (ER-N) and AP-H INTEGRA (ER-N) belong to the AP type of ELTs which are permanently attached to an aircraft. AP INTEGRA and AP-INTEGRA (ER) are designed to be installed on fixed wing aircraft or helicopters. AP-H INTEGRA and AP-H INTEGRA (ER) are designed for flat installation on board helicopters only.

CAUTION: INTEGRA (ER-N) ELTs shall always be connected to an INTEGRA ARINC e-NAV External Navigation Device. Installing an INTEGRA (ER-N) ELT without INTEGRA ARINC e-NAV is not authorized.

The INTEGRA ELT system ([Refer to Figure 2: ELT system description page 4](#)) is composed of:

1. the ELT transmitter:
 - P/N S1850501-03 for AP INTEGRA (ER-N) or,
 - P/N S1854501-03 for AP-H INTEGRA (ER-N);
2. a mounting bracket;
3. an INTEGRA ARINC e-NAV interface^(see note 1)
4. a remote control panel (RCP)^(see note 2);
5. an approved external whip, rod or blade antenna;
6. an outside buzzer (optional);
7. an auxiliary antenna;
8. an optional attachable dongle.

Note: (1) GPS/NAV Interface with an on board ARINC 429 or 743 GPS.

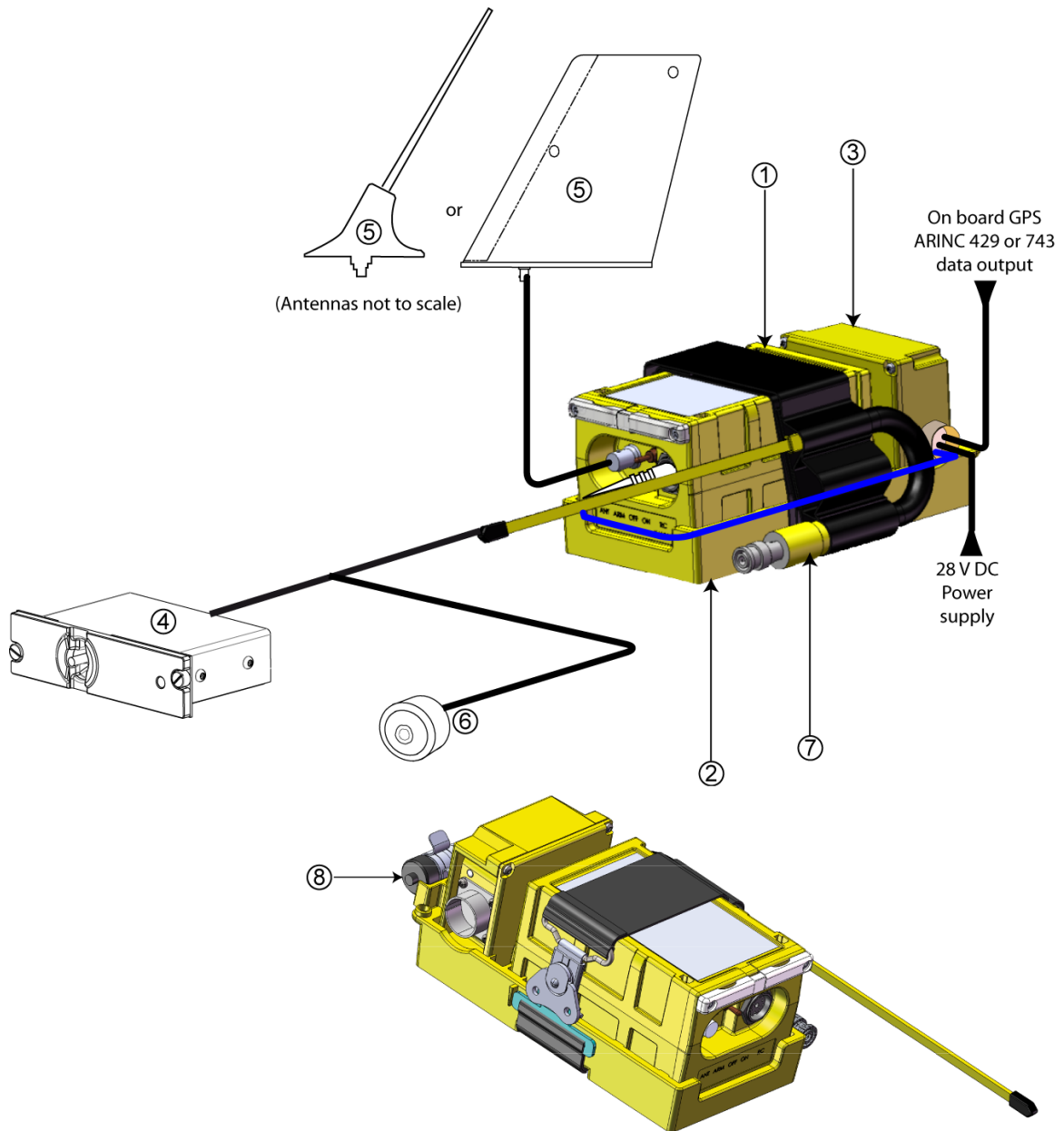
Note: (2) **The RCP is optional only if the commands and controls of the ELT are reachable and visible from the pilot seated position.**

*(RTCA DO-204A): "Equipment control and indicator installed for in-flight use **shall** be readily accessible from the cockpit crew position. The cockpit crew **shall** have an unobstructed view of visual indicator when in the normal seated position."*

For details of approved part number of INTEGRA ELT system, [.Refer to 6. Compatibility list page 112](#)

The transmitter and bracket are installed in the aircraft near the tail. The external antenna is mounted on the fuselage near the tail. The remote control panel is installed in the cockpit and connected to the ELT with a DIN-12 connector or a programming dongle and a 3 or 4-wire bundle (not supplied).

Figure 2: ELT system description



3. LINE REPLACEABLE UNITS

A. Transmitter

The AP INTEGRA (ER-N) and AP-H INTEGRA (ER-N) are ELTs designed to be installed onboard aircraft to transmit a distress signal on frequencies:

- 406 MHz (COSPAS-SARSAT frequency) for precise pinpointing and identification of the aircraft in distress.
- 121.5 MHz used for homing in the final stages of the rescue operations.

The AP INTEGRA (ER-N) and AP-H INTEGRA (ER-N) are certified as Automatic Portable (AP) ELTs with the approved outside antennas.

The housing of AP INTEGRA (ER-N) and AP-H INTEGRA (ER-N) transmitters are made of molded plastic with excellent mechanical resistance.

The ELT housing is designed with no sharp edges.



Figure 3: ELT Transmitter

B. Bracket

The bracket installed near the tail is designed to fix the ELT with an attaching strap and a latch to lock the strap. This enables quick removal of the ELT for maintenance or exchange.

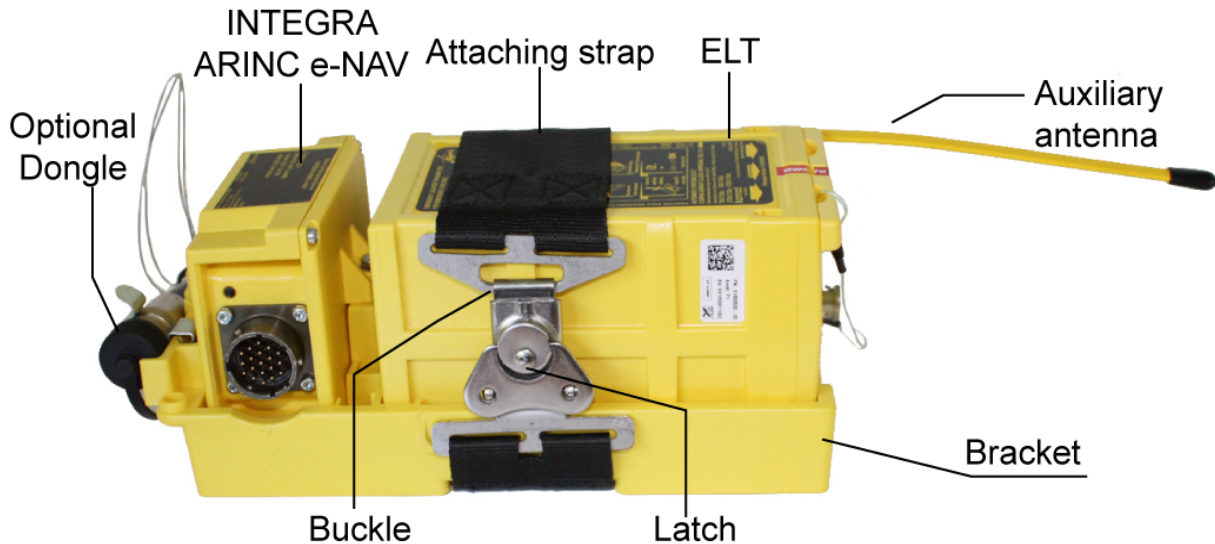


Figure 4: ELT Transmitter with Mounting Bracket

The transmitter is to be installed on a Universal Mounting Bracket for INTEGRA ARINC e-NAV for ELT (AP): P/N S1850551-01 to re-use existing drilling for retrofit (Refer to DOC14003, Initial Installation Manual for drilling masks and outline dimensions of this bracket).

