



EAC

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Requirements For Egyptian Registered Aircraft Regarding Installation Of 406 MHz Emergency Locator Transmitters (406 MHz ELTs).

1-Purpose

This circular provides the Egyptian aircraft operators with information concerning the necessary actions regarding the installation of 406 MHz ELT.

2-Related ECAR Sections

- ECAR Part 91.207
- ECAR Part 121.339
- ECAR Part 121.353

3-Related Reading Material

- ICAO Circular 185-AN/121, Satellite-Aided Search And Rescue-The COSPAS-SARSAT System.
- ICAO Doc. 9731, International Aeronautical and Maritime Search and Rescue IAMSAR
- ICAO Annex 6 Operation of Aircraft
Part I International Commercial Air Transport-Aeroplanes.
Part II International General Aviation-Aeroplanes
Part III International Operations-Helicopters.
- ICAO Annex 10 Vol. III Part II Voice Communications, Chapter 5.
- ICAO Annex 10 Vol. V Aeronautical Radio Frequency Spectrum Utilization, Chapter 2.
- ICAO Annex 12-Search And Rescue.
- Handbook Of Regulations on 406 MHz and 121-5 MHz Beacons, C/S S.007 September 1999(COSPAS/SARSAT).

4-Background

Although emergency transmitters have improved Search and Rescue (SAR) response, the methods of implementation, varieties in types and qualities of such equipment, and operational aspects have combined to produce false alerts. Search and Rescue authorities have therefore looked for improved techniques to receive alerts and to locate distress situations while minimizing problems caused by false alerts.

The existing ELTs (operating on 121.5 and 243 MHz) are uncoded and were not designed for satellite use. The 406 MHz radio spectrum has very low signal path losses for earth-to-space communications. Thus in 1979 the International Telecommunications Union (ITU) has allocated the frequency band of 406 to 406.1 MHz for exclusive use by satellite emergency position-indicating radio beacons in the earth-to-space direction.

The 406 MHz ELTs will reduce the number of false alerts to Search and Rescue teams worldwide and provide improved search coordinates. The new ELTs will also provide vital statistics to SAR teams concerning aircraft type, nationality & registration, communication equipment, etc.

All ELTs shall be designed for co-operation with the COSPAS/SARSAT (Space System for Search of Vessels in Distress/Search and Rescue Satellite-Aided Tracking) and shall be coded.

The major benefits of satellite-aided detection are that the probability of detection of ELTs is increased and the time required to detect and search for survivors of aircraft incidents is significantly decreased.

5-Operator Action

- A. Operators shall arrange with ECAA to choose the suitable protocol for ELT coding. (See Appendix A for ELT coding).
- B. Operators shall provide the manufacturer/installer with the protocol chosen.
- C. After coding the ELT, the manufacturer/installer will provide the operator with the 15 hexadecimal code.
- D. The operator shall fill in the ELT Registration form (see Appendix B) and send it to ECAA for registration.

5th. Each ELT shall have a unique code. This code must be changed in case of change of ownership or change of other information (name, propulsion, number and registration). The operator must inform the ECAA of these changes.

Note: The operator must develop a process and procedure to ensure that all ELTs remain on their registered aircraft and provide immediate notification to the ECAA whenever a unit is changed.

F. The operator must confirm that the 406 MHz ELT is certified according to TSO c126 and must be COSPAS-SARSAT approved.

Appendix A

ICAO Annex 10, Vol. III, Part 2, Voice Communications, Chapter 5

APPENDIX 1 TO CHAPTER 5 EMERGENCY LOCATOR TRANSMITTER CODING (See Chapter 5, 5.3.2)

Note.- A detailed description of beacon coding is contained in ITU/R M633/1. The following information is specific to emergency locator transmitters used in aviation.

1. GENERAL

- 1.1 The emergency locator transmitter (ELT) operating on 406 MHz has the capacity to transmit a programmed digital message, which contains information related to the ELT and/or the aircraft on which it is carried.
- 1.2 The ELT shall be uniquely coded in accordance with 1.3 below and be registered with the appropriate authority.
- 1.3 The ELT digital message shall contain either the transmitter serial number or one of the following information elements:
 - A) Aircraft operating agency designator and a serial number from 0001 to 4096.
 - B) 24-bit aircraft address.
 - C) Aircraft nationality and registration marks.
- 1.4 All ELTs shall be designated for co-operation with the COSPAS-SARSAT* system and be type approved.

Note:- Transmission characteristics of the ELT signal can be confirmed by making use of the COSPAS-SARSAT Type Approval Standard (C-S T.007).

2. ELT CODING

- 2.1 The ELT digital message contains information relating to the message format, coding protocol, country code and identification data consisting of one of the information elements listed in 1.3 above.
- 2.2 For ELTs with no navigation data provided, the short message format described in ITU/R M633/1 shall be used, making use of bits 1 through 112.

2.3 Protected data field

- 2.3.1 The protected data field consisting of bits 25 through 85 shall be protected by an error correcting code, and shall be the portion of the message which shall be unique in every distress beacon.
- 2.3.2 A message format flag indicated by bit 25 shall be set to “0” to indicate the short message format or set to “1” to indicate the long format for ELTs capable of proving location data.
- 2.3.3 A protocol flag shall be indicated by bit 26 and shall be set to “1”.
- 2.3.4 A country code, which indicates the State where additional data is available on the aircraft on which the ELT is carried, shall be contained in bits 27 through 36, which designate a three-digit decimal country code number expressed in binary notation.

