
HANDBOOK OF BEACON REGULATIONS

C/S S.007
Issue 2 – Revision 3
March 2022

Note: This document is provided for information only: up-to-date details on beacon regulations should be obtained from the relevant authorities.



HANDBOOK
OF BEACON REGULATIONS

History

<u>Issue</u>	<u>Revision</u>	<u>Date</u>	<u>Comments</u>
1	-	September 2009	
1	1	September 2010	
1	2	September 2011	
1	3	September 2012	
1	4	September 2013	
1	5	September 2014	
1	6	January 2015	
1	7	July 2015	
1	8	January 2016	
1	9	July 2016	
1	10	January 2017	
1	11	July 2017	
2	-	February 2018	Information on coding and registration requirements for each country/region was moved to the Cospas-Sarsat website.
2	1	August 2018	
2	2	January 2020	
2	3	March 2022	

TABLE OF CONTENTS

	<u>Page</u>
1. INTRODUCTION	1-1
1.1 Scope of Document	1-1
1.2 Default Beacon Coding Schemes	1-1
1.3 Testing Your 406 MHz Beacon	1-4
1.3.1 Introduction	1-4
1.3.2 How Should I Test my 406 MHz Beacon?.....	1-4
1.3.3 Live Beacon Testing.....	1-4
1.3.4 Aircraft Cockpit Testing of Distress Beacons by Aircraft Maintenance Facilities	1-5
1.4 EPIRBs and ELTs: International Regulations	1-5
1.5 PLBs	1-5
1.5.1 National Beacon Regulations for Serial-Coded PLBs.....	1-5
1.5.2 PLBs (Coded with a Serial Number).....	1-6
1.5.3 PLBs (not Coded with a Serial number).....	1-6
1.6 Checksum Feature	1-6
1.7 Reference Documents	1-8
1.7.1 Cospas-Sarsat System Documents	1-8
1.7.2 ICAO (Annexes to the Convention on International Civil Aviation).....	1-8
1.7.3 IMO (SOLAS Convention, Assembly Resolutions, MSC and COMSAR Circulars)	1-8
1.7.4 ITU	1-9
1.7.5 Other International / Regional Standards	1-9
2. SUMMARY STATUS OF BEACON REGULATIONS FOR COUNTRIES/ REGIONS	2-1
3. BEACON TEST FACILITIES	3-1
4. INTERNATIONAL BEACON REGULATIONS	4-1

LIST OF TABLES

Table 1: EPIRB Coding Methods	1-2
Table 2: ELT Coding Methods	1-2
Table 3: PLB Coding Methods	1-2
Table 4: Default User Protocols	1-3
Table 5: Default Location Protocols	1-3

1. INTRODUCTION

1.1 Scope of Document

The content of this document is provided for information only.

This document provides a summary of regulations issued by Cospas-Sarsat Participants regarding the carriage of 406 MHz beacons.

This document is based mainly on information provided by Participants at Cospas-Sarsat meetings and in reports on System status and operations. Some information was provided by non-Cospas-Sarsat Participants. However, regulations are likely to evolve and the attached information should not be regarded as an official record of their current status. Participants and non-Participants are invited to provide the Cospas-Sarsat Secretariat with updates as appropriate.

Up-to-date details on beacon regulations should be obtained from the relevant authorities noting that latest point of contact details, as provided in that respect by Administrations for “beacon matters”, are available on Cospas-Sarsat website at <https://www.cospas-sarsat.int/en/contacts-pro/contacts-details-all>.

Practical information on coding and registration regulations in each country/region, where such information was made available to the Cospas-Sarsat Secretariat, is available on the Cospas-Sarsat website at <https://www.cospas-sarsat.int/en/documents-pro/beacon-regulations-handbook> by country name on dedicated webpages. The latest changes related to beacon regulations are highlighted in light-grey color for better understanding.

If clear guidance for beacon coding is not provided for a country/territory in any Cospas-Sarsat document:

- beacon manufacturers should contact the relevant authorities for “beacon matters”; and
- if no contact with the relevant authorities could be established, then beacon manufacturers might, under their responsibility, choose to code beacons using coding protocols as proposed below in section 1.2 of this document.

An updated list of type approved beacons is available at <https://www.cospas-sarsat.int/en/beacons-pro/experts-beacon-information/approved-beacon-models-tacs?view=tac beacons>.

1.2 Beacon Coding Schemes

1.2.1 Available Beacon Coding Methods

A summary of the coding methods proposed by the Cospas-Sarsat Programme to Administrations for coding their beacons with their country code(s) is presented in the following tables:

Table 1: EPIRB Coding Methods

USER PROTOCOLS				LOCATION PROTOCOLS								
Maritime User		Serial User	Radio Call Sign	User Location			Standard Location		National Location	RLS (Return Link Service)		
MMSI	Radio Call Sign	TAC & Serial Number	Radio Call Sign	MMSI	TAC & Serial Number	Radio Call Sign	MMSI	TAC & Serial Number	Number Assigned by Competent Administration	National Number	TAC & Serial Number	RLS MMSI

Table 2: ELT Coding Methods

USER PROTOCOLS				LOCATION PROTOCOLS									RLS (Return Link Service)	
Serial User			Aviation User	User Location				Standard Location			National Location	RLS (Return Link Service)		
TAC & Serial Number	Aircraft Operator Designator and Serial Number	Aircraft 24-bit Address	Aircraft Nationality and Registration Marking	TAC & Serial Number	Aircraft Operator Designator and Serial Number	Aircraft 24-bit Address	Aircraft Nationality and Registration Marking	TAC & Serial Number	Aircraft Operator Designator and Serial Number	Aircraft 24-bit Address	Number Assigned by Competent Administration	National Number	TAC & Serial Number	

LOCATION PROTOCOLS		
ELT(DT) Location		
TAC & Serial Number ¹	Aircraft Operator Designator and Serial Number ¹	Aircraft 24-bit Address ²

Notes: (1) This protocol does not provide an ‘Aircraft Identification’ as required by ICAO for populating the LADR.

(2) This protocol provides an ‘Aircraft Identification’, and an ‘Aircraft Operator Identity’ only when the Aircraft Operator Designator (3LD) is included in the rotating PDF-2 field, as required by ICAO for populating the LADR

Table 3: PLB Coding Methods

USER PROTOCOLS		LOCATION PROTOCOLS					
Serial User		User Location	Standard Location	National Location	RLS (Return Link Service)		
PLB with [TAC & Serial Number]		PLB with TAC & Serial Number		Serial Number Assigned by Competent Administration	National Number	TAC & Serial Number	RLS MMSI

In response, under each column of the tables above:

“Y” means that the Administration allows the beacons of this type to be coded with this protocol for this(these) country code(s).

“N” means that the Administration does not allow the beacons of this type to be coded with this protocol for this(these) country code(s).

“[Y/N]” means that the Administration has not made available information to whether or not it allows the beacons of this type to be coded with this protocol for this(these) country code(s). See sections 1.1 and 1.2 of the main part of document C/S S.007 for further guidance.

1.2.2 Default Coding Methods Schemes

If clear guidance for beacon coding is not provided for a country/territory (see section 1.1), then beacon manufacturers might, under their responsibility, choose to code beacons with associated country/territory codes using a protocol that contains:

- a readily available vessel or aircraft identification, or
- a serial number, where the Cospas-Sarsat TAC number is encoded in the beacon ID.

Table 4: Default User Protocols

Beacon	Default 1	Default 2
EPIRB	Maritime User – MMSI	Serial User
ELT	Aviation User	Serial User – Aircraft 24-Bit Address
PLB	Serial User	No second default

Table 5: Default Location Protocols

Beacon	Default 1	Default 2
EPIRB	Standard Location – MMSI	Standard Location – Serial Number
ELT	Standard Location – 24-Bit Address ²	Standard Location – Serial Number ¹
PLB	Standard Location – PLB with Serial Number	No second default

Notes: The manufacturer/agent/dealer may use either Default 1 or Default 2, neither has precedence.

For beacons that can be coded with location protocols, competent Administrations may decide the use of the National Location protocol.

- (1) This protocol does not provide an ‘Aircraft Identification’ as required by ICAO for populating the LADR.
- (2) This protocol provides an ‘Aircraft Identification’, and an ‘Aircraft Operator Identity’ only when the Aircraft Operator Designator (3LD) is included in the rotating PDF-2 field, as required by ICAO for populating the LADR.

1.3 Testing Your 406 MHz Beacon

1.3.1 Introduction

Activating a 406 MHz beacon for even a very short time will generate a Cospas-Sarsat distress alert message that will be relayed to SAR services for their immediate action. 406 MHz beacons are digitally coded and transmit distress signals without delay. Therefore, 406 MHz beacons should not be activated except in real distress situations or unless special prior arrangements have been made with the Cospas-Sarsat Mission Control Centre (MCC) that services your region.

WARNING

Activating a beacon for reasons other than to indicate a distress situation or without the prior authorization from a Cospas-Sarsat MCC is considered an offence in many countries/territories of the world, and could result in prosecution.

1.3.2 How Should I Test my 406 MHz Beacon?

406 MHz beacons are designed with a self-test capability for evaluating key performance characteristics. Initiating the beacon self-test function will not generate a distress alert in the Cospas-Sarsat System. However, it will use some of the beacon's limited battery power, and should only be used in accordance with the beacon manufacturer's guidance. If you have questions regarding your beacon's self-test mode, contact your beacon manufacturer before attempting a self-test.

If you inadvertently activate the beacon in its operational mode, contact the appropriate Rescue Coordination Center (RCC) or the nearest Cospas-Sarsat MCC as soon as possible and cancel the distress alert.

1.3.3 Live Beacon Testing

In rare circumstances, there may be a need to activate a 406 MHz beacon in its operational mode for test purposes. Regardless of the beacon's location or the duration of activation, a 406 MHz beacon will be detected by at least one ground station (Local User Terminal (LUT)) in the System. The resulting distress alert message will be routed to every MCC in the Cospas-Sarsat System. Consequently, a great deal of coordination is required to ensure that all MCCs throughout the world are aware of test transmissions from beacons in their operational mode and that they have programmed their equipment to respond accordingly.

Requests to conduct a live beacon test should be directed to the Cospas-Sarsat MCC that services the location in which the test is planned and the Cospas-Sarsat MCC that supports the country/territory coded in the beacon (if different).

There are more than two million Cospas-Sarsat 406 MHz distress beacons in operation. In view of the number of beacons in service, coupled with the effort and resources required to coordinate a live beacon test, beacon owners should be aware

that authorization to activate a beacon for testing will only be granted in exceptional circumstances.

1.3.4 Aircraft Cockpit Testing of Distress Beacons by Aircraft Maintenance Facilities

Generally remote cockpit activations are performed on initial installation and during ongoing maintenance of the ELT. Aerial shielding of the beacon antenna should be considered prior to the live test.

Operational testing of a 406 MHz ELT from the cockpit may be undertaken provided the test duration is **no longer than 5 seconds**. The nearest RCC and the Air Traffic Services (ATS) Centre for the location of the test **must be advised** prior to this live test.

The test duration shall be restricted to **a maximum of 5 seconds** so that there is no potential for an operationally coded 406 MHz digital burst transmitting and thus generating a false alert. The duration of the 121.5/243 MHz homing transmission, which will also be activated as part of this test, must also be restricted so as not to generate false alerts.

Some countries/territories have regulations that are more restrictive, please check with appropriate regulatory authority regarding time and duration of test.

The Australian Maritime Safety Authority (AMSA) (Australia), the National Oceanic and Atmospheric Administration (NOAA) Satellite and Information Service (USA) and the European Union Safety Agency (EASA) provide comprehensive information and recommendations on beacon testing.

1.4 EPIRBs and ELTs: International Regulations

Regulations usually reflect the specific application in each country/territory of regulations (i.e., Recommendations, Resolutions, etc.) issued by the following international organizations:

- the International Civil Aviation Organization (ICAO),
- the International Maritime Organization (IMO),
- the International Telecommunication Union (ITU).

Copies of the relevant IMO Assembly Resolutions and Annexes to the Convention on International Civil Aviation are provided at section 8. Other international organizations' documents will be included for information in section 8 as appropriate.

1.5 PLBs

1.5.1 National Beacon Regulations for Serial-Coded PLBs

PLBs are intended for use by an individual person (i.e., not necessary linked to a ship or an aircraft like EPIRBs and ELTs). They can be used in any environment (e.g., on land, at sea and in aircraft) and installed in a mobile unit (e.g., vessel, aircraft). No beacon transmits properly under water and only EPIRBs are designed to work while

floating in water. Ownership and use of PLBs depends on national regulations including, particularly, whether they may meet “carriage” requirements for vessels and aircraft. Generally, PLBs can only be activated manually, with the exception of certain PLBs specifically designed for military use.

1.5.2 PLBs (Coded with a Serial Number)

A PLB coded with a serial number has a direct link with its registered owner rather than with a mobile unit (e.g., vessel, aircraft). Based on this:

- a PLB should be coded with the country code of the nationality of the registered owner or the country/territory where the registered owner lives,
- emergency contacts listed in the registration record of the PLB should speak the official language(s) associated with the country code of the beacon.

1.5.3 PLBs (not Coded with a Serial number)

Some Administrations permit PLBs to be coded with a direct link to a mobile unit (e.g., ship’s MMSI number, aircraft 24-bit address or an Aircraft Operator Designator). In these instances, the PLB shall be coded in accordance with the relevant rules for the permitted coding scheme.

1.6 Checksum Feature

A checksum feature shall be provided that allows, on an optional basis, the automatic verification of the 15-Hex ID entered by a beacon owner when registering a beacon. The checksum is provided by beacon manufacturers when required by national regulations.

Use of the checksum feature is designed to ensure correct initial registration of beacons and is not designed for checking changes to beacon registrations or changes to the 15-Hex ID that might be implemented in the field (for example to change the Country Code when a beacon changes flag-state).