NOTE: The dongle is not mandatory and may be installed as an option for on-board programming; Refer to 2. Programming page 203

C. External antenna

Only approved antennas may be installed ([Refer to 6. Compatibility list page 112](#)).

Connection to the ELT will be carried out with a 50 Ohm coaxial cable (RG58 for example) ended with a male BNC connector.

IMPORTANT NOTICE: Orolia S.A.S. recommends a cable with radio electric properties similar or better to those of a RG58 cable.

NOTE: the 50 Ohm coaxial cable and the male BNC connector are not supplied.

SYSTEM FUNCTIONAL DESCRIPTION AND OPERATION

1. Transmitter Functional Description

A. Transmission

The transmitter can be activated either automatically when the crash occurs (thanks to a shock sensor) or manually (thanks to a switch on the transmitter itself or on a RCP).

The transmitter is designed to transmit on two frequencies (121.5 and 406 MHz). The 121.5 Mhz is mainly used for homing in the final stages of the rescue operations. The 406 MHz frequency is used by the COSPAS-SARSAT satellites for precise pinpointing and identification of the aircraft in distress.

Once activated, the transmitter operates continuously on 121.5 MHz.

During operations, a digital message is transmitted on 406.037 MHz every 50 seconds.

B. Controls & Connectors

The following controls are to be found on the ELT front panel:

1. 3-position switch ARM/OFF/ON;
2. Visual indicator (red);
3. DIN 12 socket for connection to the INTEGRA ARINC e-NAV, an optional Remote Control Panel, optional attachable programming dongle, or a programming equipment;
4. BNC connector for the external or auxiliary antenna.

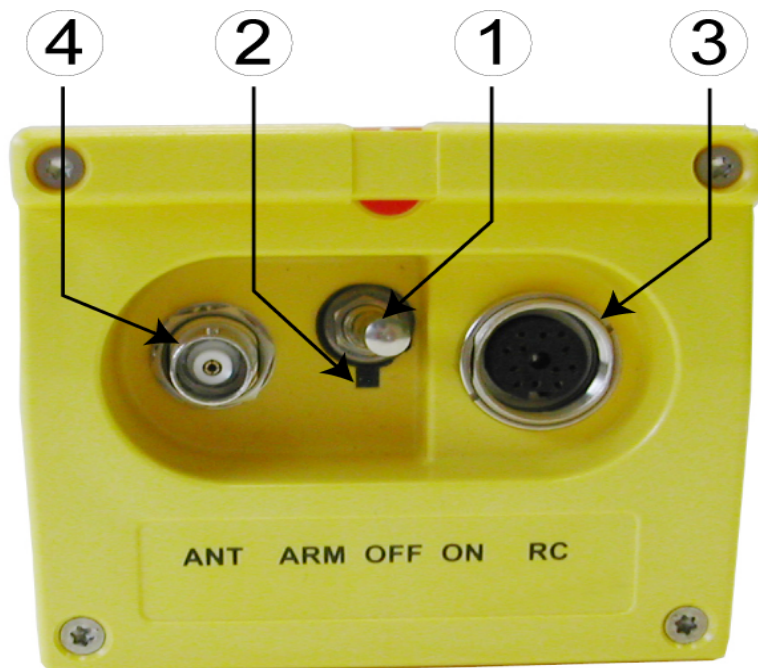


Figure 101: Front Panel

The red light gives an indication on the working mode of the beacon:

- after the self test:
 - a series of short flashes indicates the self test failed;
 - one long flash indicates a correct self test;
- in operating mode:
 - periodic flashes during 121.5 transmission;
 - long flash during 406 transmission.

A buzzer gives audio information on the beacon working:

- continuous tone during self test;
- 1 beep every 0.7 second during 121.5 transmission;
- silence during 406 transmission.

C. Working mode information

The ELT has 4 different modes:

- Off.
- Self-test (temporary mode).
- Armed (standby mode to enable automatic activation by the shock sensor or by an optional remote control panel).
- On (transmission).

Transmission is effective if the beacon is activated (either manually on the ELT control panel, automatically by the shock sensor, or remotely by the "ON" switch of an optional remote control panel when connected).

(1) Off

The ELT is off when the switch is in position "OFF", no part of the ELT is energized.

This mode must **only** be selected when the ELT is removed from the aircraft or when the aircraft is parked for a long period or for maintenance.

(2) Self-Test

The self-test mode is a temporary mode (max duration 15 sec) in which the ELT checks the main characteristics of the transmitter (Battery voltage, Programming...) and enables digital communication with programming and test equipment.

This mode is selected:

- when switching from "OFF" to "ARM";
- when switching to "RESET / TEST" on an optional Remote Control Panel (provided that the switch of the ELT is in position "ARM");
- when switching to "ON" prior to transmission.

The buzzer operates during the self-test procedure.

After about 10 seconds, the test result is displayed on the visual indicator as follows:

- One long flash indicates valid test.
- A series of short flashes indicates false test result.

The number of flashes indicates the type of failure:

- 3 + 1 = LOW BATTERY VOLTAGE.
- 3 + 2 = LOW TRANSMISSION POWER.
- 3 + 3 = FAULTY VCO LOCKING (FAULTY FREQUENCY).
- 3 + 4 = NO IDENTIFICATION PROGRAMMED.
- 3 + 5 = FAULTY VSWR (LINK TO EXTERNAL ANTENNA).
- 3 + 6 = INTERNAL GPS SERIAL LINK.
- 3 + 7 = INTEGRA ARINC e-NAV FAULTY CONNECTION

It is recommended to test the ELT regularly in order to detect any possible failure ([Refer to A. Periodicity, page 301](#)).

The number of self-tests carried out is recorded. This information is available when the ELT is connected to a programming and test equipment (PR600).

(3) Armed

In order to enable activation by the G-Switch or with an optional Remote Control Panel, the ELT must be in standby mode with the switch in the "ARM" position.

This mode is mandatory during flight. The ELT should remain in the "ARM" position except when the aircraft is parked for a long period or for maintenance.

(4) On

This mode is selected:

- manually by switching the ELT to "ON";
- by switching an optional Remote Control Panel switch to "ON" (provided that the ELT switch is in the "ARM" position);
- automatically when a crash occurs (provided that the ELT switch is in the "ARM" position).

When this mode is selected, the ELT starts transmitting:

- after 50 seconds on 406 MHz (one 406 MHz burst every 50 seconds) to the external antenna;
- after the GPS lock on 121.5 MHz (continuous transmission between

each 406 MHz burst). If GPS lock does not occur within 5 minutes, the 121.5 MHz will be activated.

The red visual indicator on the ELT (and on an optional remote control panel when connected) flashes and the buzzer operates.

- Red visual indicator:
 - 1 short flash during ELT transmission on 121.5 MHz (every 0.7 seconds);
 - 1 long flash during ELT transmission on 406 MHz (every 50 seconds).
- Buzzer:
 - 1.5 Hz pulse signal (recurrence 0.7 s) during ELT transmission on 121.5 MHz [except if the ELT has switched to built-in back-up antenna: [Refer to D. VSWR Switch function \(External / Integral antenna\)](#)].

In case of accidental activation, the ELT can be reset either by switching it to "OFF" or by switching to "RESET" on an optional Remote Control Panel when connected.

The number of 406 MHz bursts transmitted is recorded. This information is available when the ELT is connected to a programming and test equipment (PR600).

D. VSWR Switch function (External / Integral antenna)

During the 406 MHz burst, the Voltage Standing Wave Ratio (VSWR) is measured. After 5 bursts with wrong VSWR measurements, the ELT switches from the external to the built-in back-up antenna in order to optimize transmitted signal.

In ON mode, after 36 bursts, the ELT decides to re-switch or not according to the result of 2 new VSWR measurements.

NOTE: when shifting from the external to the integral antenna the pulse signal of the buzzer shifts from one beep every 0.7 second to 2 beeps every 0.7 second.

E. GPS Strategy

When valid, the position of the internal GPS will always take priority, even if the INTEGRA ARINC e-NAV is connected to the GPS equipment of the aircraft (external GPS):

- If only the internal GPS acquires a valid position, then the message will contain the true position of the internal GPS in the 406 MHz burst;
- If only the external GPS acquires a valid position, then the message will

- contain the true position of the external GPS in the 406 MHz burst;
- If both internal and external GPS acquire a valid position, then the message will contain the true position of the internal GPS;
 - If neither the internal GPS, nor the external GPS acquire a valid position, then the message will contain the default value (GPS position not valid).

According to § 4.5.5.2 of Cospas Sarsat C/S T001, if, after providing valid data, the navigation input fails or is not available, the ELT message retains the last valid position for 4 hours (± 5 min) after the last valid position data input. After 4 hours the encoded position is set to the default values.