Note.- Country codes are based on the International Telecommunication Union (ITU) Country code shown in Table 1 of Appendix 43 of the ITU Radio Regulations.
- 2.3.5 Bits 37 through 39 shall designate one of the user protocols where values “001” and “011” are used for aviation as shown in the examples contained in this Appendix.
- 2.3.6 The ELT digital message shall contain either the transmitter serial number or an identification of the aircraft or operator in bits 40 through 83 as shown below. This information shall be encoded in binary notation with the least significant bit on the right, or using the modified Baudot code shown in Table 5-1.
- 2.3.7 In the serialized used protocol (designated by bits 37 through 39 being “011”) bits 40 through 42 shall indicate type of beacon where:
 - “000” indicates ELT serial number is encoded in bits 44 through 63;
 - “001” indicates aircraft operator and a serial number are encoded in bits 44 through 61 and 62 through 73, respectively;

- "011" indicates the 24-bit aircraft address is encoded in bits 44 through 67 and each additional ELT on the same aircraft is numbered in bits 68 through 73.

Note.- States will ensure that each beacon, coded with the country code of the State, is Uniquely coded and registered in a database. Unique coding of serialized coded beacons Can be facilitated by including the COSPAS-SARSAT Type Approval Certificate Number

Which is a unique number assigned by COSPAS-SARSAT for each approved ELT model, as Part of the ELT message.

2.3.8 In the aviation user protocol (designated by bits 37 through 39 being "001"), the aircraft nationality and registration marking shall be encoded in bits 40 through 81, using the modified Baudot code shown in Table 5-1 to encode seven alphanumeric characters. This data shall be right justified with the modified Baudot space ("100100") being used where no character exists.

2.3.9 Bits 84 through 85 shall indicate any homing transmitter that may be integrated in the ELT.

Table 5-1. Modified Baudot Code

<i>Letter</i>	<i>Code</i>		<i>Figure</i>	<i>Code</i>	
	<i>MSB</i>	<i>LSB</i>		<i>MSB</i>	<i>LSB</i>
A	111000		(-)	011000	
B	110011				
C	101110				
D	110010				
E	110000		3	010000	
F	110110				
G	101011				
H	100101				
I	101100				
J	111010		8	001100	
K	111110				
L	101001				
M	100111				
N	100110				
O	100011		9	000011	
P	101101		0	001101	
Q	111101		1	011101	
R	101010		4	001010	
S	110100				
T	100001		5	000001	
U	111100		7	011100	
V	101111				
W	111001		2	011001	
X	110111		/	010111	
Y	110101		6	010101	
Z	110001				
()**	100100				

MSB = most significant bit

LSB = least significant bit

* = hyphen

** = space

Examples of Coding

ELT Serial Number

25		27 36	37			40				44 63	64 73	74 83	85	
F	1	Country	0	1	1	T	T	T	C	Serial Number Data (20 Bits)	Note 1	Note 2	A	A

Aircraft Address

25		27 36	37			40				44 67	68 73	74 83	85	
F	1	Country	0	1	1	T	T	T	C	Aircraft Address Data (24 Bits)	Note 3	Note 2	A	A

Aircraft Operator Designator and Serial Number

25		27 36	37			40				44 67	68 73	74 83	85	
F	1	Country	0	1	1	T	T	T	C	Operator 3 Letter Designator	Serial Number Jan-96	Note 2	A	A

Aircraft Registration Marking

25		27 36	37			40				81		83		85
F	1	Country	0	0	1	Aircraft Registration Marking (up to 7 Alphanumeric Characters (42 Bits))						0	0	A A

T=	Beacon type TTT	= 000 indicates ELT serial number is encoded; = 001 indicates operating agency and serial number are encoded; = 011 indicates 24-bit aircraft address is encoded.
C=	Certificate flag bit:	1 = To indicate COSPAS/SARSAT Type Approval Certificate Number is encoded in bits 74 to 83 0 = Otherwise
F=	Format Flag:	0 = Short Message 1 = Long Message
A=	Auxiliary Radio- Locating Device	00 = No auxiliary radio-locating device 01 = 121.5 MHz 11 = Other auxiliary radio-locating device

Note 1. 10 bits, all 0s or National Use.

Note2. COSPAS/SARSAT Type Approval Certificate number in binary notation with the least significant bit on the right, or National Use.

Note 3. Serial number, in binary notation with the least significant bit on the right, of additional ELTs carried in the same aircraft or default to 0s when only one ELT is carried.

Appendix B

406 MHz ELT Registration Form

Deliver to:

**SARSAT Beacon Registration
Flight Safety Standards Sector
Egyptian Civil Aviation Authority
ECAA Building, Airport Road
Heliopolis, Cairo, Egypt**

Date: _____

Check the appropriate box:

- ☐ New ELT Registration
- ☐ Change of ELT Ownership
- ☐ Change of ELT Information
- ☐ A replacement for a previously registered ELT.

1. Unique Identifier Number (15 Characters)

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

2. Manufacturer: _____

3. Model No.: _____

Owner Information

4. Owners Name (Last, First Middle Initial): _____

5. Leasing Agent: _____

6. Mailing Address: _____

7. Country: _____

8. Telephone: (Home) _____ (Work) _____

Aircraft Data

9. Registration Number:

			-			
--	--	--	---	--	--	--

10. Usage (Check One): ☐ General Aviation ☐ Air Carrier ☐ Commercial
☐ Military ☐ Government ☐ Other

11. Aircraft Manufacturer: _____

12. Model: _____

13. Color: _____

14. Seating Capacity: _____

15. Radio Equipment: ☐ VHF ☐ HF ☐ MF ☐ Other:

16. Principal Airport (Identifier): _____

17. Additional Data: _____

Emergency Contacts

18. Name of Primary 24-Hour Emergency Contact: _____

19. Telephone: (Home) _____ (Work) _____

20. Alternate 24-Hour Emergency Contact: _____

21. Telephone: (Home) _____ (Work) _____

Signature: _____