The algorithm for calculating the beacon checksum and guidelines for its use can be found in document C/S G.005, "Guidelines on 406 MHz Beacon Coding, Registration and Type Approval".

1.7 Return Link Service (RLS)

The Return Link Service (RLS) provides notification to a 406 MHz beacon that an alert transmitted by the beacon has been detected by a LUT and distributed via the Cospas-Sarsat MCC network to the MCC whose service area covers the beacons confirmed position.

This service is intended to provide acknowledgement of the reception of the alert message to persons in distress and is only available for 406 MHz beacons coded to provide a return link. Once notified that an RLS-capable beacon has been located, the Return-Link Service Provider (RLSP) interfaces to the Ground Segment for transmitting return link messages to appropriate satellites, which, in turn, transmit return link messages (RLMs) to the transmitting beacon. After receipt of the return link message by the beacon, subsequent beacon transmissions

include the return link message receipt status, and a notification that includes the receipt status is distributed via the Cospas-Sarsat MCC network to the designated RLSP. Once notified that the beacon has received the return link message, the RLSP interfaces to the relevant ground segment which will cease transmitting return link messages to satellites.

A RLS-capable beacon must be coded with the RLS protocol in order for the RLS system to function. If an RLS capable beacon is coded with an alternative location protocol (either Standard Location or National Location) due to an administration not approving the use of RLS in their territory, then the RLS function in that beacon will be disabled. The RLS location protocol can be coded in one of three ways:

- National RLS Number (for which the Administration provides a ‘national’ serial number, or
- TAC and Serial Number (for which the Type-Approved Certificate number and the associated serial number are provided by the beacon manufacturer), or
- RLS-MMSI number (for which the last 6 digits of a vessel’s MMSI are provided, which together with the Country Code provide the full MMSI for that vessel) (only applicable to EPIRBs).

Additional information on the return link service is available in document C/S R.012 “Cospas-Sarsat 406 MHz MEOSAR Implementation Plan”.

1.8 Reference Documents

1.8.1 Cospas-Sarsat System Documents

The latest issues of these documents are available on the Cospas-Sarsat website (www.cospas-sarsat.int):

- a. C/S S.011 Cospas-Sarsat Glossary,
- b. C/S G.005 Cospas-Sarsat Guidelines on 406 MHz Beacon Coding, Registration and Type Approval,
- c. C/S G.007 Handbook on Distress Alert Messages for RCCs, SPOCs and IMO Ship Security Competent Authorities,
- d. C/S T.001 Specification for Cospas-Sarsat [First-Generation] 406 MHz Distress Beacons,
- e. C/S T.007 Cospas-Sarsat [First-Generation] 406 MHz Distress Beacon Type Approval Standard.

1.8.2 ICAO (Annexes to the Convention on International Civil Aviation)

- a. Annex 6 Operation of Aircraft,
- b. Annex 10 Aeronautical Telecommunications,
- c. Annex 12 Search and Rescue.

1.8.3 IMO (SOLAS Convention, Assembly Resolutions, MSC and COMSAR Circulars)

- a. International Convention for the Safety of Life at Sea (SOLAS), 1974,
- b. Resolution A.662(16): Performance Standards for Float-Free Release and Activation Arrangements for Emergency Radio Equipment,
- c. Resolution A.694(17): General Requirements for Shipborne Radio Equipment Forming Part of the Global Maritime Distress and Safety System (GMDSS) and for Electronic Navigational Aids,
- d. Resolution A.810(19): Performance Standards for Float-Free Satellite Emergency Position-Indicating Radio Beacons (EPIRBs) Operating on 406 MHz,
- e. Resolution A.814(19): Guidelines for the Avoidance of False Distress Alerts,
- f. Resolution A.887(21): Establishment, Updating and Retrieval of the Information Contained in the Registration Databases for the Global Maritime Distress and Safety System (GMDSS),
- g. Resolution MSC.83(70): Adoption of Amendments to the Survey Guidelines Under the Harmonized System of Survey and Certification (Resolution A.746(18)),
- h. Resolution MSC.471(101): Performance standards for float-free emergency position-indicating radio beacons (EPIRBs) operating on 406 MHz

- i. MSC Circular 861: Measures to Reduce the Number of False Distress Alerts,
- j. MSC Circular 863: Recommendation on Prevention of Harmful Interference to 406 MHz EPIRBs Operating with the Cospas-Sarsat System,
- k. MSC Circular 1039: Guidelines for Shore-Based Maintenance of Satellite EPIRBs,
- l. MSC Circular 1040: Guidelines on Annual Testing of 406 MHz Satellite EPIRBs,
- m. MSC Circular 1174: Basic Safety Guidance for Oceanic Voyages by non-Regulated Craft,
- n. MSC.1 Circ. 1210/Rev.1: Guidance on the Cospas-Sarsat International 406 MHz Beacon Registration Database,
- o. COMSAR Circular 32: Harmonization of GMDSS Requirements for Radio Installations on Board SOLAS Ships.

1.8.4 ITU

Recommendation ITU-R M.633: Transmission Characteristics of a Satellite Emergency Position-Indicating Radio Beacon (Satellite EPIRB) System Operating through a Low Polar-Orbiting Satellite System in the 406 MHz Band.

1.8.5 Other International / Regional Standards

1.8.5.1 International Electrotechnical Commission (IEC)

International Standard on GMDSS. IEC 61097-2, Ed.3: Cospas-Sarsat EPIRB - Satellite Emergency Position-Indicating Radio Beacons Operating on 406 MHz (Operational and Performance Requirements, Methods of Testing and Required Test Results), 2008.

1.8.5.2 European Telecommunications Standards Institute (ETSI)

These documents are available free-of-charge on the ETSI website at www.etsi.org.

- a. ETSI EN 300 066 V1.3.1 (2001-01): Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Float-Free Maritime Satellite Emergency Position Indicating Radio Beacons (EPIRBs) Operating in the 406.0 MHz to 406.1 MHz Frequency Band; Technical Characteristics and Methods of Measurement (see Note 2),
- b. ETSI EN 302 152-1 V1.1.1 (2003-11): Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Satellite Personal Locator Beacons (PLBs) Operating in the 406.0 MHz to 406.1 MHz Frequency Band; Technical Characteristics and Methods of Measurement (see Note 2).

1.8.5.3 The European Organization for Civil Aviation Equipment (EUROCAE)

ED-62B (December 2018): Minimum Operational Performance Specification for Aircraft Emergency Locator Transmitters 406 MHz.

1.8.5.4 The European Union Aviation Safety Agency (EASA)

1.8.5.5 EASA SIB No.: 2019-09R1 (11 September 2019): Safety Information Bulletin Airworthiness on Emergency Locator Transmitters and Personal Locator Beacon - Annual Testing. Radio Technical Commission for Maritime Services (RTCM)

- a. RTCM Recommended Standards for 406 MHz Satellite Emergency Position-Indicating Radiobeacons (EPIRBs), RTCM 11000.4 with Amendment 1 published on 17 July 2016,
- b. RTCM Recommended Standards for 406 MHz Satellite Personal Locator Beacons (PLBs), RTCM 11010.3 published 25 June 2018.
- c. RTCM Recommended Standards for 406 MHz Ship Security Alert System Beacons (SSAS), RTCM 11020.1 published on 9 October 2009.

(all available at www.rtcm.org)

1.8.5.6 Radio Technical Commission for Aeronautics (RTCA)

Document No. RTCA/DO-204B (December 13, 2018): Minimum Operational Performance Standards for Aircraft Emergency Locator Transmitters 406 MHz.

- END OF SECTION 1 -

2. SUMMARY STATUS OF BEACON REGULATIONS FOR COUNTRIES/REGIONS

Available information on coding and registration requirements for the Administrations listed below is at <https://www.cospas-sarsat.int/en/documents-pro/beacon-regulations-handbook>.

Albania	India	Pakistan
Algeria	Indonesia	Panama
Antigua and Barbuda	Ireland	Peru
Argentina	Israel	Poland
Australia	Italy	Portugal
Bahamas	Jamaica	Qatar
Belgium	Japan	Romania
Bermuda	Kenya	Russia
Brazil	Korea (Rep. of)	South Africa
Bulgaria	Latvia	Saudi Arabia
Canada	Liberia	Serbia
Chile	Liechtenstein	Singapore
China, P.R. of	Lithuania	Spain
Croatia	Malta	Sweden
Cyprus	Marshall Islands	Switzerland
Denmark	Mauritius	Taipei (Chinese)
Egypt	Mexico	Thailand
Estonia	Malaysia	Tunisia
Fiji	Moldova	Turkey
Finland	Montenegro	United Arab Emirates
France	Myanmar	United Kingdom
Germany	Netherlands, The	Ukraine
Georgia	Nigeria	United States of America
Greece	North Macedonia	Vanuatu
Hong Kong, China	Norway	Viet Nam
Iceland	New Zealand	

Updated point of contact details for Administrations are available at
<https://www.cospas-sarsat.int/en/contacts-pro/contacts-details-all>.

3. BEACON TEST FACILITIES

General information on beacon test facilities is available on the Cospas-Sarsat website at www.cospas-sarsat.int.

- END OF SECTION 3 -

This document has been
superseded
by a later version

4. INTERNATIONAL BEACON REGULATIONS

Name of Document	Page
IMO Resolution MSC.471(101): Performance standards for float-free emergency position-indicating radio beacons (EPIRBs) operating on 406 MHz	4-2
IMO Assembly Resolution A.696(17): Type Approval of Satellite Emergency Position-Indicating Radio Beacons (EPIRBs) Operating in the Cospas-Sarsat System	4-7
IMO Assembly Resolution A.662(16): Performance Standards for Float-Free Release and Activation Arrangements for Emergency Radio Equipment	4-8
IMO Assembly Resolution A.887(21): Establishment, Updating and Retrieval of the Information Contained in the Registration Databases for the Global Maritime Distress and Safety System (GMDSS)	4-10
IMO Assembly Resolution A.814(19): Guidelines for the Avoidance of False Distress Alerts	4-14
MSC/Circ.861: Measures to Reduce the Number of False Distress Alerts	4-21
MSC/Circ.863: Recommendation on Prevention of Harmful Interference to 406 MHz EPIRBs Operating with Cospas-Sarsat System	4-23
MSC/Circ.1039: Guidelines for Shore-Based Maintenance of Satellite EPIRBs	4-24
MSC.1/Circ.1040 /Rev.1: Guidelines on Annual Testing of 406 MHz Satellite EPIRBs	4-30
MSC/Circ.1174: Basic Safety Guidance for Oceanic Voyages by non-Registered Craft	4-32
MSC.1/Circ.1210/Rev.1: Guidance on the Cospas-Sarsat International 406 MHz Beacon Registration Database	4-35
IMO Resolution MSC.83(70): Adoption of Amendments to the Survey Guidelines Under the Harmonized System of Survey and Certification (Resolution A.746(18))	4-41
COMSAR Circular 32: Harmonization of GMDSS Requirements for Radio Installations on Board SOLAS Ships	4-43
Annex 6 to the Convention on International Civil Aviation Operation of Aircraft	4-45
Annex 10 to the Convention on International Civil Aviation Aeronautical Telecommunications	4-50
Annex 12 to the Convention on International Civil Aviation Search and Rescue	4-59

Maritime Safety Committee Resolution MSC.471(101)
adopted on 14 June 2019

**PERFORMANCE STANDARDS FOR FLOAT-FREE EMERGENCY
POSITION-INDICATING RADIO BEACONS (EPIRBs)
OPERATING ON 406 MHz**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO regulations IV/7.1 and 14.1 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, concerning radiocommunications for the Global Maritime Distress and Safety System (GMDSS), which require, *inter alia*, that ships be provided with an emergency position-indicating radio beacon (EPIRB), which shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to prepare performance standards for float-free EPIRBs operating on 406 MHz through the Cospas-Sarsat System of low-altitude earth orbiting, medium-altitude earth orbiting, and geostationary earth orbiting satellites to be used in the GMDSS, in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment on board ships,

RECOGNIZING ALSO that EPIRBs, as a component of the GMDSS and operating through the Cospas-Sarsat System in the frequency band 406-406.1 MHz, should be type-approved to ensure the integrity of the Cospas-Sarsat satellite system, avoid harmful interference to the spaceborne equipment, exclude unauthorized transmissions, and to provide reliable data to rescue coordination centres,

HAVING CONSIDERED the recommendation made by Sub-Committee on Navigation, Communications and Search and Rescue, at its sixth session,

1 ADOPTS the Recommendation on performance standards for float-free Emergency Position-Indicating Radio Beacons (EPIRBs) operating on 406 MHz, set out in the annex to the present resolution;

2 RECOMMENDS that Member States ensure that float-free EPIRBs operating on the frequency 406 MHz, which form part of the GMDSS:

- .1 if installed on or after 1 July 2022, conform to performance standards and type-approval standards not inferior to those specified in the annex to the present resolution;
- .2 if installed before 1 July 2022, conform to performance standards not inferior to those specified in the annex to resolution A.810(19), as amended by resolutions MSC.56(66) and MSC.120(74), and type-approval standards not inferior to those specified in resolution A.696(17);

3 INVITES the Cospas-Sarsat partners to ensure that any amendments to the specification for Cospas-Sarsat 406 MHz distress beacons that could impact on this performance standard are agreed with the Organization prior to their adoption;

4 AGREES that any proposed amendments to this resolution are agreed with the Cospas-Sarsat partners prior to their adoption;

5 ALSO AGREES to keep these Performance Standards under review and to adopt amendments thereto, as necessary.

This document has been
superseded
by a later version

ANNEX

**RECOMMENDATION ON PERFORMANCE STANDARDS FOR
FLOAT-FREE EMERGENCY POSITION-INDICATING RADIO
BEACONS (EPIRBs) OPERATING ON 406 MHz****Part A – GENERAL****1 INTRODUCTION**

The emergency position-indicating radio beacon (EPIRB) should, in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations and the general requirements set out in resolution A.694(17), comply with the following performance standards.