F. Autonomy

The energy is provided by a battery pack composed of a LiMnO₂ two-element battery (See pages 107 & 602 for Kit battery reference).

Lithium cells, lithium batteries and equipment containing such batteries are subjected to regulations and classified under class 9 as from 1st of January 2003.

Battery shall be replaced according to the expiry date indicated on the ELT.

IMPORTANT: If the ELT has been activated for more than 1 hour, the battery shall be replaced (See page 602 section 2, Battery replacement requirements).

With new batteries, the duration of the 121.5 transmission is over 48 hours at -40°C.

As it is therefore preferable to keep the battery power for 121.5 MHz homing frequency transmission for the rescue operations, in compliance with COSPAS-SARSAT specifications, the 406 MHz transmission is deliberately stopped after 24 hours to extend the 121.5 MHz transmission for as long as possible.

G. Electrical interfaces

J1

DIN 12 socket J1 is dedicated for connection to the Remote Control Panel and to the INTEGRA ARINC e-NAV. When the ELT is disconnected from these devices, a Programming or Maintenance Dongles or a programming equipment (PR600) can be connected to the ELT.

IMPORTANT: Shielded cables are recommended. The required wires are AWG24.

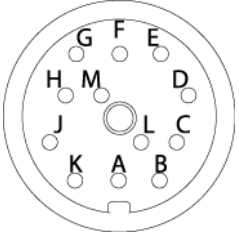
J1	PIN	Signal Name	From / To	I/O
<p>Viewed from Front Face</p> 	J1-A	RCP RESET	RCP	I
	J1-B	DONGLE RX	TX ARINC e-NAV	O
	J1-C	DONGLE CS	CS ARINC e-NAV	O
	J1-D	DONGLE SK	SK ARINC e-NAV	O
	J1-E	DONGLE TX	RX ARINC e-NAV	I
	J1-F	DONGLE ALE2P	ALEP2 ARINC e-NAV	O
	J1-G	RCP COMMON	RCP	O
	J1-H	RCP BUZZER	RCP	O
	J1-J	RCP LED	RCP	O
	J1-K	RCP ON	Not connected	
	J1-L	DONGLE GND	GND ARINC e-NAV	O
	J1-M	RCP 2W COM.	Not connected	

Table 1: J1 connector pin-out

J2

BNC female connector J2 is used to connect either the external antenna through a 50 Ω coaxial cable or the auxiliary antenna.

IMPORTANT NOTICE:

The use of a low attenuation coaxial cable is recommended. The maximum permitted attenuation in the coaxial is 2dB@406 MHz, excepted for Chelton 2624-82 antenna (0.75dB). The minimum permitted attenuation is 0 dB, excepted for RAMI AV-100 antenna (0.3 dB)

H. Transmitter Technical Specifications

TYPE

- Two-frequency ELT (121.5 / 406.037 MHz)
- Automatic Portable
- COSPAS-SARSAT Class Class I, -40°C to +55°C.

406 MHz TRANSMISSION

- Frequency: 406.037 MHz +/- 1 kHz
- Output power: 5W (37 dBm +/- 2 dB)
- Modulation type: 16K0G1D (Biphase L encoding)
- Transmission duration: 520ms (long message) every 50 s.
- Autonomy 24 Hours @ -40°C

121.5 MHz TRANSMISSION

- Frequency: 121.5 MHz +/- 6 kHz
- Output power: 50 to 400 mW (17dBm to 26 dBm), typical 100 mW
- Modulation type: 3K20A3X
- Modulation rate: > 85 %
- Frequency of modulation signal: 1600 Hz to 300 Hz with decreasing sweep
- Autonomy over 48 hours @ -40°C

G-SWITCH SENSOR

Mechanical G-switch sensor compliant with EUROCAE ED62 specifications.

RF Fied strenght limits

0.471 V/m

Hardware - DAL E

- AP (ER-N) P/N S1850611-03
- AP-H (ER-N) P/N S1850621-03

Software - DAL D

- P/N YLS1819

CONTROLS

- ARM / OFF / ON switch
- DIN12 socket for RCP and pin programming option.
- Bright red visual indicator
- Buzzer
- BNC antenna connector

BATTERY

KIT BAT200, P/N: S1840510-01

LiMnO₂ two-element battery for transmitter power supply

Battery expiry date: 7 years from date of cell manufacturing

HOUSING

Material: Polycarbonate

Color: Yellow (color compounded)

Transmitter dimensions:

137 x 86 x 75.4 mm

(5.393 x 3.385 x 2.968 inches)

Weight:

- AP: typical 878 g. (1.94 lb)
- AP-H: Typical 883 g. (1.95 lb)

Tightness: O-ring

ENVIRONMENTAL CONDITIONS

See [Table 2: ENVIRONMENTAL QUALIFICATION FORM](#)

QUALIFICATIONS

ETSO-C126a / TSO-C126b

TSO C-126b deviations

- Use of RTCA DO-160G instead of RTCA DO-160F
- Use of RTCA DO-178C instead of RTCA DO-178B

FOR USE OUTSIDE OF THE USA OR EASA RULES, CONTACT YOUR LOCAL CIVIL AVIATION AUTHORITY.

Table 2: ENVIRONMENTAL QUALIFICATION FORM

Conditions	Section	Description of tests conducted
Temperature and Altitude	4.0	As per ED-62A
Low Temperature	4.5.1	As per ED-62A -40°C
High Temperature	4.5.2 & 4.5.3	As per ED-62A +55°C
In-Flight Loss Cooling	4.5.4	Cat. X, no test performed
Altitude	4.6.1	As per ED-62A 50,000 ft
Decompression	4.6.2	As per ED-62A
Overpressure	4.6.3	As per ED-62A
Temperature Variation	5.0	As per ED-62A
Humidity	6.0	Cat. A
Operational Shock and Crash Safety	7.0	As per ED-62A
Vibration	8.0	AP type Cat. R(C,C1) AP-H Type Cat. U(G)
Explosive Atmosphere	9.0	Cat. X, no test performed
Waterproofness	10.0	Cat. W
Fluids Susceptibility	11.0	Cat. X, no test performed
Sand and Dust	12.0	Cat. X, no test performed
Fungus	13.0	Cat. X, no test performed
Salt Fog	14.0	Cat. S
Magnetic Effect	15.0	Cat. Z
Power Input	16.0	Cat. X, no test performed
Voltage Spike	17.0	Cat. X, no test performed
Audio Frequency Susceptibility	18.0	Cat. X, no test performed
Induced Signal Susceptibility	19.0	Cat. Z
Radio Frequency Susceptibility	20.0	As per ED-62A
Radio Frequency Emission	21.0	Cat. B
Lightning Induced Transient Susceptibility	22.0	XXG33
Lightning Direct Effects	23.0	Cat. X, no test performed
Icing	24.0	Cat. X, no test performed
Electrostatic Discharge	25.0	Cat. Z
Fire, Flammability	26.0	As per ED-62A

2. Equipment limitations

Antenna - ELT cable with maximum permitted attenuation: 2dB@406 MHz.

WARNING: ELTs are radio transmitters which emit radio frequency radiation when activated. When transmitting, the user's minimum distance of exposure is 0.20 meter.

For RF Field strength limits, please [Refer to H. Transmitter Technical Specifications, page 107](#). RF Field strength limits have been calculated according to Canadian RSS-102 Standard "Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)".

For Canadian user, any information and/or contact on Radiofrequency (RF) Energy and Health may be found on:

<http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08792.html>.

3. Activation

A. Standby mode for automatic activation

In order to be automatically activated by the crash sensor, the ELT must be in standby mode. This mode is mandatory during the flight. We recommend to switch off the ELT only when removed from the aircraft or when the aircraft is parked for a long period or for a maintenance operation.

- Check that the antenna is correctly connected.
- Switch to " ARM".

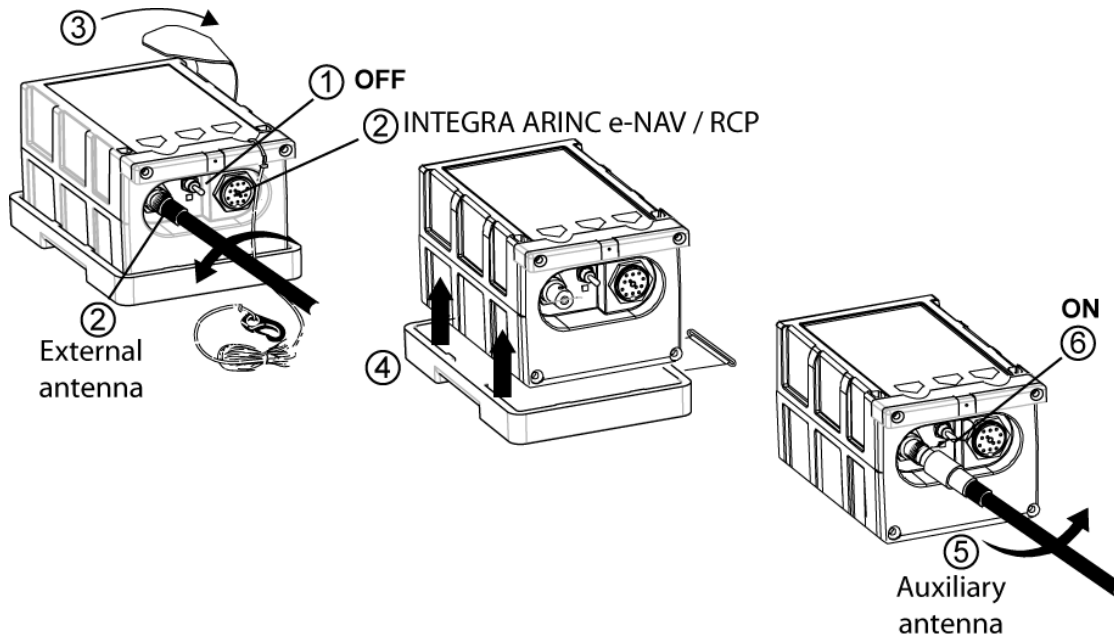
To operate the ELT with an optional Remote Control Panel, ensure that:

- The ELT switch is the "ARM" position .

B. Manual activation as Fixed ELT

- Check that the main antenna is correctly connected.
- Switch to " ON " (either on the ELT or on an optional Remote Control Panel when connected):
 - The ELT starts with the self-test sequence then, after 50 sec., transmits on:
 - 406 MHz (one 406 MHz burst every 50 seconds);
 - 121.5 MHz (continuous transmission between each 406 MHz burst after the GPS lock, or after 5 minutes if GPS lock does not occur.
 - During transmission, the buzzer operates and the red visual indicator flashes.

C. Manual activation as Portable ELT



The AP or AP-H INTEGRA (ER-N) ELT can be used outside the aircraft in portable version. A tether is used to fix the transmitter to a liferaft in case of ditching.

1. Switch to "OFF".
2. Disconnect the external antenna (ANT) and DIN-12 connector.
3. Unfasten the attaching strap ([Refer to Figure 205: Removing the transmitter, page 210](#)).
4. Remove the transmitter and the auxiliary antenna from the bracket ([Refer to Figure 205: Removing the transmitter, page 210](#)).
5. Connect the auxiliary antenna (ANT).
6. Switch to "ON":

Important: Put the antenna in a vertical position.

- The ELT starts with the self-test sequence then, after 50 sec., transmits on:
 - 406 MHz (one 406 MHz burst every 50 seconds).
 - 121.5 MHz (continous transmission between each 406 MHz burst after the GPS lock).
- During transmission, buzzer operates and visual indicator flashes periodically.



4. Off

It is possible to stop the ELT in case of unintentional activation:

- Switch to " OFF ".

Regulations state that no transmission must be interrupted unless every means are used to contact and inform the Air Traffic Controller of this action.

Important notice: As 406 MHz transmission is effective 50 seconds after the ELT activation, if it is switched off within this delay, no further radio contact will be necessary.

5. Self-Test

[Refer to 1. Self-test, page 301](#)

6. Compatibility list

A. Mounting brackets

Designation	Part Number
Universal Mounting Bracket for INTEGRA ARINC e-NAV for ELT (AP)	S1850551 - 01

Designation	Part Number
--------------------	--------------------

B. External Navigation Device (GPS / NAV Interface)

Orolia Designation	Part Number
INTEGRA ARINC e-NAV	S1850581-01

C. Remote control panels (RCP)

Orolia Designation	Part Number
RC100 KIT	S1820513-03
RC200	S1820513-11
RC300	S1820513-09
RC300-NVG	S1820513-10
RC310-NVG	S1820513-26
RC600 NVG (Y) ^(See Important Notice below)	S1820513-12
RC600-NVG (W) ^(See Important Notice below)	S1820513-13
RC800	S1820513-15

IMPORTANT NOTICE:

RC600 RCP: Non ETSO equipment only designed to be installed on military aircraft.

D. DIN-12 connector

Orolia Designation	Part Number
DIN-12 connector	S1820514-03

E. Programming dongles

Orolia Designation	Part Number
Attachable Programming dongle	S1820514-12 ⁽¹⁾

Note (1): Optional programming dongle attached to the mounting bracket

F. Outside buzzer

Orolia Designation	Part Number
OUTSIDE BUZZER KIT	S1820515-06

G. Auxiliary Antenna / External antennas

Orolia Designation	Manufacturer	Orolia Part Number
ANT100 ^(see not below)	PROCOM	0124206
N/A	CHELTON 21-41	N/A
WHIP ANTENNA AV100	RAMI AV-100	0147444
ROD ANTENNA AV300	RAMI AV-300	0146151
ROD ANTENNA ANT300	CHELTON 1327-82	0124220
BLADE ANTENNA ANT500	SENSOR SYSTEMS S65-8282-406	0124222
BLADE ANTENNA ANT560	DAYTON GRANGER ELT10-696-1	0145787
BLADE ANTENNA ANT650	CHELTON 2624-82	0124251
BLADE ANTENNA ANT700	CHELTON 2632-82	1002063

NOTE: ANT100 can be only used as auxiliary antenna when the ELT is used as portable equipment.

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INSTALLATION / REMOVAL

1. Registration

A. General

The ELT must be registered prior to installation onboard.

When a 406 MHz ELT is installed in an aircraft, it is imperative that the aircraft owner register the ELT. Each 406 MHz ELT contains a unique identification code that is transmitted to the satellite. This helps the “Rescue Coordination Center” (RCC) to determine whether an emergency has actually occurred. The unique identification permits accessing a data base.

The registration card available from the local registration authority must be completed and returned to this authority.

Any change of ownership shall also be declared and registered with the local registration authority.

B. Registration in USA

Mail or Fax your registration form to:

SARSAT BEACON REGISTRATION

NOAA

NSOF, E/SPO53

1315 East West Hwy

Silver Spring, MD 20910

or Save Time! Register your beacon online at:

www.beaconregistration.noaa.gov

All online registrations will be entered into the National 406 MHz Beacon Registration Database on the same day of entry. Registration forms received via postal mail will be entered within 2 business days of receipt. For online registrations, a confirmation letter with your completed registration information form will be sent immediately via e-mail or fax (if provided). Confirmation letters sent via postal mail should arrive within two weeks. Once your registration confirmation is received, please review all information. Any changes or updates to your registration information can be done via the internet, fax, e-mail or postal mail. If you do not receive your registration confirmation from NOAA on the same day you submit it over the internet or within two weeks if you submit it by postal mail, please call NOAA toll-free at: 1-888-212-SAVE (7283) or 301-817-4515 for assistance.

After initial registration (or re-registration) you will receive a NOAA Proof of Registration Decal by postal mail. This decal is to be affixed to the beacon and

should be placed in such a way that it is clearly visible. If for some reason you do not receive the registration decal within two weeks, please call NOAA toll-free at: 1-888-212-SAVE (7283) or 301-817-4515.

Failure to register, re-register (as required every two years), or to notify NOAA of any changes to the status of your 406 MHz beacon could result in penalties and/or fines being issued under Federal Law. The owner or user of the beacon is required to notify NOAA of any changes to the registration information at any time. By submitting this registration the owner, operator, or legally authorized agent declares under penalty of law that all information in the registration information is true, accurate, and complete. Providing information that is knowingly false or inaccurate may be punishable under Federal Statutes. Solicitation of this information is authorized by Title 47 - Parts 80, 87, and 95 of the U.S. Code of Federal Regulations (CFR). Additional registration forms can be found on the NOAA-SARSAT website at:

www.sarsat.noaa.gov or at: www.beaconregistration.noaa.gov

C. Registration in Canada

Beacon information is held in the Canadian Beacon Registry maintained by the National Search and Rescue Secretariat for use in search and rescue operations. Online access to the Registry is available for all beacon owners to register new beacons or to update their beacon information. You can add or update your beacon information by accessing the registry directly, sending in a completed registration form or by talking to one of our beacon registry representatives.

You can access the registry:

- online: www.canadianbeaconregistry.com
- by email: CBR@Sarnet.dnd.ca
- by fax: 1-613-996-3746
- by telephone: 1-800-727-9414 or 1-613-996-1616

The registration information must be updated when the aircraft ownership changes as per the Canadian Airworthiness Notice AN B029 (refer to following link):

http://www.nss.gc.ca/site/Emergency_Beacons/canadian_beacon_registry_e.asp

Additional information and registration forms can be found on the Canadian NSS website at:

http://www.nss.gc.ca/site/cospas-sarsat/INTRO_e.asp

2. Programming

A. "Pin programming" option

The INTEGRA family offers pin-programming capabilities to facilitate maintenance operations especially in the case of removals and/or replacement.

When this option is chosen, an attachable programming dongle, P/N S1820514-12 is attached to the mounting bracket.

A special DIN 12 connector with a Serial Memory Module (called "Programming Dongle") is connected to the ELT when installed onboard. This Programming Dongle contains the identification information of the aircraft and remains onboard the aircraft. When an unprogrammed ELT is installed and connected to this Programming Dongle and the "ELT" is switched to "ARM", it automatically updates its own memory with the identification data contained in the Programming Dongle memory.