2 GENERAL

2.1 The EPIRB should be capable of transmitting a distress alert, including encoded position information from a receiver using a recognised global navigation satellite system (GNSS) with global coverage, to satellites equipped with a search and rescue 406 MHz processor or repeater.

2.2 The EPIRB should be of an automatic float-free type. The equipment, mounting and releasing arrangements should be reliable, and should operate satisfactorily under the most extreme conditions likely to be met with at sea.

2.3 The EPIRB should:

- .1 be fitted with adequate means to prevent inadvertent activation;
- .2 be so designed that the electrical portions are watertight at a depth of 10 m for at least 5 min. Consideration should be given to a temperature variation of 45°C during transitions from the mounted position to immersion. The harmful effects of a marine environment, condensation and water leakage should not affect the performance of the beacon;
- .3 be automatically activated after floating free;
- .4 be capable of manual activation and deactivation;
- .5 be provided with means to indicate that signals are being emitted;
- .6 be capable of floating upright in calm water and have positive stability and sufficient buoyancy in all sea conditions;
- .7 be capable of being dropped into the water without damage from a height of 20 m;
- .8 be capable of being tested, without using the satellite system, to determine that the EPIRB is capable of operating properly;
- .9 be of highly visible yellow/orange colour and be fitted with retroreflecting material;

- .10 be equipped with a buoyant lanyard suitable for use as a tether (to a liferaft, lifeboat or person in the water but not to the ship), which should be so arranged as to prevent its being trapped in the ship's structure when floating free;
- .11 be provided with a low duty cycle light (0.75 cd), active during darkness, visible to the human eye and detectable by all types of night vision devices, to indicate its position to nearby survivors and to rescue units;
- .12 not be unduly affected by seawater or oil or both;
- .13 be resistant to deterioration in prolonged exposure to sunlight;
- .14 be provided with a 121.5 MHz beacon primarily for homing by aircraft;
- .15 be provided with a GNSS receiver for position fixes and an associated indication that GNSS signal reception is satisfactory or unsatisfactory; and
- .16 be provided with an Automatic Identification System (AIS) locating signal in accordance with the Recommendation ITU-R M.1371, Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile frequency band.

2.4 The battery should have sufficient capacity to operate the EPIRB for a period of at least 48 h.

2.5 The EPIRB should be so designed as to operate under any of the following environmental conditions:

- .1 ambient temperatures of -20°C to +55°C;
- .2 icing;
- .3 relative wind speeds up to 100 knots; and
- .4 after stowage, at temperatures between -30°C and +70°C.

2.6 The installed EPIRB should:

- .1 have local manual activation; remote activation may also be provided from the navigating bridge, while the device is installed in the float-free mounting;
- .2 be capable, while mounted on board, of operating properly over the ranges of shock and vibration and other environmental conditions normally encountered above deck on seagoing ships; and
- .3 be designed to release itself and float free before reaching a depth of 4 m at a list or trim of any angle.

3 DISTRESS FUNCTION

3.1 When the EPIRB is manually operated a distress alert should be initiated only by means of a dedicated distress alert activator.

3.2 The dedicated activator should:

- .1 be clearly identified; and
- .2 be protected against inadvertent operation.

3.3 Manual distress alert initiation should require at least two independent actions.

3.4 The EPIRB should not be automatically activated after being manually removed from the release mechanism.

4 GNSS RECEIVER POSITION REPORTING

When the EPIRB is activated:

- .1 the GNSS position fix shall be updated at intervals of no more than five minutes; and
- .2 when an updated fix is transmitted in the AIS message for the first time, the error between the transmitted and the actual position shall not exceed 30 m assuming a drift rate of 3 kn.

5 LABELLING

5.1 Labelling for operation controls and indicators should, as far as possible, be understood through graphical images and symbols without the need for text.

5.2 In addition to the items specified in resolution A.694(17) on general requirements, the following should be clearly indicated on the exterior of the equipment:

- .1 brief operating instructions;
- .2 expiry date for the primary battery used; and
- .3 the identity codes programmed into the transmitters.

Part B – RADIO-FREQUENCY SIGNALS

1 The technical characteristics of the transmitted signal and the message format should be in accordance with the requirements of Cospas-Sarsat System documents C/S T.001 or C/S T.018.

2 Provisions should be included for storing the fixed portion of the distress message in the EPIRB using non-volatile memory.

3 A unique beacon identification code should be made part of all 406 MHz messages.

For EPIRBs compliant with C/S T.001 this identification code should include a three-digit maritime identification digits (MID) code to denote the country in which the beacon is registered, followed by either:

- .1 the trailing 6 digits of the ship station identity in accordance with appendix 43 of ITU Radio Regulations Recommendation ITU-R M.585, Assignment and use of identities in the maritime mobile service; or

- .2 a unique serial number; or
- .3 a radio call sign.

Preference is given to the method in sub-paragraph .1 above.

For EPIRBs compliant with C/S T.018 this identification code should include a three-digit maritime identification digits (MID) code to denote the country in which the beacon is registered, followed by a unique serial number and either the maritime mobile service identity or a radio call sign.

4 The 121.5 MHz homing signal should:

- .1 have a 121.5 MHz transmitting duty cycle not less than 50% (1.125 seconds on, 1.125 seconds off) and if more than 50%, the on time should be increased beyond 1.125 seconds and the off time reduced accordingly; and
- .2 with the exception of the sweep direction, meet the technical characteristics of appendix 15 of the Radio Regulations. The sweep may be either upward or downward.

5 The AIS locating signal should:

- .1 transmit in accordance with recommendation ITU-R Rec M.1371;
- .2 start after the first 406 MHz satellite message and ensure the AIS signal does not conflict with a scheduled 406 MHz satellite signal;
- .3 when the AIS signal coincides with a scheduled 121.5 MHz homing signal, then the 121.5 MHz homing signal may be interrupted for the transmission of the AIS signal, provided the minimum 50% duty cycle is maintained;
- .4 broadcast the Cospas-Sarsat beacon 15 HEX-ID in the AIS message 14, alternating with the text " "EPIRB ACTIVE" on AIS1 and AIS2; and
- .5 indicate in the transmitted AIS locating signal when the included position fix is more than five minutes old.

Part C –TYPE APPROVAL OF EPIRBs OPERATING IN THE COSPAS-SARSAT SYSTEM

1 EPIRBs forming an integral component of the GMDSS and operating through the Cospas-Sarsat satellite system in the frequency band 406 - 406.1 MHz should be type approved to ensure the integrity of the Cospas-Sarsat satellite system, avoid harmful interference to the spaceborne equipment, exclude unauthorized transmissions, and to provide reliable data to rescue coordination centres.

2 National administrations should:

- .1 ensure, as part of national type approval procedures, that any new type of EPIRB to be deployed on board ships is tested to confirm that it is in accordance with the performance standards for EPIRBs; confirmation that the EPIRB meets part B of this performance standard can be achieved by either:

- .1 performing, or having performed, under national procedures, all appropriate tests; and/or
- .2 accepting type approval test results obtained through the Cospas-Sarsat type approval procedure for first generation beacons (Cospas-Sarsat document C/S T.007) or the Cospas-Sarsat type approval procedure for second generation beacons (Cospas-Sarsat document C/S T.021) and confirmed by the delivery of a Cospas-Sarsat Type Approval Certificate; and
- .2 encourage national type approval authorities to develop test procedures compatible, to the extent possible, with Cospas-Sarsat System document C/S T.007 or C/S T.021 as appropriate

This document has been
superseded
by a later version

IMO Assembly - Resolution A.696(17)**adopted on 6 November 1991****TYPE APPROVAL OF SATELLITE EMERGENCY POSITION-INDICATING
RADIO BEACONS (EPIRBs) OPERATING IN THE COSPAS-SARSAT SYSTEM****THE ASSEMBLY,**

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

NOTING that the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS 1974), on the global maritime distress and safety system (GMDSS Conference, 1988) adopted regulation IV/7.1.6 of the 1988 SOLAS amendments, applicable not later than 1 August 1993, requiring the carriage of a float-free satellite EPIRB on every ship as part of the global maritime distress and safety system,

NOTING Assembly resolution A.695(17), "Performance standards for float-free satellite emergency position-indicating radio beacons (EPIRBs) operating on 406 MHz",

NOTING FURTHER resolution 3, "Recommendation on the early introduction of GMDSS elements", adopted by the 1988 GMDSS Conference, which recommends, *inter alia*, that satellite EPIRBs be introduced as early as possible,

RECOGNIZING that satellite EPIRBs forming part of the global maritime distress and safety system and operating through the Cospas-Sarsat satellite system in the frequency band 406-406.1 MHz (406 MHz EPIRBs) should be type approved to ensure the integrity of the Cospas-Sarsat satellite system, to avoid harmful interference to the spaceborne equipment, to exclude unauthorized transmissions and to provide reliable data to rescue co-ordination centres,

RECOGNIZING FURTHER the value of the type approval procedure proposed by the Cospas-Sarsat partners in order to ensure that satellite EPIRBs will not degrade system performance and will be compatible with the spaceborne equipment,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-eighth session,

RECOMMENDS Governments:

(a) to ensure, as part of national type approval procedures, that any new type of 406 MHz satellite EPIRB to be deployed on board ships is tested to confirm that it is in accordance with the IMO performance standards for 406 MHz EPIRBs (resolution A.695(17)); confirmation that the satellite EPIRB meets part B of that performance standard can be achieved by either:

- (i) performing, or having performed, under national procedures, all appropriate tests; or
- (ii) accepting type approval test results obtained through the Cospas-Sarsat type approval procedure (C/S T.007) and confirmed by the delivery of a Cospas-Sarsat Type Approval Certificate; and

(b) to encourage national type approval authorities to develop test procedures compatible, to the extent possible, with C/S T.007, if necessary in consultation with the Cospas-Sarsat Secretariat.

IMO Assembly - RESOLUTION A.662(16)**adopted on 19 October 1989****PERFORMANCE STANDARDS FOR FLOAT-FREE RELEASE
AND ACTIVATION ARRANGEMENTS
FOR EMERGENCY RADIO EQUIPMENT****THE ASSEMBLY,**

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECOGNIZING the need to prepare performance standards for float-free release and activation arrangements for use in the global maritime distress and safety system (GMDSS) for emergency radio equipment to ensure the operational reliability of such equipment,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. **ADOPTS** the Recommendation on Performance Standards for Float-Free Release and Activation Arrangements for Emergency Radio Equipment, the text of which is set out in the Annex to this resolution;
2. **RECOMMENDS** Member Governments to ensure that arrangements for the float-free release and activation of appropriate equipment for use in the GMDSS conform to performance standards not inferior to those specified in the Annex to this resolution.

ANNEX**RECOMMENDATION ON PERFORMANCE STANDARDS FOR
FLOAT-FREE RELEASE AND ACTIVATION ARRANGEMENTS FOR
EMERGENCY RADIO EQUIPMENT**

1 Float-free release and activation arrangements enable the automatic release of specified radio apparatus from a sinking ship and its automatic activation.

2 The float-free arrangement should:

.1 be designed so that the release mechanism should operate before reaching a depth of 4 m in any orientation;

.2 *be capable of operating throughout the temperature range of -30°C to +65°C;*

.3 be constructed of non-corrosive compatible materials, so as to prevent deterioration which may cause any malfunction of the unit. Galvanizing or other forms of metallic coating on parts of the float-free release mechanism should not be accepted;

.4 be constructed to prevent release when seas wash over the unit;

.5 not be unduly affected by seawater or oil or prolonged exposure to sunlight;

.6 be capable of operating properly after exposure to shock and vibration and other severe environmental conditions encountered above deck on seagoing vessels;

.7 if the ship navigates in areas where icing may be expected, be so designed as to minimize the formation of ice and prevent its effects from hindering the release of the radio equipment as far as practicable;

.8 be mounted in such a way that the radio equipment after being released, is not obstructed by the structure of the sinking ship; and

.9 carry a label indicating clearly the operating instructions for manual release.

For radio equipment requiring external power or data connection, or both, the means of connection should not inhibit the release or activation of the radio apparatus.

It should be possible to assess the proper functioning of the automatic release mechanism by a simple method without activation of the radio equipment.

It should be possible to release the radio equipment manually from the float-free mechanism.

IMO Assembly - Resolution A.887(21)**adopted on 25 November 1999****ESTABLISHMENT, UPDATING AND RETRIEVAL OF THE INFORMATION
CONTAINED IN THE REGISTRATION DATABASES FOR THE GLOBAL
MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)****THE ASSEMBLY,**

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulation IV/5-1 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, which requires that each Contracting Government undertakes to ensure that suitable arrangements are made for registering Global Maritime Distress and Safety System (GMDSS) identities and for making information on these identities available to rescue co-ordination centres on a 24-hour basis,

RECOGNIZING the need to continuously update the information contained in the registration databases for the GMDSS,

RECOGNIZING ALSO that the information in such registration databases is essential for search and rescue purposes,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its seventieth session,

1. ADOPTS the Recommendation on the Establishment, Updating and Retrieval of the Information Contained in the Registration Databases for the GMDSS set out in the Annex to the present resolution;
2. RECOMMENDS Governments to ensure that the information contained in the registration databases for the GMDSS and their continuous updating and availability to rescue co-ordination centres is in accordance with the annexed Recommendation;
3. REVOKEs resolution A.764(18).

ANNEX

RECOMMENDATION ON ESTABLISHMENT, UPDATING AND RETRIEVAL OF THE INFORMATION CONTAINED IN THE REGISTRATION DATABASES FOR THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

1 All identities that may be used for identifying ships in distress should be registered in accordance with this resolution and the data should be updated whenever it changes.