When the ELT is removed from the aircraft, it keeps its identification data.

For maintenance purposes, it is possible to delete the identification information of the ELT by connecting a "Maintenance Dongle" to the ELT. Any accidental transmission with this "maintenance dongle" will not involve SAR operation as the identification code transmitted is recognised by COSPAS-SARSAT as "not onboard".

When a maintenance dongle is connected:

- Country code is **227** (France).
- Protocol is **Test**.
- Identification number is **K + 6 digits** (the 6 digits of the CSN number).

If the pin programming option is selected by the owner, the following equipment are required:

- a "Programming Dongle" on each aircraft;
- a "Maintenance Dongle" on each ELT spare.



Figure 201: Maintenance Dongle

3. ELT transmitter installation procedure

(1) ELT Installation

Refer to [Figure 202: Installing ELT transmitter and INTEGRA ARINC e-NAV page 205](#)

1. On the Mounting Bracket, place INTEGRA ARINC e-NAV housing onto its supports either with its connector on the left side or on the right side.
2. Fix the INTEGRA ARINC e-NAV onto the mounting bracket with the 2 captive screws and tighten to a torque of 1.4 Newton per meter using a torque driver with a 2.5 mm Allen bit.
3. Place the INTEGRA (ER-N) ELT onto the Bracket with "Flight Direction Arrow" of the ELT pointed towards the front of the aircraft.
 - For AP INTEGRA (ER-N), refer to Section [3. AP INTEGRA \(ER-N\), axis of installation page 503](#).
 - For AP-H INTEGRA (ER-N) refer to Section [4. AP-H INTEGRA \(ER-N\), axis of installation page 504](#).
4. Pass the attaching strap with the buckle above the ELT.

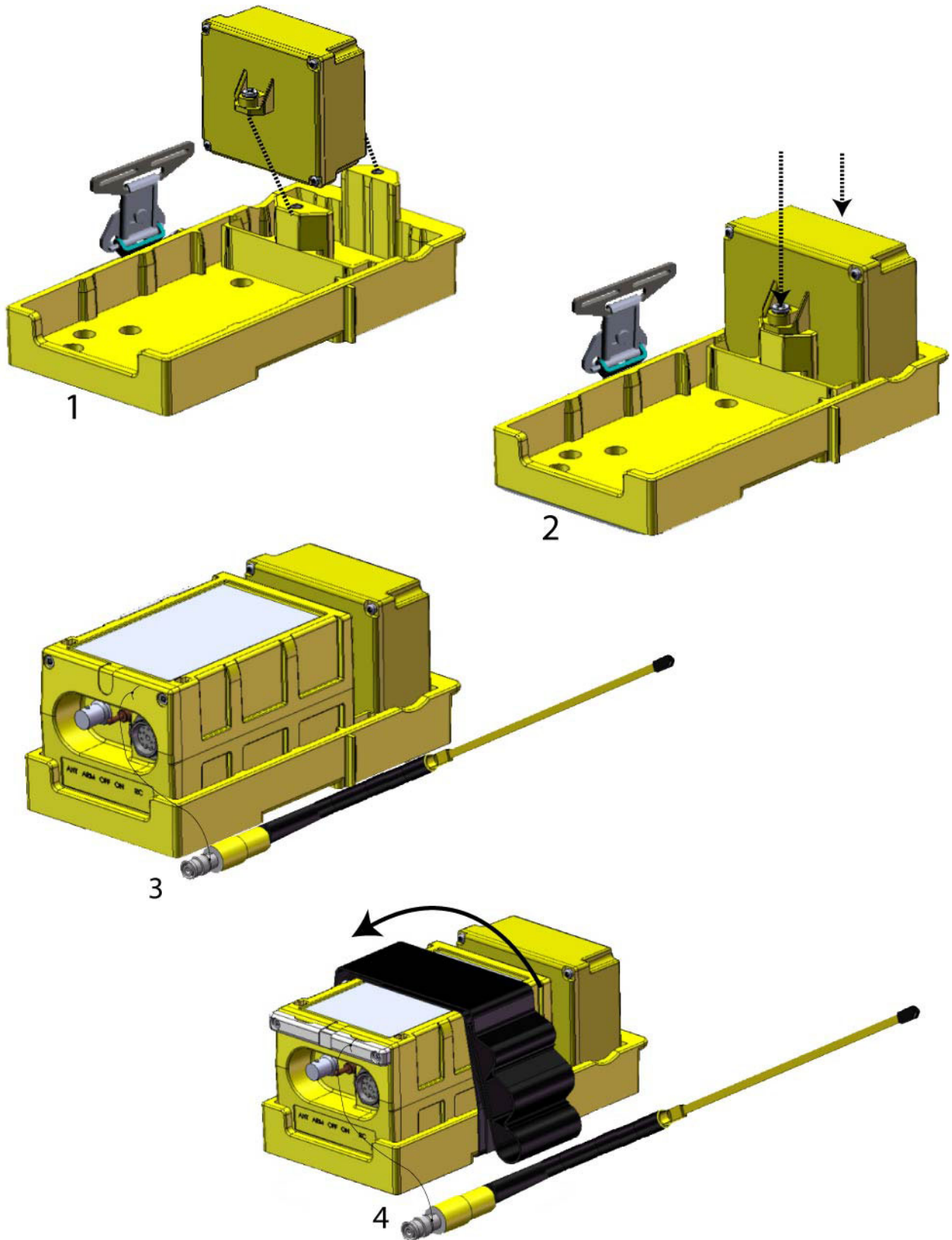


Figure 202: Installing ELT transmitter and INTEGRA ARINC e-NAV

(2) *ELT Fixing*

Refer to [Figure 203: Fixing the ELT on Mounting Bracket page 207](#)

5. Fix the strap of the mounting bracket by locking the latch on the buckle of the strap.
6. Do a quarter turn counterclockwise to the latch then bring the hook of the latch onto the buckle of the attaching strap.
7. Do a quarter turn clockwise to the latch to fix the attaching strap by sliding the hook down.
8. Pull down the latch to lock the attaching strap.

CAUTION: When locked, the center of the latch shall be aligned with the center of the buckle.

Check that the ELT is firmly attached:

IMPORTANT:

Once installed in the mounting bracket, the installer must be sure that the transmitter is firmly attached in its bracket by trying to extract it manually, thereby verifying there is no play and that it remains attached when extraction from the bracket is attempted.

CAUTION:

AN INCORRECT LOCKING OF THE LATCH COULD LEAD TO AN UNSAFE SITUATION BY THE ELT PREVENTING THE TRANSMISSION OF THE DISTRESS MESSAGE.

9. Close the snap of the strap, slide the auxiliary antenna (extremity first) into the lower antenna housing of the attaching straps.
10. Bend the antenna, then slide the extremity of the antenna into the upper antenna housing of the attaching straps.

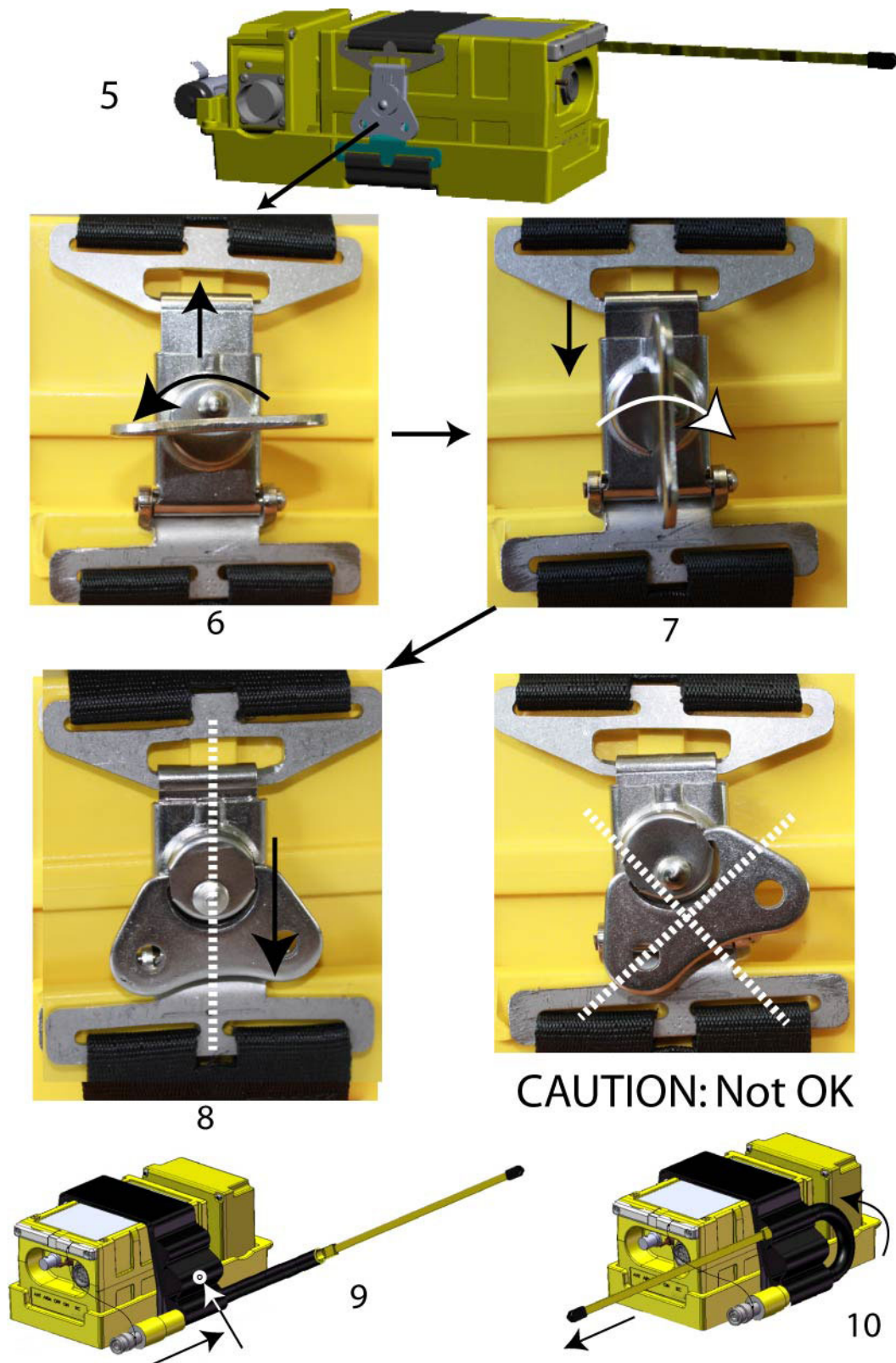


Figure 203: Fixing the ELT on Mounting Bracket

4. ELT transmitter Connection

1. Connect the cable of the outside antenna to the BNC connector of the front panel.
2. Connect the DIN12 connector of the ARINC e-NAV and Remote Control Panel cable to the DIN 12 socket of the front panel.
3. Connect +28VDC of ARINC e-NAV.
4. Connect and switch ON the on board GPS equipment.
 NOTE: any failure on ARINC e-NAV will result in a 3+7 failure on the ELT self-test.
5. Set the 3-position switch of the front panel to ARM.

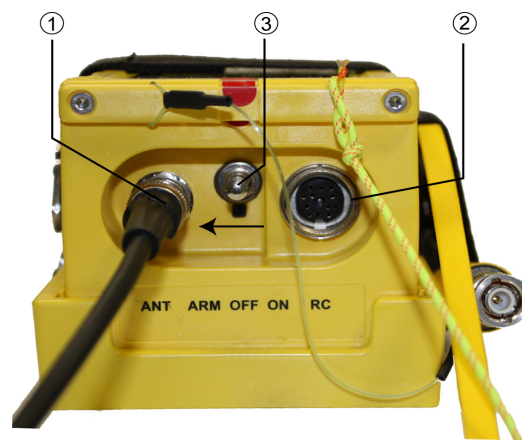


Figure 204: Installation, controls and connectors

- Perform the first power up procedure (see below).

5. First power up

Perform the following tests:

1. ELT operational tests:
 - connect the external antenna to J2;
 - switch the ELT from OFF to ARM;
 - check that the Self-Test result is OK (one long flash).
2. 406 & 121.5 MHz transmission tests (optional):
[Refer to B. Test of transmitted signals page 302.](#)

At the end of the first power up procedure, switch the ELT to ARM.

The ELT is now in stand by mode and ready to be activated:

- either automatically by G-Switch sensor if a crash occurs;
- or manually by an optional Remote Control Panel (when connected).

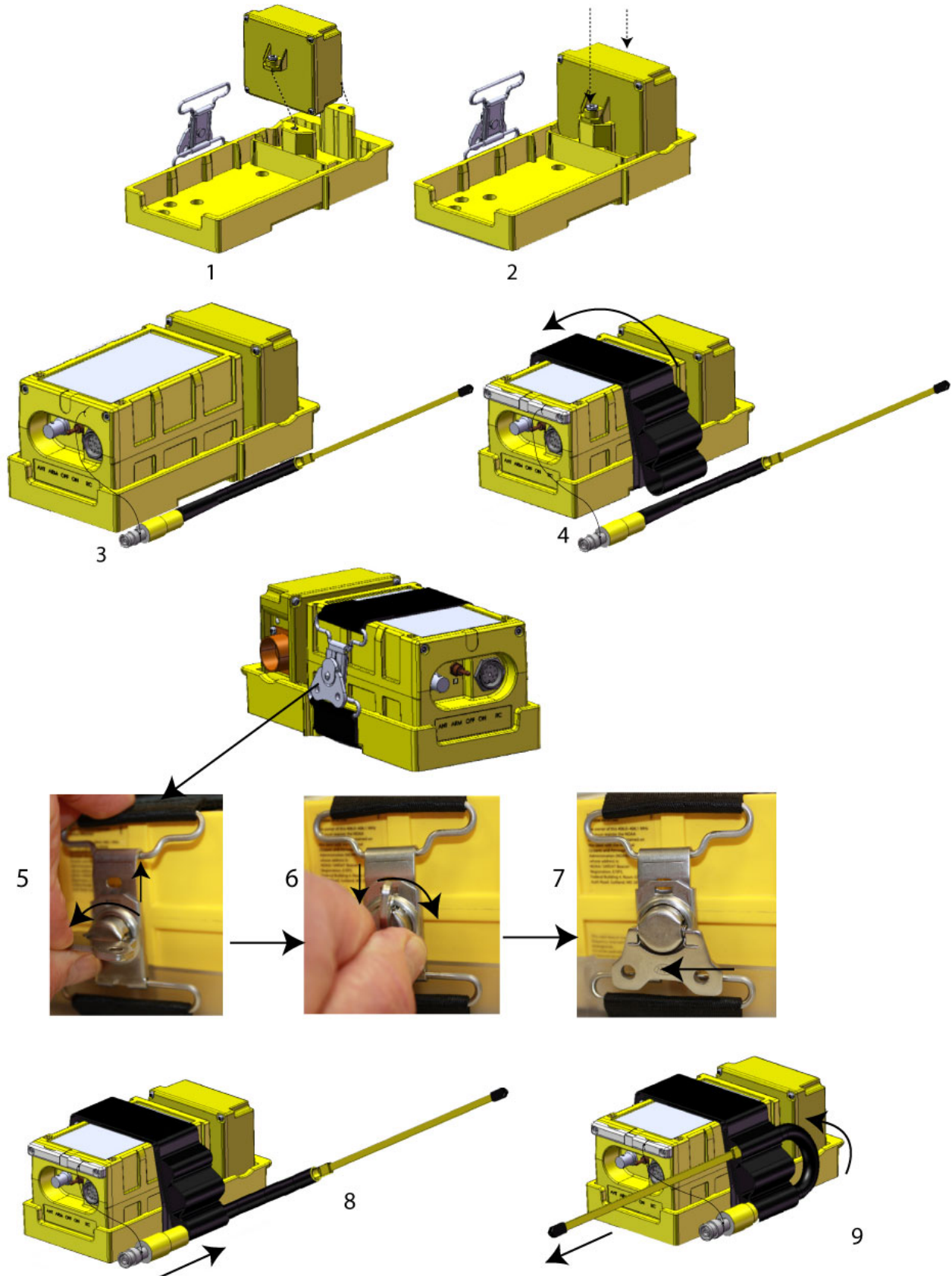
Note : switching to ON directly on the ELT front panel will also activate the ELT.

6. Removal

Refer to [Figure 205: Removing the transmitter page 210](#)

1. Open the snap of the strap.
2. Remove the antenna.
3. Pull up the latch to unlock.
4. Do a quarter turn counterclockwise to the latch to slide up the lock.
5. Lift the latch to disengage the hook of the latch from the buckle.
6. Remove the attaching strap from the ELT.
7. Extract the ELT from the mounting bracket.
8. Unscrew the 2 fixing screws of the INTEGRA ARINC e-NAV.
9. Remove the INTEGRA ARINC e-NAV from the mounting bracket.

Figure 205: Removing the transmitter



CHECK

1. Self-test

A. Periodicity

EUROCAE ED-62A Recommendations

§ 2.8.9 : "The battery source shall provide sufficient capacity for a self-test to be conducted according to the period specified by the manufacturer or at least once a month according to Cospas-Sarsat requirement."

§ 7.5 : "Check the self-test function according to manufacturer's recommendation and that such a test shall occur at least once every six months."

Manufacturer Recommendations

It is recommended by the manufacturer to test the ELT to detect any possible failure.

Operational check must be performed regularly by a pilot or maintenance personnel from the cockpit (Remote Control Panel). It is recommended to perform a self-test at least once every six months but it **should not be done more than once a month**.

Each self-test consumes energy from the battery. Should self-tests be carried out more often than the maximum allowed, the battery life-time might be shorter than specified.