2 Every State requiring or allowing the use of these GMDSS systems should make suitable arrangements for ensuring registrations of these identities are made, maintained and enforced.

3 Those responsible for maintaining registration databases for GMDSS equipment should ensure that any MRCC can immediately access the registration data at any time.

4 Means should be provided for the GMDSS equipment licensee, owner or the ship's master to easily and expediently update emergency information in the registration database.

5 All databases for GMDSS equipment should have an identical data format to permit immediate access among each other.

6 All equipment using Maritime Mobile Service Identities (MMSIs) should be registered, if appropriate, with the International Telecommunications Union in accordance with established procedures.

7 All Inmarsat equipment should be registered with Inmarsat.

8 Registration databases should include the following information, noting that the data elements listed are not necessarily those maintained by the radio licensing authority and that not all of the following entries need to be notified to the ITU as long as the national database is identified and is accessible 24-hours per day:

.1 ship name;

.2 Maritime Mobile Service Identity (MMSI);

.3 radio call sign;

.4 EPIRB identification code (if applicable) and its homing frequency;

.5 country (ship flag State; may be derived from MMSI and call sign);

.6 ship identification number (IMO number or national registration number);

.7 brief ship description (type, gross tonnage, ship superstructure, deck Colors, identifying marks, etc.);

.8 name, address, telephone and (if applicable) telefax number of emergency contact person ashore;

- .9 alternative 24-hour emergency telephone number (alternate contact ashore);
- .10 capacity for persons on board (passengers and crew);
- .11 radio installations (Inmarsat-A, B, C, M, VHF DSC, etc.) for ship and survival craft;
- .12 identification numbers for all radio systems available;
- .13 type and number of survival craft; and
- .14 date of last modification of database record.

9 For 406 MHz satellite Emergency Position Indicating Radiobeacons (EPIRBs), the country of registration should be coded in accordance with one of the following principles:

- .1 if the registration database is maintained by the ship's flag State, use the Maritime Identification Digits (MID) of the flag State;
- .2 if the registration database is not maintained by the ship's flag State, use:
 - .2.1 the MID of the flag State, and inform all concerned where the unique database containing its registry of 406 MHz satellite EPIRBs is located; or
 - .2.2 a serialized protocol with the MID of the country which is maintaining the database.

10 The data record of ships to which SOLAS chapter IV applies should be reviewed, and the database information should be updated annually. Other ships should be encouraged to update their data records annually or at least every other year.

11 Authorities maintaining or using databases should ensure that information described in paragraphs 8.4, 8.8, 8.9 and 8.12 above supplied for GMDSS equipment registration is used only by appropriate recognized SAR authorities.

12 Every State should:

- .1 maintain a suitable national database, or co-ordinate with other States of their geographical area to maintain a joint database; and additionally,
- .2 for ships which are using GMDSS frequencies and techniques or which are sailing internationally, ensure that the data records of these ships are notified to an international database (e.g. updated ITU database).

13 States should also:

- .1 promulgate clear and timely guidance to manufacturers, agents and users on the appropriate coding, registration and updating procedures;
- .2 co-operate closely with other States, manufacturers, owners and organizations to help resolve any registration or information-retrieval problems that may arise;

.3 formalize co-operative arrangements between the parties concerned for the maintenance of the joint database;

.4 encourage manufacturers and distributors to advise customers, upon purchase of GMDSS equipment, about registration requirements, and refer unresolved coding and registration issues to proper national authorities for resolution; and

.5 encourage manufacturers and distributors to educate users about the maintenance of GMDSS equipment.

This document has been
superseded
by a later version

IMO Assembly - Resolution A.814(19)**adopted on 23 November 1995****GUIDELINES FOR THE AVOIDANCE OF FALSE DISTRESS ALERTS**

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety and the prevention and control of marine pollution from ships,

CONSIDERING problems reported by Member Governments in regard to the proper operation of the GMDSS, in particular that false distress alerts are becoming a major obstacle to the efficient operation of search and rescue (SAR) services,

RECALLING that the GMDSS was developed on the basis of resolution 6 of the International Conference on Maritime Search and Rescue, 1979, and that according to that resolution the GMDSS should provide, among other things, the essential radio elements of the international SAR plan,

NOTHING that the excessive amount of false distress alerts imposes a considerable and unnecessary burden on Rescue Co-ordination Centres (RCCs), may have adverse effects on seafarers' confidence in the GMDSS, and could also have a potentially serious impact on real distress situations and on safety of life at sea,

BEING AWARE that, if a substantive reduction in the number of false distress alerts now occurring is not achieved in the near future, the quality and efficiency of SAR organizations may be jeopardised,

CONSIDERING that an urgent dissemination of some of the problems which have become evident to providers of rescue services would help to educate people and organizations involved and eventually contribute to a reduction in the number of false distress alerts,

CONSIDERING ALSO that Administrations, manufacturers, educators, users, providers of communications and rescue services, and all others concerned need guidance on ways and means of reducing false distress alerts,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. ADOPTS the Guidelines for Avoiding False Distress Alerts set out in the annex to the present resolution;
2. URGES Governments to bring these Guidelines to the attention of all concerned.

ANNEX

GUIDELINES FOR AVOIDING FALSE DISTRESS ALERTS

1 Administrations should:

- .1** inform shipowners and seafarers about the implications of the rising number of false distress alerts;
- .2** take steps to enable ships properly to register all GMDSS equipment, and ensure that this registration data is readily available to RCCs;
- .3** consider establishing and using national enforcement measures to prosecute those who:
 - .3.1** inadvertently transmit a false distress alert without proper cancellation, or who fail to respond to a distress alert due to misuse or negligence;
 - .3.2** repeatedly transmit false distress alerts; and
 - .3.3** deliberately transmit false distress alerts;
- .4** use the International Telecommunication Union violation reporting process for false distress alerts, or for failure to respond a distress alert relayed from shore-to-ship;
- .5** ensure that all relevant ship personnel know how GMDSS equipment operates, the importance of avoiding false distress alerts, the steps to be taken to prevent the transmission of such false distress alerts, and the procedures to be followed when a false distress alert has been transmitted;
- .6** inform type-approval authorities of false distress alert problems, in order to draw their attention to the testing and alerting functions of radio equipment during the type approval process;
- .7** urge companies installing radio equipment to ensure that relevant ship personnel are made familiar with the operation of the installed equipment;
- .8** investigate the cause when a specific model of GMDSS equipment repeatedly transmits unwanted distress alerts, and inform the appropriate organizations accordingly;
- .9** ensure that surveyors and inspectors are informed about GMDSS equipment, and particularly about how to operate and test it without transmitting a false distress alert; and
- .10** require the GMDSS radio operators be appropriately certificated.

2 Manufacturers, suppliers and installers should:

.1 design equipment for distress alerting so that:

.1.1 it will not be possible to transmit a distress alert unintentionally;

.1.2 the panel for emergency operation is separated from the one for normal operation and is partially fitted and a cover, and the switches on the panel are clearly classified by colouring; and

.1.3 there are standardized arrangements of operation panels and operational procedures;

.2 design test features so that the testing of GMDSS equipment will not result in the transmission of false distress alerts;

.3 ensure that any distress alert activation is indicated visually or acoustically, or both, and shows that the equipment is transmitting a distress alert until manually deactivated;

.4 ensure that the satellite EPIRB position on board, installations (inducing the release and activation mechanisms) and handling procedures preclude unwanted activation (designing the EPIRB so that when it is out of its bracket it must also be immersed in water to activate automatically, and so that, when operated manually, a two-step activation action is required);

.5 provide clear and precise operational instructions that are easy to understand (maintenance and operational instructions should be separated, and should be written both in English and in any other language deemed necessary);

.6 ensure that when any GMDSS equipment has been installed, the necessary instructions are given to ship personnel, drawing specific attention to operational procedures (a record should be kept that such instructions have been given); and

.7 ensure that supply and installation personnel understand how the GMDSS works, and the consequences of transmitting a false distress alert.

3 Trainers and educators should:

.1 ensure that maritime education centres are informed about false distress alert problems and their implications for SAR, the GMDSS, etc., and procedures to be followed if a false distress alert is transmitted, and include them in their teaching programmes;

.2 obtain and use actual case histories as examples;

.3 emphasize the need to avoid false distress alerts; and

.4 ensure that no inadvertent transmission of a false distress alert occurs when training on GMDSS equipment.

4 Companies, masters and seafarers should, as appropriate:

- .1 ensure that all GMDSS certificated personnel responsible for sending a distress alert have been instructed about, and are competent to operate, the particular radio equipment on the ship;
- .2 ensure the person or persons responsible for communications during distress incidents give the necessary instructions and information to all crew members on how to use GMDSS equipment to send a distress alert;
- .3 ensure that as part of each “abandon ship” drill, instruction is given on how emergency equipment should be used to provide GMDSS functions;
- .4 ensure that GMDSS equipment testing is only undertaken under the supervision of the person responsible for communications during distress incidents;
- .5 ensure that GMDSS equipment testing or drills are never allowed to cause false distress alerts;
- .6 ensure that encoded identities of satellite EPIRBs, which are used by SAR personnel responding to emergencies, are properly registered in a database accessible 24 h a day or automatically provided to SAR authorities (masters should confirm that their EPIRBs have been registered with such a database, to help SAR services identify the ship in the event of distress and rapidly obtain other information which will enable them to respond appropriately);
- .7 ensure that EPIRB, Inmarsat and DSC registration data is immediately updated if there is any change in information relating to the ship such as owner, name or flag, and that the necessary action is taken to reprogramme the ship’s new data in the GMDSS equipment concerned.
- .8 ensure that, for new ships, positions for installing EPIRBs are considered at the earliest stage of ship design and construction;
- .9 ensure that satellite EPIRBs are carefully installed in accordance with manufacturers’ instructions and using qualified personnel (sometimes satellite EPIRBs are damaged or broken due to improper handling or installation. They must be installed in a location that will enable them to float free and automatically activate if the ship sinks. Care must be taken to ensure that they are not tampered with or accidentally activated. If the coding has to be changed or the batteries serviced, manufacturers’ requirements must be strictly followed. There have been cases where EPIRB lanyards were attached to the ship so that the EPIRB could not float free; lanyards are only to be used by survivors for securing the EPIRB to a survival craft or person in water);
- .10 ensure that EPIRBs are not activated if assistance is already immediately available (EPIRBs are intended to call for assistance if the ship is unable to obtain help by other means, and to provide position information and homing signals for SAR units);
- .11 ensure that, if a distress alert has been accidentally transmitted, the ship makes every reasonable attempt to communicate with the RCC by any means to cancel the false distress alert using the procedures given in the appendix;
- .12 ensure that, if possible, after emergency use, the EPIRB is retrieved and deactivated; and

.13 ensure that when an EPIRB is damaged and needs to be disposed of, if a ship is sold for scrap, or if for any other reason a satellite EPIRB will no longer be used, the satellite EPIRB is made inoperable, either by removing its battery and, if possible, returning it to the manufacturer, or by demolishing it.

Note: If the EPIRB is returned to the manufacturer, it should be wrapped in tin foil to prevent transmission of signals during shipment.

APPENDIX

INSTRUCTIONS FOR MARINERS AND OTHERS* ON HOW TO CANCEL A FALSE DISTRESS ALERT

DSC

1 VHF

- .1** switch off transmitter immediately;[†]
- .2** switch equipment on and set to Channel 16; and
- .3** make broadcast to “All Stations” giving the ship’s name, call sign and DSC number, and cancel the false distress alert.

Example

All Stations, All Stations, All Stations
This is NAME, CALL SIGN,
DSC NUMBER, POSITION.

* Appropriate signals should precede these messages in accordance with the ITU Radio Regulations chapter N1X.

[†] This applies when the false alert is detected during transmission.

Cancel my distress alert of
DATE, TIME UTC,
= Master NAME, CALL SIGN,
DSC NUMBER, DATE, TIME UTC.

2 MF

- .1 switch off equipment immediately; [†]
- .2 switch equipment on and tune for radiotelephony transmission on 2,182 kHz; and
- .3 make broadcast to “All Stations” giving the ship’s name, call sign and DSC number, and cancel the false distress alert.

Example

All Stations, All Stations, All Stations
This is NAME, CALL SIGN,
DSC NUMBER, POSITION.

Cancel my distress alert of
DATE, TIME UTC,
= Master NAME, CALL SIGN,
DSC NUMBER, DATE, TIME UTC.

3 HF

As for MF, but the alert must be cancelled on all the frequency bands on which it was transmitted. Hence, in stage 2.2 the transmitter should be tuned consecutively to the radiotelephony distress frequencies in the 4, 6, 8, 12 and 16 MHz bands, as necessary.

4 Inmarsat-C

Notify the appropriate RCC to cancel the alert by sending a distress priority message via the same CES through which the false distress alert was sent.

Example of message

NAME, CALL SIGN, IDENTITY NUMBER,
POSITION,

Cancel my Inmarsat-C distress
alert of DATE, TIME UTC
= Master +

5 EPIRBs

If for any reason an EPIRB is activated accidentally, the ship should contact the nearest coast station or an appropriate coast earth station or RCC and cancel the distress alert.

6 General

6.1 Notwithstanding the above, ships may use any means available to them to inform the appropriate authorities that a false distress alert has been transmitted and should be cancelled.

6.2 No action will normally be taken against any ship or mariner for reporting and cancelling a false distress alert. However, in view of the serious consequences of false alerts, and the strict ban on their transmissions, Governments may prosecute in cases of repeated violations.

This document has been superseded by a later version

MSC/Circ.861**22 May 1998****4.1.1.1.1 MEASURES TO REDUCE THE NUMBER OF FALSE DISTRESS ALERTS**

1 The Maritime Safety Committee, at its sixty-ninth session (11 to 20 May 1998), being concerned with the high percentage of false distress alerts which have been experienced in many GMDSS radio systems during the last years, noted the significant increase in the number of SOLAS convention ships which will be fitted with GMDSS equipment prior to 1 February 1999.

2 The Committee also noted the large number of non-convention ships which are expected to fit GMDSS equipment in the coming years and recognized that false distress alerts already impose a considerable burden on Rescue Co-ordination Centres (RCCs) and divert SAR resources away from real distress situations and therefore also reduce the confidence of seafarers.

3 Recognizing also that the numbers of false distress alerts could be even more severe in the coming years due to the expected large increase in the number of GMDSS installations, unless effective measures to reduce or eliminate false distress alerts are implemented, and being aware that investigations into false distress alerts indicate that a large portion of these are caused by a combination of operational errors and equipment being inadequately protected against initiation of false distress alerts, the Committee therefore considered that measures are urgently needed to eliminate or reduce the danger of false distress alerts being transmitted as a consequence of the combination referred to and decided to urge member Governments:

.1 to ensure that all GMDSS equipment being manufactured and installed on ships comply fully with the latest IMO performance standards including, where relevant, a dedicated and protected distress button as the only means of initiating a distress alert;

.2 to require shipowners when ordering GMDSS equipment for their ships to seek and ensure from manufacturers that such equipment complies fully with the latest IMO performance standards;

.3 to encourage manufacturers of GMDSS radio equipment to investigate as a matter of urgency the possibilities for modifying equipment not fitted with a dedicated and protected distress button as the only means of initiating transmission of a distress alert, so as to be fitted with such a facility, and to advise Governments and shipowners on the suitability for such modifications;

.4 to consider establishing requirements for GMDSS radio equipment not fitted with a dedicated and protected button as the only means of distress alerting to be modified so as to incorporate such facilities;

.5 to encourage manufacturers also to co-operate so as to agree on common standards and simplification of operating equipment design, especially related to the facilities and layout for initiating, and responding to, distress alerts;

.6 to encourage shipowners and manufacturers further to provide facilities and information enabling personnel having radio duties to familiarize themselves with the equipment involved and how it should be operated in a correct manner, including the avoidance of transmitting false distress alerts;

.7 also to take appropriate measures to ensure compliance with all relevant requirements applicable to ships fitted with GMDSS equipment, including that ships to which such requirements apply, be fitted with a dedicated and protected distress button; and

.8 to bring the COMSAR/Circular concerning operational performance of DSC system to the attention of shipowners, masters and seafarers.

*This document has been
superseded
by a later version*

MSC/Circ.863**22 May 1998****RECOMMENDATION ON PREVENTION OF HARMFUL INTERFERENCE TO
406 MHz EPIRBs OPERATING WITH THE COSPAS-SARSAT SYSTEM**

1 The Maritime Safety Committee, at its sixty-ninth session (11 to 20 May 1998), being concerned with the harmful interference to 406 MHz EPIRBs operating with the COSPAS-SARSAT system noted the information provided by COSPAS-SARSAT on the 406 MHz interference sources. Accordingly, the Committee approved the following recommendations which would assist Member Governments to prevent harmful interference to 406 MHz EPIRBs.

2 The COSPAS-SARSAT search and rescue satellite system is a multi-national system using low earth orbiting and geostationary satellites and ground receiving stations to locate 406 MHz emergency position indicating radio beacons (EPIRBs) activated in distress situations. The system has contributed to saving over 7,000 lives since it became operational in 1982.

3 The 406 MHz EPIRBs are a very important part of international search and rescue. They are carried on Safety of Life at Sea (SOLAS) vessels as part of the Global Maritime Distress and Safety System. Additionally, carriage of EPIRBs on small vessels is mandated by various national Administrations. The life-saving mission of these beacons must not be interfered with.

4 Transmissions from ground based emitters cause harmful interference to distress signals from 406 MHz satellite EPIRBs. A major cause of harmful interference is due to unwanted emissions from radars and other wideband transmitters operating within 30 MHz of the 406-406.1 MHz allocated bandwidth for satellite EPIRBs.

5 ITU regulations prohibit interference in the 406 to 406.1 MHz band; however the maximum permitted emission limits for the bands within 30 MHz of the 406 distress band are not adequately defined to comply with the harmful interference limits described in ITU Recommendation SM.1051.

6 Member Governments are invited to bring this problem to the attention of their radio spectrum management authorities and request them to assure that new equipment designs will not interfere with the COSPAS-SARSAT system and notify owners of existing equipment operating within 30 MHz of 406 MHz of the potential for interfering with the COSPAS-SARSAT system.

MSC/Circ.1039

28 May 2002**GUIDELINES FOR SHORE-BASED MAINTENANCE OF SATELLITE EPIRBs**

1 The Maritime Safety Committee, at its seventy-fifth session (15 to 24 May 2002), approved Guidelines for shore-based maintenance of satellite EPIRBs, for the purpose of establishing standardized procedures and minimum levels of service for the testing and maintenance of satellite EPIRBs to ensure maximum reliability whilst minimizing the risk of false distress alerts.

2 Member Governments are invited to bring the annexed Guidelines to the attention of shore-based maintenance providers, equipment manufacturers, classification societies, shipping companies, shipowners, ship operators, shipmasters and all other parties concerned.

*This document is superseded
by a later version*

ANNEX

GUIDELINES FOR SHORE-BASED MAINTENANCE OF SATELLITE EPIRBs

1 Introduction

1.1 The purpose of these guidelines is to establish standardized procedures and minimum levels of service for the testing and maintenance of satellite EPIRBs to ensure maximum reliability whilst minimizing the risk of false distress alerting.

1.2 The guidelines are intended to be applicable both to 406 MHz EPIRBs and to L-band EPIRBs, as either type may be carried to comply with the requirements of SOLAS regulation IV/7.1.6. EPIRBs may include 121.5 MHz transmitters, or Global Navigation Satellite System (GNSS) receivers.

1.3 The guidelines also apply to service exchange EPIRBs, which should be properly encoded to match the appropriate registration database.

2 Shore-based maintenance (SBM) provider

2.1 The SBM provider should:

.1 have a quality control system audited by a competent authority in respect of its servicing operation;

.2 have access to adequate calibrated test equipment and facilities to carry out the SBM in accordance with these guidelines;

.3 have access to batteries and other spare parts to the original equipment specification;

.4 have access to up-to-date technical manuals, service bulletins and the latest software versions as provided by the original equipment manufacturer;

.5 keep records of maintenance, available for inspection by the Administration as may be required;

.6 ensure that all personnel responsible for supervising and for carrying out the maintenance procedures are adequately trained and fully competent to perform their duties; and

.7 issue a shore-based maintenance report with a list of the test results and maintenance performed.

3 Prevention of false distress alerts

3.1 Throughout the testing and maintenance process, **great care must be taken to avoid the transmission of false distress alerts**. The transmissions may be picked up by aircraft as well as satellites.

3.2 A radio-frequency-screened room or enclosure should be used for all maintenance procedures involving, or likely to involve, any transmission from an EPIRB.

3.3 Provision of a 121.5 MHz monitor receiver is required; this will pick up the homing transmitter and give a warning if the EPIRB is accidentally activated outside the screened enclosure.

3.4 If a distress signal is transmitted accidentally, the local RCC should be contacted immediately and informed of the co-ordinates of the test site.

4 Maintenance service interval

4.1 406 MHz satellite EPIRBs should be inspected and tested in accordance with MSC/Circ.1040.

4.2 Shore-based maintenance of all satellite EPIRBs, as defined in paragraph 1.2, should be carried out in accordance with these guidelines at intervals specified by the flag Administration and not exceeding 5 years. It is recommended that the maintenance be performed at the time when the battery is to be changed.

5 Self-test

5.1 Prior to carrying out any maintenance and, upon completion, a self-test should be performed, following the instructions on the equipment, and the results noted.

5.2 Attention is drawn to paragraph 3 on the prevention of false distress alerts. Avoidance of live transmissions is required to prevent unnecessary loading of the satellite channels.

5.3 It should be verified that the self-test mode operates properly. This check could be performed by holding the switch in self-test mode position for 1 min after the first self-test mode burst transmission. All transmissions should cease after releasing the self-test mode switch. Additionally, for 406 MHz satellite EPIRBs which received the COSPAS-SARSAT type approval after October 1998 (Type Approval Certificates 106 and higher) the number of self-test bursts should be verified to be no more than one.

6 Battery change

6.1 The main battery should be changed in accordance with the manufacturer's recommendations, including the replacement of any other routine service parts (e.g. seals, memory battery, desiccant).

6.2 The removed batteries should be disposed of in accordance with the manufacturer's and/or national/local recommendations.

6.3 After having changed the battery, the new expiration date should be displayed on the exterior surface of the EPIRB.

7 Satellite distress transmission

7.1 The satellite EPIRB should be activated in its normal transmitting mode (i.e. not just self-test). Attention is drawn to paragraph 3 on the prevention of false distress alerts. Where seawater contacts are fitted, these should be connected together to activate the EPIRB.

7.2 The transmitted signal should be checked with a suitable test receiver to verify the signal integrity and coding.

7.3 The frequency of the transmitted signal should be recorded and verified to be within the limits required by the specification to which it is approved.

7.4 The output power of the transmitter should be checked in the self-test mode. A simple method of the emission verification, such as a low sensitivity receiver placed at an unobstructed distance of at least 3 m from the EPIRB antenna, may be used for this check. The original equipment manufacturer may suggest an appropriate method to verify the output power. Attention is drawn to paragraph 3 on the prevention of false distress alerts.

8 121.5 MHz homing transmission

8.1 The satellite EPIRB should be activated in its normal transmitting mode (i.e. not just self-test). Attention is drawn to paragraph 3 on the prevention of false distress alerts. Where seawater contacts are fitted, these should be connected together to activate the EPIRB.

8.2 The transmitted signal should be checked with a suitable test receiver for the characteristic swept tone modulation.

9 Global Navigation Satellite System (GNSS)

9.1 Some satellite EPIRBs are designed to transmit a position derived from a GNSS receiver, which may be internal or external to the EPIRB.

9.2 The original equipment (EPIRB) manufacturer should be consulted for a method of testing the correct operation of this function, e.g.: by using a GNSS repeater/simulator or external input. This test may involve a live transmission from the EPIRB and should be performed in a screened room or enclosure in accordance with paragraph 3.2. Attention is drawn to paragraph 3 on the prevention of false distress alerts.

9.3 A test receiver should be used to verify that the signal transmitted by the satellite EPIRB contains the correctly encoded position data derived from the GNSS receiver. Attention is drawn to paragraph 3 on the prevention of false distress alerts.

10 Waterproof integrity

10.1 The satellite EPIRB should be inspected for any signs of damage or cracks to the casing, or of water ingress. Any damaged item should be replaced in accordance with the manufacturer's recommended procedures.

10.2 The satellite EPIRB should be tested for waterproof integrity at the end of the SBM. The equipment manufacturer may suggest an appropriate method to test the integrity of the EPIRB.

10.3 One method involves immersing the equipment in hot water (20-30°C above ambient) for a period of 1 min. It can be readily seen if there are any problems with the seals, as the air inside the beacon expands and escapes as a stream of bubbles. This test should not be carried out with cool water, as the water may be drawn into the equipment without showing significant release of air bubbles.

10.4 Satellite EPIRBs equipped with seawater switches should have this function disabled during the immersion test to prevent activation, unless the complete test is performed inside a screened room. This disabling may be achieved by immersing the EPIRB complete with a mounting bracket if the bracket includes an interlock to prevent activation before release. In some cases the EPIRB contains an inversion switch, so it will not be activated if immersed in the inverted position. The manufacturer should be consulted for specific guidance.

11 Labelling

11.1 As a minimum, the equipment external labeling should be checked for the following details:

.1 manufacturer's serial number. This identifies the equipment, even if the programmed data (e.g. MMSI or callsign) is later changed;

.2 the transmitted identification code:

- for L-band EPIRBs, it will be the Inmarsat System Code; and
- for 406 MHz EPIRBs, this will be the beacon 15 Hexadecimal Identification (15 Hex ID) and other encoded identification information (MMSI / callsign) as required by the Administration. It should be verified that the label matches the information decoded from the self-test mode transmission using the test receiver. For the COSPAS-SARSAT location protocol beacons, the 15 Hex ID should correspond to position data set to default values;

.3 the expiration date of the battery; and

.4 the date when the next shore-based maintenance is due (see paragraph 12.1).

11.2 The above checks also apply if a replacement EPIRB is provided by the SBM provider.

12 Shore-based maintenance report and other documentation

12.1 The results of shore-based maintenance should be provided in the form of a shore-based maintenance report, a copy of which is to be kept on board, and a label affixed to the exterior of the beacon detailing the name of the SBM provider and the date when the next shore-based maintenance is due.

12.2 The SBM provider may affix a tamperproof seal or similar device on completion of the SBM.

12.3 Before returning the beacon to the owner, or when providing a replacement beacon, the SBM provider should check the registration details with the beacon registry, where practicable.

*This document has been
superseded
by a later version*

MSC.1/Circ.1040/Rev.1**25 May 2012****REVISED GUIDELINES ON ANNUAL TESTING OF 406 MHz SATELLITE EPIRBs**

1 The Maritime Safety Committee, at its ninetieth session (16 to 25 May 2012), approved the annexed revised Guidelines on annual testing of 406 MHz satellite EPIRBs, as required by SOLAS regulation IV/15.9.

2 Member Governments are invited to bring these Guidelines to the attention of shipping companies, shipowners, ship operators, equipment manufacturers, classification societies, shipmasters and all parties concerned.

3 This circular supersedes MSC/Circ.1040.

*This document has been
superseded
by a later version*

ANNEX

GUIDELINES ON ANNUAL TESTING OF 406 MHz SATELLITE EPIRBs

1 The annual testing of 406 MHz satellite EPIRBs is required by SOLAS regulation IV/15.9.

2 The testing should be carried out using suitable test equipment capable of performing all the relevant measurements required in these guidelines. All checks of electrical parameters should be performed in the self-test mode, if possible.