B. Self-test procedure

- Check that the antenna is correctly connected
Do not perform self-test without antenna connected.
- Tune aircraft radio to 121.5 MHz and ensure you can hear it.
- Switch from position "OFF" to position "ARM" or press RESET & TEST on the Remote Control Panel (ensure that the ELT switch is in position "ARM").
- Listen for the buzzer or watch the LED - it operates during the whole Self-test procedure. Close to the end of self-test a short (3 sweeps) 121.5 transmission is made - confirm this on the aircraft radio.
- 10 seconds after the beginning of the self test, the test result is displayed with the red visual indicator and the buzzer will sound:
 - One long flash (duration 1 second) indicates that the system is operational and that no error conditions were found.
 - A series of short flashes (200 ms) indicates the test has failed.

Remark: The number of flashes gives an indication of the faulty parameter detected during the self-test.

3+1	LOW BATTERY VOLTAGE
3+2	LOW RF POWER
3+3	FAULTY VCO LOCKING (FAULTY FREQUENCY)
3+4	NO IDENTIFICATION PROGRAMMED
3+5	FAULTY VSWR (EXT. ANTENNA)
3+6	INTERNAL GPS SERIAL LINK
3+7	FAULTY INTEGRA ARINC e-NAV Possible faults: ARINC frame not valid; +28V D.C. not correct; Faulty connection.

If self-test fails, contact the distributor as soon as possible. Unless a waiver is granted, flight should be cancelled (refer to National Aviation Authorities).

2. Operational tests

These tests must be performed by maintenance personnel when performing the first power up procedure or to check the transmitter ([Refer to B. Test of transmitted signals](#)).

A. ELT operational tests

NOTE: ELT operational tests only provide the aircraft operator with an indication that the ELT is transmitting; however, a positive result cannot be interpreted as meaning that the ELT meets all operational parameters.

- connect the outside antenna to J2;
- switch the ELT from OFF to ARM;
- check that the Self-Test result is OK (one long flash).

B. Test of transmitted signals

(1) 406 MHz Transmission tests

This test should be carried out with a COSPAS-SARSAT decoder.

Note: If a COSPAS-SARSAT decoder is not available, the coding sheet supplied by the programmer for the beacon (or dongle) with the corresponding CSN proves that the beacon (or dongle) is correctly programmed. Skip to § (2) 121.5 MHz

- Perform self-test (switch ELT from OFF to ARM).
- Check with the COSPAS-SARSAT decoder that, except for the 5th and the 6th digits, the decoded message is identical to the programmed message.

NOTE: The message transmitted during self-test sequence always begins with FF FE D0 whereas a programmed message begins with FF FE 2F.

Example of message programmed in ELT:

FF FE 2F 96 E3 AF 0F 0F 7F DF FF 62 60 B7 83 E0 F6 6C

Example of same message decoded by Cospas-Sarsat Decoder:

FF FE D0 96 E3 AF 0F 0F 7F DF FF 62 60 B7 83 E0 F6 6C

NOTE: for location protocol beacons, the content of the encoded position data field of the self-test message shall be the default values (extract from C/S T001 Cospas Sarsat).

(2) 121.5 MHz Transmission tests

This check shall only be conducted during the first five minutes of any UTC, (co-ordinated universal time) hour, and restricted in duration to not more than five seconds. Be sure to notify any nearby control tower of your intentions.

This test must be carried out with a VHF receiver either with the aircraft VHF receiver or with a not on-board VHF receiver.

IMPORTANT: Aircraft VHF receiver may be used only if 406 MHz test was carried out with a Cospas-Sarsat decoder, otherwise check 121.5 MHz using a VHF receiver (not the on-board VHF receiver) several dozens meters away from the antenna. This ensures to validate the antenna.

- Tune VHF receiver to 121.5 MHz;
- Start transmission:
 - Switch ELT to ON.
- Only 2 "sweep tones" are heard after 5 seconds, then the 121.5 MHz stops.
- Stop transmission:
 - Switch to OFF;
 - continue to listen to 121.5 MHz for a few seconds to ensure that the ELT does not continue to transmit after the test is terminated.

IMPORTANT: If the ELT operates for approximately 50 seconds, a 406 MHz signal is transmitted and is considered valid by the satellite system.

- Switch ELT to ARM.

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TROUBLESHOOTING

1. General

Procedure for fault isolation onboard uses the indicator light (red visual indicator) of the ELT's front panel. This indicator light is activated by a self-test capability within the ELT.

2. Faults on Self-test

A. Visual Indicator

When the self-test is carried out, the number of flashes on ELT or RCP's visual indicator gives an indication of the faulty parameter detected during the self-test.

(1) 3+1 flashes

- Low battery voltage:
Replace battery: refer to relevant CMM for tests and repair.

(2) 3+2 flashes

- Low RF power:
Check 406 MHz power: refer to relevant CMM for tests and repair.

(3) 3+3 flashes

- Faulty VCO locking (faulty frequency):
Check frequencies: refer to relevant CMM for tests and repair.

(4) 3+4 flashes

- No identification programmed
Check programming: refer to relevant CMM for tests and repair.

(5) 3+5 flashes

- VSWR Fault
Check correct connection of antenna
Perform a VSWR measurement

(6) 3+6 flashes

- Internal GPS serial link fault
Check GPS receiver: refer to relevant CMM for tests and repair.

(7) 3+7 flashes

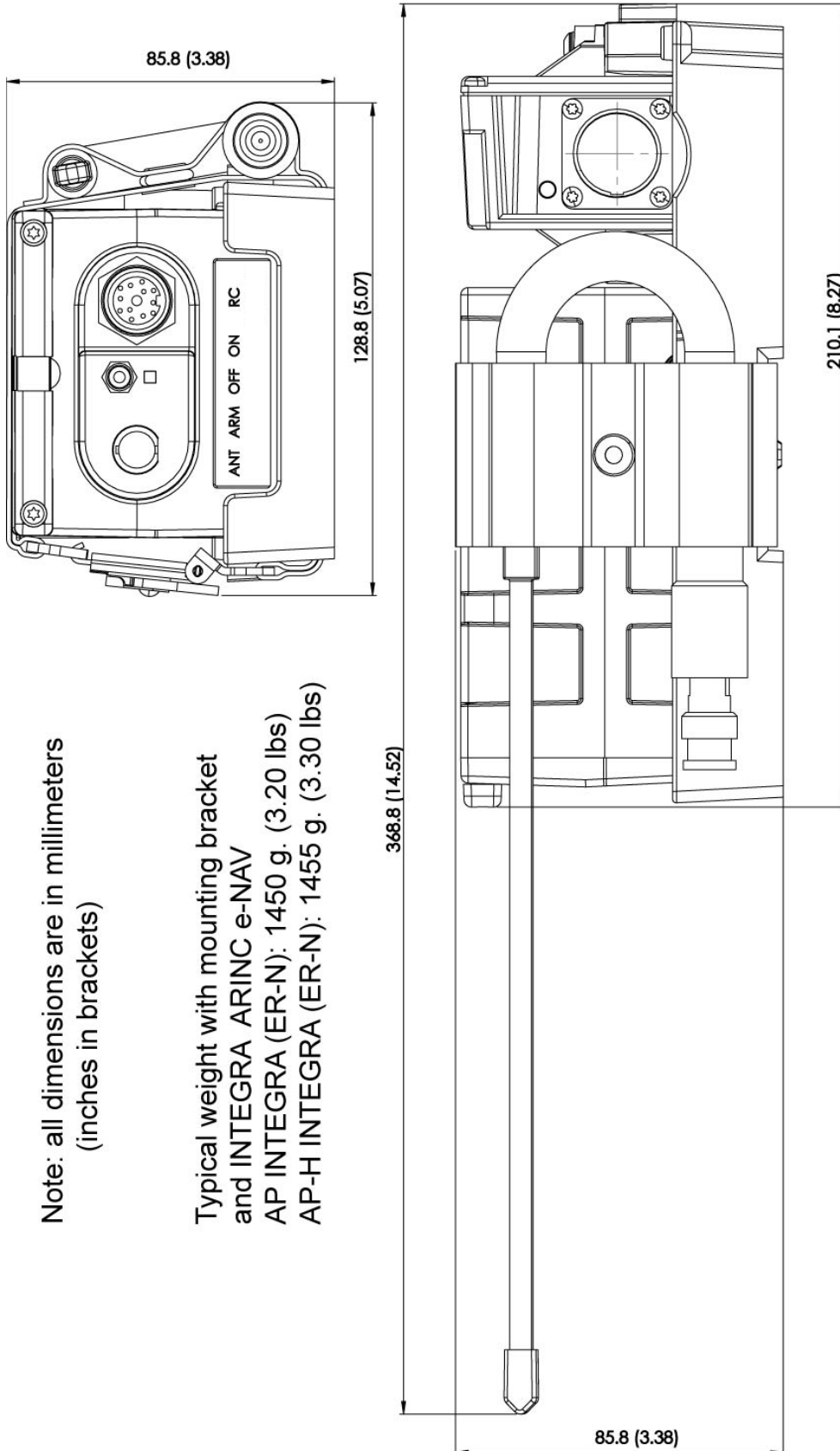
- INTEGRA ARINC e-NAV not connected
Check connection of INTEGRA ARINC e-NAV with ELT
Check +28VDC INTEGRA ARINC e-NAV power supply
Check ARINC429 frame

Note: for CMM download and other servicing instructions, refer to Service & Support section of Orolia website.