3 The examination of the installed 406 MHz satellite EPIRB should include:

- .1 checking position and mounting for float-free operation;
- .2 verifying the presence of a firmly attached lanyard in good condition; the lanyard should be neatly stowed, and must not be tied to the vessel or the mounting bracket;
- .3 carrying out visual inspection for defects;
- .4 carrying out the self-test routine;
- .5 checking that the EPIRB identification (15 Hex ID and other required information) is clearly marked on the outside of the equipment;
- .6 decoding the EPIRB 15 Hexadecimal Identification Digits (15 Hex ID) and other information from the transmitted signal, checking that the decoded information (15 Hex ID or MMSI/callsign data, as required by the Administration) is identical to the identification marked on the beacon;
- .7 checking that the MMSI number encoded in the beacon corresponds with the MMSI number assigned to the ship;
- .8 checking registration through documentation or through the point of contact associated with that country code;
- .9 checking the battery expiry date;
- .10 checking the hydrostatic release and its expiry date, as appropriate;
- .11 checking the emission in the 406 MHz band using the self-test mode or an appropriate device to avoid transmission of a distress call to the satellites;
- .12 if possible, checking emission on the 121.5 MHz frequency using the self-test mode or an appropriate device to avoid activating the SAR system;
- .13 checking that the EPIRB has been maintained by an approved shore-based maintenance provider at intervals required by the Administration;
- .14 after the test, remounting the EPIRB in its bracket, checking that no transmission has been started; and
- .15 verifying the presence of beacon operating instructions.

MSC/Circ.1174**20 May 2005****BASIC SAFETY GUIDANCE FOR OCEANIC VOYAGES BY
NON-REGULATED CRAFT**

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its ninth session (7 to 11 February 2005), developed Basic safety guidance for oceanic voyages by non-regulated craft, given in the annex.

2 The Maritime Safety Committee, at its eightieth session (11 to 20 May 2005), with a view to providing basic safety guidance for oceanic voyages by non-regulated craft to reduce those risks that could lead to loss of life or severe physical injuries to both crew and would-be rescuers, agreed to the annexed Guidance.

3 Member Governments are invited to bring the annexed Guidance to the attention of all parties concerned for consideration and action, as appropriate.

*This document has been
superseded
by a later version*

ANNEX

BASIC SAFETY GUIDANCE FOR OCEANIC VOYAGES BY NON-REGULATED CRAFT

I PURPOSE

The purpose of this circular is to provide basic safety guidance for oceanic voyages by non-regulated craft to reduce those risks that could lead to loss of life or severe physical injuries to both crew and would-be rescuers, and to reduce the need for extended and expensive SAR operations. Furthermore, these craft can, during their voyages, cross congested areas and create a risk for the safety of the traffic in these areas.

II BASIC SAFETY GUIDANCE

1 Type of craft

1.1 The craft should be of suitable construction for the intended voyage, possess adequate buoyancy and stability and carry appropriate high visibility markings.

2 Provisions and safety equipment in the craft

2.1 Life-raft(s) of an approved type.

2.2 Sufficient life jacket(s) of an approved type for all crew members.

2.3 Electronic positioning system.

2.4 Pyrotechnics, hand flares and other signalling devices.

2.5 Radar reflector of an approved type.

2.6 Sufficient food, water and, if required, fuel for the voyage. (Emergency water making kit may be an advantage.)

2.7 Adequate medical equipment.

3 Radiocommunications

3.1 The craft should be equipped with adequate communications and distress alerting systems within the Global Maritime Distress & Safety System, for example:

.1.1 two types of alerting systems, e.g. long-range communications (radio or satellite) and a satellite EPIRB properly registered; and

.1.2 hand held radios capable of operating on maritime and aeronautical short-rangefrequencies.

4 Voyage planning

4.1 The person in charge of the craft should prepare a voyage plan and leave that plan with a responsible person ashore together with details of the craft. Normally, the responsible person ashore will be the primary contact with the craft for normal communications throughout the voyage. If the responsible person ashore becomes concerned for the safety of the craft, he/she should contact the appropriate MRCC. The person in charge of the craft should submit a voyage plan to the Maritime Administration at the port of departure, if required by that Maritime Administration.

5 Crew gear

5.1 Suitable clothing with high visibility markings and survival equipment appropriate for the voyage should be provided.

6 Crew training

6.1 All members of the crew should have satisfactorily completed appropriate:

.1.1 training for the intended voyage, e.g. navigation and communications with appropriate certification where necessary;

.1.2 survival course(s); and

.1.3 first aid course(s).

III GUIDANCE FOR ADMINISTRATIONS

7.1 A Maritime Administration that becomes aware of a planned oceanic voyage by a non-regulated craft that does not meet the basic safety guidance herein should use its best endeavours to prevent the craft from departing.

7.2 If the craft does depart, then the Maritime Administration should ensure that the MRCC(s) responsible for the SAR Region(s) through which the craft is expected to pass are made aware of the particular voyage.

IV DETAILED GUIDANCE

8.1 Further detailed guidance can be obtained from:

.1.1 ISAF Offshore Special Regulations . www.sailing.org

.1.2 International Ocean Rowing Society . www.oceanrowing.com/index.htm

MSC.1/Circ.1210/Rev.1**21 November 2014****GUIDANCE ON THE COSPAS-SARSAT
INTERNATIONAL 406 MHz BEACON REGISTRATION DATABASE**

1 The Maritime Safety Committee, at its eighty-fourth session (7 to 21 November 2014), recognizing the continuous importance of 406 MHz EPIRB registration databases to be available to SAR Authorities at all times, approved the revised guidance on Cospas-Sarsat International 406 MHz Beacon Registration Database (IBRD) prepared by the Sub-Committee on Navigation, Communications and Search and Rescue (NCSR), at its first session, as set out in the annex.

2 This circular revokes MSC.1/Circ.1210.

3 Member Governments are invited to bring the annexed guidance to the attention of all parties concerned.

*This document has been
superseded
by a later version*

ANNEX

GUIDANCE ON THE COSPAS-SARSAT INTERNATIONAL 406 MHz BEACON REGISTRATION DATABASE

Need for EPIRB registration and associated databases

1 Emergency position-indicating radio beacons (EPIRBs) perform distress alerting and other functions to support search and rescue (SAR) services covered by the 1979 International Convention on Maritime Search and Rescue, as amended, for any person in distress at sea, and the 1974 International Convention on Safety of Life at Sea (SOLAS), as amended, requires EPIRB carriage (chapter IV, regulation 7.6) and registration.

2 The provisions relevant to EPIRB registration in chapter IV, regulation 5-1 apply to all ships on all voyages, and are as follows:

“Each Contracting Government undertakes to ensure that suitable arrangements are made for registering global maritime distress and safety system (GMDSS) identities and for making information on these identities available to rescue co-ordination centres on a 24-hour basis. Where appropriate, international organizations maintaining a registry of these identities shall be notified by the Contracting Government of these assignments.”

3 It is crucial that 406 MHz EPIRBs be registered, and that the registration data be available to SAR authorities at all times. Experience has shown that EPIRB registration data is either critically important or otherwise often helpful in the majority of SAR cases involving an EPIRB alert.

4 406 MHz EPIRBs should be registered regardless of whether they are carried aboard ships or other marine craft, and registrations should be reinforced by national requirements.

5 It is essential that IMO Member States provide a readily-accessible mechanism (preferably one that is available by internet, as well as other conventional means) to enable EPIRB owners to fulfill their obligation to register the beacons, and to make this data available for SAR authorities 24-hours-per-day, seven-days-per-week for use in an emergency. Such arrangements can be implemented nationally, on a regional basis in cooperation with other Administrations, or by other suitable means. The Cospas-Sarsat International Beacon Registration Database is a facility available free of charge to enable beacon owners to directly register their beacons and/or to allow Administrations to upload their national registration data to ensure that it is available to SAR authorities worldwide on a 24-hours-per-day, seven-days-per-week basis.

International Beacon Registration Database

6 The International Cospas-Sarsat Programme processes 406 MHz EPIRB alerts and routes them to the identified SAR authorities. It also operates the International Beacon Registration Database (IBRD) for 406 MHz beacons, operational since January 2006.

7 The IBRD is hosted on the internet at www.406registration.com, with online help capabilities.

8 Cospas-Sarsat provides the IBRD as a readily-available means for beacon owners to register their beacons unless an alternative method of registration is required by their national Administration. The registration information contained in the IBRD, whether directly entered by beacon owners or uploaded from national registration databases maintained by Administrations, is available 24-hours-per-day, seven-days-per-week for assisting SAR Services in SAR operations. The IBRD is available free of charge to individuals directly registering beacons and to Administrations uploading or retrieving registration data.

9 Administrations that maintain their own national registers are encouraged to upload their registration data to the IBRD to make their national beacon registration data available as quickly and easily as possible to SAR personnel on a 24-hour basis.

10 The IBRD can be used not only for registering 406 MHz EPIRBs, but also 406 MHz emergency locator transmitters (ELTs) carried on board aircraft, and personal locator beacons (PLBs) designed for personal use.

Background

11 The Cospas-Sarsat 406 MHz system provides distress alerts that include the unique 15-character hexadecimal identification of the transmitting beacon. This beacon identification can be decoded to obtain information that includes:

- .1 the type of beacon, i.e. ELT, EPIRB or PLB;
- .2 the country code and identification data which form the unique beacon identification; and
- .3 the type of auxiliary radio locating (homing) device, e.g. 121.5 MHz transmitter.

12 If a beacon is properly registered, the 15-character hexadecimal identification of the beacon can be used to access additional information. Beacon registration databases can provide information of great use to SAR personnel, including:

- .1 specific owner identification information;
- .2 the make/model and identification of aircraft or vessel in distress;
- .3 communications equipment available;
- .4 the total number of persons onboard; and
- .5 emergency contact information.

13 To have this valuable information available to SAR authorities in an emergency, it must be available from either a national database available 24-hours-per-day, seven-days-per-week maintained by a national Administration and/or from the IBRD provided that the national Administration allows direct registration in the IBRD by beacon owners or the Administration uploads its registration data to the IBRD for access by other SAR authorities.

14 Registration of 406 MHz beacons is required in accordance with international regulations on SAR established by the International Civil Aviation Organization (ICAO) and by the SOLAS Convention. In addition, some countries have made 406 MHz beacon registration mandatory.

IBRD concept of operations

15 The IBRD is designed to support:

- .1 beacon owners who wish to directly register their beacons;
- .2 Administrations to make their registration data easily available to other SAR authorities in an emergency by uploading that information to the IBRD; and
- .3 SAR authorities that need to efficiently access beacon registration data to assist persons in distress.

16 Cospas-Sarsat has configured the IBRD to accept by default beacon registrations from beacon owners, unless the Administration associated with the beacon's country code(s) has advised Cospas-Sarsat that it:

- .1 operates a national database with a 24-hour point of contact and does not want EPIRBs with its country code(s) included in the IBRD; or
- .2 wishes to control the inclusion of beacons with its country code(s) in the IBRD.

Establishing an IBRD point of contact

17 Each Administration should provide Cospas-Sarsat with a national IBRD point of contact for coordinating use of the IBRD. This contact will decide the settings in the IBRD related to beacons with its country code and help to resolve problems arising with registration of beacons with that Administration's country code(s).

18 The national IBRD point of contact should be officially identified to the Cospas-Sarsat Secretariat using a letter of the form that may be found at the Cospas-Sarsat website (www.cospas-sarsat.int – on the "Cospas-Sarsat Professionals" page choose the "Documents" tab, then "Document Templates, and select the "IBRD" tab). This letter must be signed by the Administration's IMO representative, or by its representative to Cospas-Sarsat or to the International Civil Aviation Organization (ICAO), and sent to the Cospas-Sarsat Secretariat. Based on the letter, the Cospas-Sarsat Secretariat will allocate the requested user identifications and passwords to the Administration's national IBRD point of contact.

19 The request should specify whether user identification and passwords to be issued to the Administration's IBRD point of contact are required to:

- .1 enable the Administration to upload registration data about its beacons to the IBRD;
- .2 enable its SAR Services to access IBRD registration data in an emergency; and/or
- .3 make IBRD registration data available to authorized shore-based service facilities and vessel inspectors.

20 Passwords and user identifications will be sent via post to the national IBRD point of contact. The national IBRD point of contact must then forward the user identifications and passwords to those entities authorized by its Administration to access the IBRD.

21 It is critical that, at a minimum, passwords be requested for SAR Services to access beacon registration information in the IBRD during an emergency.

Providing details of your national beacon registry

22 If an Administration maintains its own national beacon registry and decides not to allow beacons with its country code(s) to be registered in the IBRD, the Administration should review the information provided on the Cospas-Sarsat website to the public (such as beacon owners) relating to its beacon-registration policies (please see the information contained on www.cospas-sarsat.int on the "Cospas-Sarsat Professionals" page choose the "Contact Lists" tab and select "406 MHz Beacon Register"). Please provide the Cospas-Sarsat Secretariat immediately with any updates, as appropriate. This is a source very commonly used by beacon owners to learn where to register their beacons and, therefore, it is critically important that accurate information is provided in order to keep these web pages up to date.

23 Based on the information that Administrations provide, beacon owner who attempts to register a beacon on the IBRD will be advised through a "pop up" window on the IBRD website of how and/or where to register the beacon (based on the country code programmed into the beacon and the policies of that Administration reported to the Cospas-Sarsat Secretariat).

24 If no information is available regarding a national beacon registry for an Administration, Cospas-Sarsat policy is to assume that no such registry exists and allow the direct registration in the IBRD by owners of beacons with that Administration's country code(s) (www.406registration.com).

National Administration control of beacon registration in the IBRD

25 If an Administration has elected to prohibit direct registration by owners of their beacons in the IBRD, but wishes upload to the IBRD some or all of its national beacon registration records, a national IBRD Point of Contact should be designated as described above so that the necessary arrangements can be made to enable the uploading of records.

26 The Administration will be able to upload in bulk its beacon registration data or, if desired, keep sole control of individual record inputs or updates. In that case, beacon owners who attempt to register beacons with that Administration's country code(s) will be directed by the IBRD website to the Administration's national website or point of contact for beacon registration.

Means of registration

27 Beacon registrations allowed on the IBRD only will be accepted via the online facilities of www.406registration.com and, under no circumstances can registrations be accepted in paper format nor by telephone, facsimile or any other communication facilities.

Other supported beacon types

28 In addition to EPIRBs, the IBRD supports two other types of beacons:

- .1 Emergency Locator Transmitters (ELTs), for use in aircraft; and
- .2 Personal Locator Beacons (PLBs), small beacons for individuals to carry or wear; these beacons sometimes may be used for purposes similar to an EPIRB or ELT, as allowed by local regulations and, therefore, sometimes may be coded to transmit distress messages that have the same content as an EPIRB or ELT, and/or registered as an EPIRB or ELT in the IBRD.

Further information

29 Further information can be found at www.cospas-sarsat.int, or by email at dbadmin@406registration.com.

Resolution MSC.83(70)**(adopted on 10 December 1998)****ADOPTION OF AMENDMENTS TO THE SURVEY GUIDELINES UNDER
THE HARMONIZED SYSTEM OF SURVEY AND CERTIFICATION
(RESOLUTION A.746(18))**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO that the Assembly, when adopting resolution A.746(18) on Survey Guidelines under the Harmonized System of Survey and Certification, authorized the Maritime Safety Committee and the Marine Environment Protection Committee to keep the Survey Guidelines under review for their further improvement,

NOTING that new SOLAS regulation II-1/3-4 requires that all tankers of not less than 20,000 tonnes deadweight shall be fitted with emergency towing arrangements, the design and construction of which shall be approved by the Administration based on the guidelines adopted by the Organization by resolution MSC.35(63),

MINDFUL of the fact that the above-mentioned Guidelines do not contain any provisions for the periodical surveying of the emergency towing arrangements, other than in paragraph 3.2 therein which refers to regular inspection and maintenance,

RECOGNIZING that the exposed location and limited usage of such arrangements justify surveys to be carried out on an annual basis as a condition for the issuance and endorsement of the Cargo Ship Safety Construction Certificate or the Cargo Ship Safety Certificate, as appropriate,

BEING AWARE that new SOLAS regulation IV/15.9, adopted by resolution MSC.69(69), requires that satellite EPIRBs shall be tested at intervals not exceeding 12 months for all aspects of operational efficiency with particular emphasis frequency stability, signal strength and coding,

HAVING CONSIDERED the recommendations made by the Sub-Committee on Radiocommunications and Search and Rescue at its third session and Sub-committee on flag State Implementation at its sixth session,

1. ADOPTS amendments to the Survey Guidelines under the Harmonized System of Survey and Certification (resolution A.746(18)0, the text of which is set out in the Annex to the present resolution;

2. INVITES Governments carrying out surveys in accordance with resolution A.746(18) to take appropriate steps to implement the amendments annexed to this resolution.

ANNEX**AMENDMENTS TO THE SURVEY GUIDELINES UNDER THE
HARMONIZED SYSTEM OF SURVEY AND CERTIFICATION
(RESOLUTION A.746(18))****8 GUIDELINES FOR SURVEYS FOR THE CARGO SHIP SAFETY RADIO
CERTIFICATE****8a.1 Initial surveys**

9 The existing text of subparagraph .17.4 of paragraph 8a.1.2 replaced by the following:

“(RI) .17.4 checking the EPIRB identification (ID) is clearly marked on the outside of the equipment and decoding the EPIRB identity number and other information from the transmitted signal.”

10 The following new subparagraphs .17.7, .17.8, .17.9 and .17.10 are added after existing subparagraph .17.6 of paragraph 8a.1.2:

“(RI) .17.7 checking the frequency of the 406 MHz signal without transmission of a distress call to the satellites;

(RI) .17.8 if possible, checking the frequency of the 121.5 MHz homing signal without activating the satellite system;

(RI) .17.9 after the above checking, remounting the EPIRB in its bracket, checking that no transmission has been started;

(RI) .17.10 checking that the EPIRB has been maintained at an approved testing or servicing station, if appropriate.”

COMSAR/Circ.32/**16 August 2004****HARMONIZATION OF GMDSS REQUIREMENTS FOR RADIO
INSTALLATIONS ON BOARD SOLAS SHIPS**

.../...

ANNEX**GUIDELINES FOR THE HARMONIZATION OF GMDSS REQUIREMENTS FOR
RADIO INSTALLATIONS ON BOARD SOLAS SHIPS**

.../...

4.10 Satellite Float-free EPIRB

The satellite float-free EPIRB should be located/installed so that the following requirements are fulfilled:

.1 The EPIRB should, with greatest possible probability, float-free and avoid being caught in railings, superstructure, etc., if the ship sinks.

.2 The EPIRB should be located so that it may be easily released manually and brought to the survival craft by one person. It should therefore not be located in a radar mast or any other places which can only be reached by vertical ladder.

(SOLAS 1974, as amended, regulations IV/7.1.6, 8.1.5.2, 9.1.3.1, 10.1.4.1, 10.2.3.1 and IMO resolutions A.763(18), A.810(19), as amended, and A.812(19))

Note: - A float-free EPIRB may also be used to fulfil the requirements for one piece of equipment (of two), which is capable of transmitting distress alert to shore from or near the navigating bridge of the ship. Under such conditions the float-free EPIRB should fulfil the following **additional requirements** with regards to location/installation:

.3 The EPIRB must be installed in the vicinity of the navigation bridge, i.e. on the wings of the navigation bridge. Access via vertical ladder should not be accepted. A location on the top of the wheelhouse may be accepted to fulfil the requirement if accessible by stairs; or

(SOLAS 1974, as amended, regulation IV/7 and COM/Circ.105)

.4 It may be possible to activate the EPIRB remotely from the bridge. If remote activation is used, the EPIRB should be installed so that it has unobstructed hemispherical line of sight to the satellites.

(COM/Circ.105)

Note: - It should be considered that the main function of the EPIRB is float-free activation. If the additional requirements mentioned above cannot be met without reducing the reliability of the float-free activation, priority should be given to this requirement. Alternatively, two float-free EPIRBs should be installed.

.5 The EPIRB should be equipped with a buoyant lanyard suitable for use as a tether to life raft etc. Such buoyant lanyard should be so arranged as to prevent its being trapped in the ship's structure.

(IMO resolutions A.810(19) and A.812 (19), as amended)

.6 The EPIRB should be marked with the ship's call sign, serial number of EPIRB, MMSI number (if applicable), Hex ID, and battery expiry date.

**Convention
on International Civil Aviation**

ANNEX 6 - OPERATION OF AIRCRAFT

**PART I
INTERNATIONAL COMMERCIAL AIR TRANSPORT - AEROPLANES**

CHAPTER 1. DEFINITIONS

.../...

Aircraft tracking. A process, established by the operator, that maintains and updates, at standardized intervals, a groundbased record of the four dimensional position of individual aircraft in flight.

Emergency locator transmitter (ELT). A generic term describing equipment which broadcast distinctive signals on designated frequencies and, depending on application, may be automatically activated by impact or be manually activated. An ELT may be any of the following:

Automatic fixed ELT (ELT(AF)). An automatically activated ELT which is permanently attached to an aircraft.

Automatic portable ELT (ELT(AP)). An automatically activated ELT which is rigidly attached to an aircraft but readily removable from the aircraft.

Automatic deployable ELT (ELT(AD)). An ELT which is rigidly attached to an aircraft and which is automatically deployed and activated by impact, and, in some cases, also by hydrostatic sensors. Manual deployment is also provided.

Survival ELT (ELT(S)). An ELT which is removable from an aircraft, stowed so as to facilitate its ready use in an emergency, and manually activated by survivors.

.../...

CHAPTER 6. AEROPLANE INSTRUMENTS, EQUIPMENT, AND FLIGHT DOCUMENTS

.../...

6.17 EMERGENCY LOCATOR TRANSMITTER (ELT)

6.17.1 Recommendation.- *All aeroplanes should carry an automatic ELT.*

6.17.2 Except as provided for in 6.17.3, all aeroplanes authorized to carry more than 19 passengers shall be equipped with at least one automatic ELT or two ELTs of any type.

6.17.3 All aeroplanes authorized to carry more than 19 passengers for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with either:

- a) at least two ELTs, one of which shall be automatic; or
- b) at least one ELT and a capability that meets the requirements of 6.18.

Note.— In the case where the requirements for 6.18 are met by another system no automatic ELT is required.

6.17.4 Except as provided for in 6.17. 5, all aeroplanes authorized to carry 19 passengers or less shall be equipped with at least one ELT of any type.

6.17.5 All aeroplanes authorized to carry 19 passengers or less for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with at least one automatic ELT.

6.17.6 ELT equipment carried to satisfy the requirements of 6.17.1, 6.17.2, 6.17.3, 6.17.4 and 6.17.5 shall operate in accordance with the relevant provisions of Annex 10, Volume III.

Note.- The judicious choice of numbers of ELTs, their type and placement on aircraft and associated floatable life support systems will ensure the greatest chance of ELT activation in the event of an accident for aircraft operating over water or land, including areas especially difficult for search and rescue. Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.

6.18 LOCATION OF AN AEROPLANE IN DISTRESS

6.18.1 All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2021, shall autonomously transmit information from which a position can be determined by the operator at least once every minute, when in distress, in accordance with Appendix 9.

6.18.2 Recommendation.— *All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2021, should autonomously transmit information from which a position can be determined at least once every minute, when in distress, in accordance with Appendix 9.*

6.18.3 The operator shall make position information of a flight in distress available to the appropriate organizations, as established by the State of the Operator.

Note.— Refer to 4.2.1.3.1 for operator responsibilities when using third parties.

*This document has been superseded
by a later version*

APPENDIX 9. LOCATION OF AN AEROPLANE IN DISTRESS

(*Chapter 6, 6.18, refers*)

1. PURPOSE AND SCOPE

Location of an aeroplane in distress aims at establishing, to a reasonable extent, the location of an accident site within a 6 NM radius.

2. OPERATION

2.1 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. It shall also be possible for this transmission to be activated manually. 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.

Note.— Guidance on the location of an aeroplane in distress is provided in Attachment K.

2.2 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. 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. The operator shall be alerted when an aircraft is in a distress condition with an acceptable low rate of false alerts. 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.

2.3 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.

2.4 The State of the Operator shall identify the organizations that will require the position information of an aircraft in an emergency phase. These shall include, as a minimum:

- a) air traffic service unit(s) (ATSU); and
- b) 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.

2.5 When autonomous transmission of position information has been activated, it shall only be able to be deactivated using the same mechanism that activated it.

2.6 The accuracy of position information shall, as a minimum, meet the position accuracy requirements established for ELTs.

This document has been
superseded
by a later version

PART II
INTERNATIONAL GENERAL AVIATION - AEROPLANES

.../...

CHAPTER 2.4 AEROPLANE INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

.../...

2.4.12 Emergency locator transmitter (ELT)

2.4.12.1 **Recommendation.** - *All aeroplanes should carry an automatic ELT.*

2.4.12.2 Except as provided for in 2.4.12.3, all aeroplanes shall be equipped with at least one ELT of any type.

2.4.12.3 All aeroplanes for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with at least one automatic ELT.

2.4.12.4 ELT equipment carried to satisfy the requirements of 2.4.12.1, 2.4.12.2 and 2.4.12.3 shall operate in accordance with the relevant provisions of Annex 10, Volume III.

Note.- The judicious choice of numbers of ELTs, their type and placement on aircraft, and associated floatable life support systems, will ensure the greatest chance of ELT activation in the event of an accident for aircraft operating over water or land, including areas especially difficult for search and rescue. Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.

PART III
INTERNATIONAL OPERATIONS - HELICOPTERS

.../...

SECTION II
INTERNATIONAL COMMERCIAL AIR TRANSPORT

.../...

**CHAPTER 4. HELICOPTER INSTRUMENTS, EQUIPMENT,
AND FLIGHT DOCUMENTS**

.../...

4.7 EMERGENCY LOCATOR TRANSMITTER (ELT)

4.7.1 From 1 July 2008, all helicopters operating in performance Class 1 and 2 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in 4.5.1 a), with at least one automatic ELT and one ELT(S) in a raft or life jacket.

4.7.8 From 1 July 2008, all helicopters operating in performance Class 3 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in 4.5.1 b), with at least one automatic ELT and one ELT(S) in a raft or life jacket.

4.7.9 ELT equipment carried to satisfy the requirements of 4.7.1 and 4.7.2 shall operate in accordance with the relevant provisions of Annex 10, Volume III.

Note.- The judicious choice of numbers of ELTs, their type and placement on aircraft and associated floatable life support systems will ensure the greatest chance of ELT activation in the event of an accident for aircraft operating over water or land, including areas especially difficult for search and rescue. Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.

**Convention
on International Civil Aviation**

ANNEX 10 - AERONAUTICAL TELECOMMUNICATIONS

VOLUME III, PART II - VOICE COMMUNICATION SYSTEMS

.../...

**CHAPTER 5. EMERGENCY LOCATOR TRANSMITTER (ELT) FOR SEARCH
AND RESCUE**

5.1 GENERAL

5.1.1 Until 1 January 2005, emergency locator transmitters shall operate either on both 406 MHz and 121.5 MHz or on 121.5 MHz.

Note.- From 1 January 2000, ELTs operating on 121.5 MHz will be required to meet the improved technical characteristics contained in 5.2.1.8.