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SCHEMATICS & DIAGRAMS

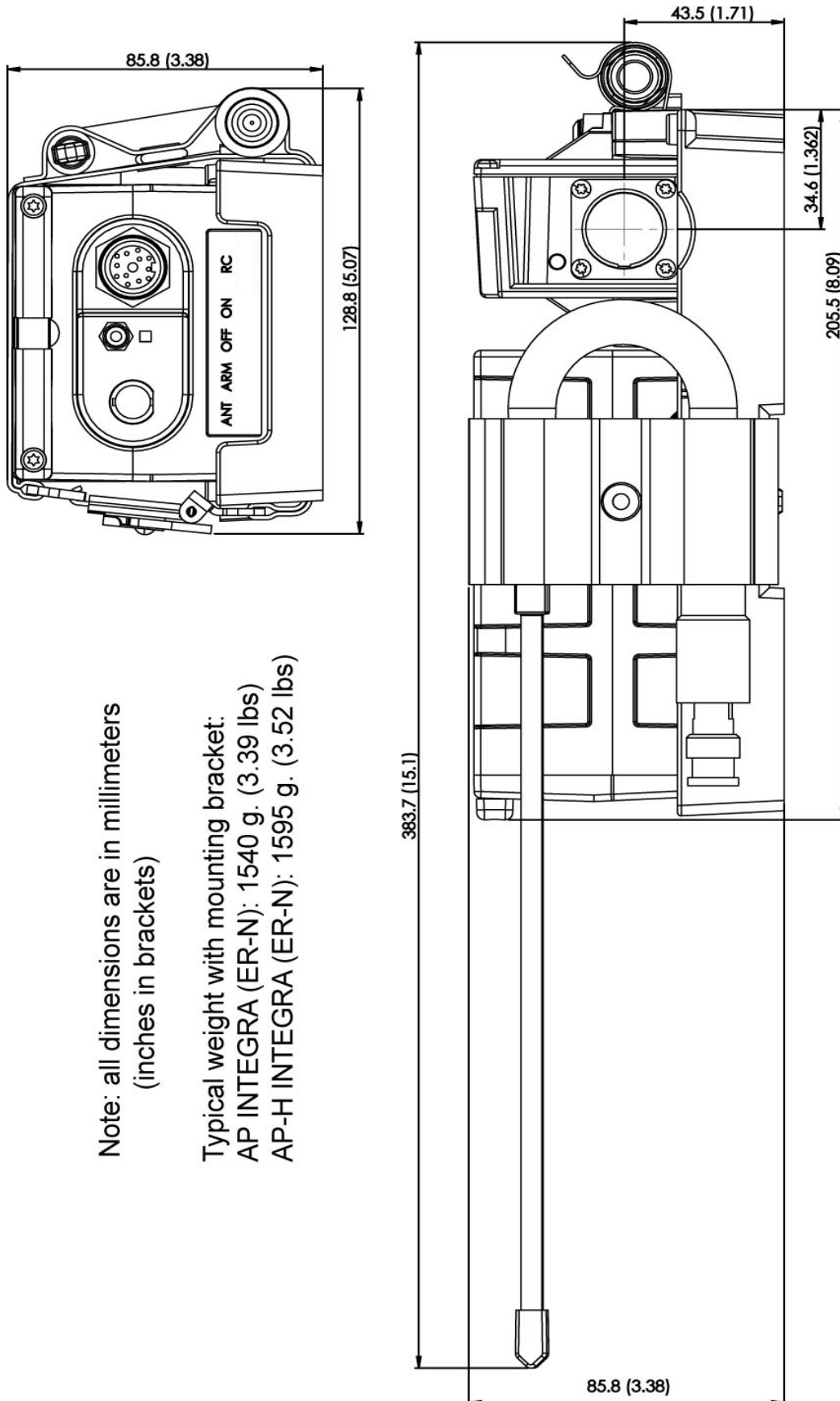
1. Outline dimensions and weight with mounting bracket and INTEGRA ARINC e-NAV



Note: all dimensions are in millimeters
 (inches in brackets)

Typical weight with mounting bracket
 and INTEGRA ARINC e-NAV
 AP INTEGRA (ER-N): 1450 g. (3.20 lbs)
 AP-H INTEGRA (ER-N): 1455 g. (3.30 lbs)

2. Outline dimensions and weight with mounting bracket, INTEGRA ARINC e-NAV and optional dongle



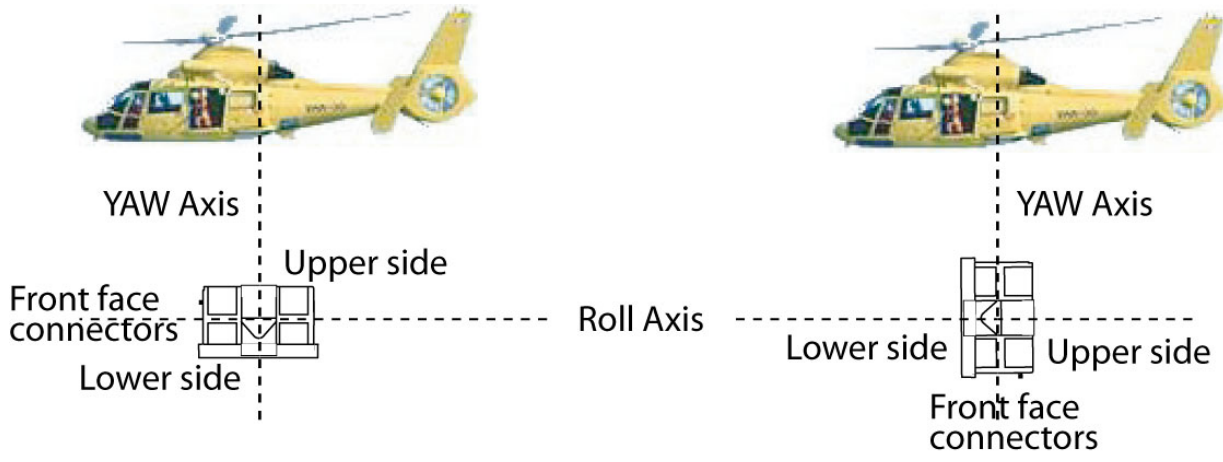
Note: all dimensions are in millimeters
 (inches in brackets)

Typical weight with mounting bracket:

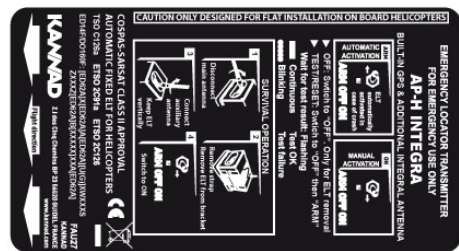
AP INTEGRA (ER-N): 1540 g. (3.39 lbs)

AP-H INTEGRA (ER-N): 1595 g. (3.52 lbs)

4. AP-H INTEGRA (ER-N), axis of intallation



= "Direction of Flight" Arrow



SERVICING

1. Maintenance Schedule

Battery replacement:

carried out by an accredited PART 145 or FAR 145 (or equivalent) maintenance station.

Periodic inspection:

depending if the ELT is opened or not, PART 145 or FAR 145 (or equivalent) may be required. Refer to local regulations

A. Periodic inspection

Note: (if required by the relevant Civil Aviation Authority).

Some Civil Aviation Authorities may require the ELT be tested periodically.

In this case, refer to Service Letter SL S1840501-25-05 "Guidelines for periodic inspection" available on the Service & Support section of Orolia Website.

B. Battery replacement

Testing of various elements and parameters of the ELT is mandatory when the battery is replaced.

- For battery replacement interval, [Refer to § 2. Battery replacement requirements, page 602.](#)
- The testing procedure associated with the battery replacement is described in the relevant CMM

For CMM download and other servicing instructions, refer to Service & Support section of Orolia Website.

2. Battery replacement requirements

Battery replacement is mandatory:

- after more than 1 hour of real transmission (cumulated duration);
- before or on the battery expiration date;
- after use in an emergency;
- after an inadvertant activation of unknown duration.

Only original and approved battery pack included in battery KIT BAT200 supplied by Orolia S.A.S. can be installed.

The battery replacement can only be carried out by a Kannad Approved Service Center.

For more information, refer to Kannad ELT Maintenance Policy available on Orolia website.

Orolia S.A.S. refuses all responsibility and invalidates all warranty should unapproved maintenance be carried out.

List of service stations available on our Web site: <https://www.orolia.com>

Orolia S.A.S.

Z.I. des Cinq Chemins CS10028

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