5.1.2 All installations of emergency locator transmitters operating on 406 MHz shall meet the provisions of 5.3.

5.1.3 All installations of emergency locator transmitters operating on 121.5 MHz shall meet the provisions of 5.2.

5.1.4 From 1 January 2005, emergency locator transmitters shall operate on 406 MHz and 121.5 MHz simultaneously.

5.1.5 All emergency locator transmitters installed on or after 1 January 2002 shall operate simultaneously on 406 MHz and 121.5 MHz.

5.1.6 The technical characteristics for the 406 MHz component of an integrated ELT shall be in accordance with 5.3.

5.1.7 The technical characteristics for the 121.5 MHz component of an integrated ELT shall be in accordance with 5.2.

5.1.8 States shall make arrangements for a 406 MHz ELT register. Register information regarding the ELT shall be immediately available to search and rescue authorities. States shall ensure that the register is updated whenever necessary.

5.1.9 ELT register information shall include the following:

- a) transmitter identification (expressed in the form of an alphanumerical code of 15 hexadecimal characters);
- b) transmitter manufacturer, model and, when available, manufacturer's serial number;
- c) COSPAS-SARSAT¹ type approval number;
- d) name, address (postal and e-mail) and emergency telephone number of the owner and operator;
- e) name, address (postal and e-mail) and telephone number of other emergency contacts (two,

¹ COSPAS = Space system for search of vessels in distress;
SARSAT = Search and rescue satellite-aided tracking.

if possible) to whom the owner or the operator is known;

- f) aircraft manufacturer and type; and
- g) colour of the aircraft.

Note 1.- Various coding protocols are available to States. Depending on the protocol adopted, States may, at their discretion, include one of the following as supplementary identification information to be registered:

- a) aircraft operating agency designator and operator's serial number; or
- b) 24-bit aircraft address; or
- c) aircraft nationality and registration marks.

The aircraft operating agency designator is allocated to the operator by ICAO through the State administration, and the operator's serial number is allocated by the operator from the block 0001 to 4096.

Note 2.- At their discretion, depending on arrangements in place, States may include other relevant information to be registered such as the last date of register, battery expiry date and place of ELT in the aircraft (e.g. "primary ELT" or "life-raft No. 1").

5.2 SPECIFICATION FOR THE 121.5 MHz COMPONENT OF EMERGENCY LOCATOR TRANSMITTER (ELT) FOR SEARCH AND RESCUE

Note 1.- Information on technical characteristics and operational performance of 121.5 MHz ELTs is contained in RTCA Document DO-183 and European Organization for Civil Aviation Equipment (EUROCAE) Document ED.62.

Note 2.- Technical characteristics of emergency locator transmitters operating on 121.5 MHz are contained in ITU-R Recommendation M.690-1. The ITU designation for an ELT is Emergency Position — Indicating Radio Beacon (EPIRB).

5.2.1 Technical characteristics

5.2.1.1 Emergency locator transmitters (ELT) shall operate on 121.5 MHz. The frequency tolerance shall not exceed plus or minus 0.005 per cent.

5.2.1.2 The emission from an ELT under normal conditions and attitudes of the antenna shall be vertically polarized and essentially omnidirectional in the horizontal plane.

5.2.1.3 Over a period of 48 hours of continuous operation, at an operating temperature of minus 20°C, the peak effective radiated power (PERP) shall at no time be less than 50 mW.

5.2.1.4 The type of emission shall be A3X. Any other type of modulation that meets the requirements of 5.2.1.5, 5.2.1.6 and 5.2.1.7 may be used provided that it will not prejudice precise location of the beacon by homing equipment.

Note.- Some ELTs are equipped with an optional voice capability (A3E) in addition to the A3X emission.

5.2.1.5 The carrier shall be amplitude modulated at a modulation factor of at least 0.85.

5.2.1.6 The modulation applied to the carrier shall have a minimum duty cycle of 33 per cent.

5.2.1.7 The emission shall have a distinctive audio characteristic achieved by amplitude modulating the carrier with an audio frequency sweeping downward over a range of not less

than 700 Hz within the range 1 600 Hz to 300 Hz and with a sweep repetition rate of between 2 Hz and 4 Hz.

5.2.1.8 After 1 January 2000, the emission shall include a clearly defined carrier frequency distinct from the modulation sideband components; in particular, at least 30 per cent of the power shall be contained at all times within plus or minus 30 Hz of the carrier frequency on 121.5 MHz.

5.3 SPECIFICATION FOR THE 406 MHz COMPONENT OF EMERGENCY LOCATOR TRANSMITTER (ELT) FOR SEARCH AND RESCUE

5.3.1 Technical characteristics

Note 1.- Transmission characteristics for 406 MHz emergency locator transmitters are contained in ITU-R M.633.

Note 2.- Information on technical characteristics and operational performance of 406 MHz ELTs is contained in RTCA Document DO-204 and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-62.

5.3.1.1 Emergency locator transmitters shall operate on one of the frequency channels assigned for use in the frequency band 406.0 to 406.1 MHz.

Note.- The COSPAS-SARSAT 406 MHz channel assignment plan is contained in COSPAS-SARSAT Document C/S T.012.

5.3.1.2 The period between transmissions shall be 50 seconds plus or minus 5 per cent.

5.3.1.3 Over a period of 24 hours of continuous operation at an operating temperature of – 20°C, the transmitter power output shall be within the limits of 5 W plus or minus 2 dB.

5.3.1.4 The 406 MHz ELT shall be capable of transmitting a digital message.

5.3.2 Transmitter identification coding

5.3.2.1 Emergency locator transmitters operating on 406 MHz shall be assigned a unique coding for identification of the transmitter or aircraft on which it is carried.

5.3.2.2 The emergency locator transmitter shall be coded in accordance with either the aviation user protocol or one of the serialized user protocols described in the Appendix to this chapter, and shall be registered with the appropriate authority.

APPENDIX TO CHAPTER 5.
EMERGENCY LOCATOR TRANSMITTER CODING
(see Chapter 5, 5.3.2)

Warning from Cospas-Sarsat Secretariat:
This section extracted from ICAO Annex 10
is out of date compared to referenced document C/S T.001.

Note.- A detailed description of beacon coding is contained in Specification for COSPAS-SARSAT 406 MHz Distress Beacons (C/S T.001). The following technical specifications are specific to emergency locator transmitters used in aviation.

1. GENERAL

1.1 The emergency locator transmitter (ELT) operating on 406 MHz shall have 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 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;
- b) 24-bit aircraft address;
- c) aircraft nationality and registration marks.

1.4 All ELTs shall be designed for operation with the COSPAS-SARSAT² 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 shall contain information relating to the message format, coding protocol, country code, identification data and location data, as appropriate.

2.2 For ELTs with no navigation data provided, the short message format C/S T.001 shall be used, making use of bits 1 through 112. For ELTs with navigation data, if provided, the long message format shall be used, making use of bits 1 through 144.

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 ELT.

2.3.2 A message format flag indicated by bit 25 shall be set to “0” to indicate the short

² COSPAS = Space system for search of vessels in distress;
SARSAT = Search and rescue satellite-aided tracking.

message format or set to “1” to indicate the long format for ELTs capable of providing location data.

2.3.3 A protocol flag shall be indicated by bit 26 and shall be set to “1” for user and user location protocols, and “0” for location protocols.

2.3.4 A country code, which indicates the State where additional data are 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 codes shown in Table 4 of Part I, Volume I of the ITU List of Call Signs and Numerical Identities.

2.3.5 Bits 37 through 39 (user and user location protocols) or bits 37 through 40 (location protocols) shall designate one of the protocols where values “001” and “011” or “0011”, “0100”, “0101”, and “1000” 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 as shown below.

2.3.7 In the serial user and serial user location protocol (designated by bit 26=1 and bits 37 through 39 being “011”), the serial identification data shall be encoded in binary notation with the least significant bit on the right. Bits 40 through 42 shall indicate type of ELT serial identification data encoded where:

- “000” indicates ELT serial number (binary notation) is encoded in bits 44 through 63;
- “001” indicates aircraft operator (3 letter encoded using modified Baudot code shown in Table 5-1) and a serial number (binary notation) 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 number (binary notation) on the same aircraft is encoded 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 or user location protocol (designated by bit 26=1 and 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 and 85 (user or user location protocol) or bit 112 (location protocols) shall indicate any homing transmitter that may be integrated in the ELT.

2.3.10 In standard and national location protocols, all identification and location data shall be encoded in binary notation with the least significant bit right justified. The aircraft operator designator (3 letter code) shall be encoded in 15 bits using a modified Baudot code (Table 5-1) using only the 5 right most bits per letter and dropping the left most bit which has a value of 1 for letters.

Table 5-1. Modified Baudot code

<i>Letter</i>	<i>Code</i> <i>MSB LSB</i>	<i>Figure</i>	<i>Code</i> <i>MSB 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)	SEE NOTE 1	SEE 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 (24 BITS)	SEE NOTE 3	SEE NOTE 2	A	A

Aircraft operator designator and serial number

25		27	36	37	40	44	61	62	73	74	83	85		
F	1	COUNTRY	0	1	1	T	T	T	C	OPERATOR 3-LETTER DESIGNATOR	SERIAL NUMBER 1-4096	SEE 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 that COSPAS-SARSAT Type Approval Certificate number is encoded in bits 74 through 83 and
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.

Note 2.- 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.

EXAMPLE OF CODING (USER LOCATION PROTOCOL)

25	26	←27	←37	←40	85→	←86	←107	←113	←133
36→		36→	39→		83→	106→	112→		132→
1	1	10	3	44	2	21	1	12	12
1	1	CC	T	IDENTIFICATION DATA (AS IN ANY OF USER PROTOCOLS ABOVE)	A	21-BIT BCH ERROR CORRECTING CODE	E	LATITUDE	LONGITUDE
								1 7 4	1 8 4
								N DEG MIN E DEG MIN	
								/ 0–90 0–56 / 0–180 0–56	
								S (1 d) (4m) W (1 d) (4m)	

CC = Country Code;

E = Encoded position data source: 1 = Internal navigation device, 0 = External navigation device

EXAMPLE OF CODING (STANDARD LOCATION PROTOCOL)

25	26	←27	←37	←40	←41	85→	←86	107	←113	132→	←133	144→
61 BITS												
1	1	10	4	45			106→	112	132→	144→		
1	0	CC	PC	IDENTIFICATION DATA	LATITUDE	LONGITUDE	21	6	20	12		
				24	1	9						
				0011	AIRCRAFT 24 BIT ADDRESS	N = 0 DEG	LAT E = 0 DEG	LON DEG	SD	Δ LATITUDE	Δ LONGITUDE	
				0101	15 9 AIRCRAFT OPER. DESIGNATOR	S = 1 0–90 (1/4 d)	W = 1 0–180 (1/4 d)		1	5	4	1 5 4
									M I U T E S	S E C O N D	M I U T E S	
				0100	10 14 C/STA No 1–1023				– = 0 + = 1 0–30 (1 m)	– = 0 + = 1 0–56 (4 s)		
									N C O N D S	U N O T E S	N C O N D S	
									0–30 (1 m)	0–56 (4 s)		

CC = Country Code;

PC = Protocol Code

0011 indicates 24-bit aircraft address is encoded;

0101 indicates operating agency and serial number are encoded;

0100 indicates ELT serial number is encoded.

SD = Supplementary Data

bits 107 – 110 = 1101;

bit 111 = Encoded Position Data Source (1 = internal; 0 = external)

bit 112: 1 = 121.5 MHz auxiliary radio locating device;

0 = other or no auxiliary radio locating device.

Note 1.- Further details on protocol coding can be found in Specification for COSPAS-SARSAT 406 MHz Distress Beacon (C/S T.001).

Note 2. - All identification and location data are to be encoded in binary notation with the least significant bit on the right except for the aircraft operator designator (3 letter code).

Note 3. - For details on BCH error correcting code see Specification for COSPAS-SARSAT 406 MHz Distress Beacon (C/S T.001).

EXAMPLE OF CODING (NATIONAL LOCATION PROTOCOL)

25	26	←27	←37						←86	107	←113						←133		
		36→	40→ ←41						85→	106→	112						132→	144→	
61 BITS PDF-1						26 BITS PDF-2						BCH-2							
1	1	10	4	45						21	6	7			7			6	12
1	0	CC	1000	18 bits ID	27 bits LATITUDE						SD	△ LATITUDE			△ LONGITUDE			NU	12-BIT BCH CODE
				18	1	7	5	1	8	5		1	2	4	1	2	4		
				NATIONAL ID NUMBER	N = 0	D E G R E E S	M I N U T E S	E = 0	D E G R E E S	M I N U T E S	21-BIT BCH CODE	— = 0	M I U T E S	S E O N D S	— = 0	M I U T E S	S E O N D S		
					S = 1	0—90	0—58		0—180	0—58		+	= 1	0—3	0—56	0—3	0—56		
						(1 d)	(2 m)		(1 d)	(2 m)				(1 m)	(4 s)	(1 m)	(4 s)		

CC = Country Code;

ID = Identification Data = 8-bit identification data consisting of a serial number assigned by the appropriate national authority

SD = Supplementary Data = bits 107 – 109 = 110;

bits 107 – 109 = 110;
bit 110 = Additional Data Flag describing the use of bits 113 to 132:
1 = Delta position; 0 = National assignment;
bit 111 = Encoded Position Data Source: 1 = internal, 0 = external;
bit 112: 1 = 121.5 MHz auxiliary radio locating device;
0 = other or no device

NU = National use = 6 bits reserved for national use (additional beacon type identification or other uses).

Note 1.- Further details on protocol coding can be found in Specification for COSPAS-SARSAT 406 MHz Distress Beacon (C/S T.001).

Note 2.- All identification and location data are to be encoded in binary notation with the least significant bit on the right.

Note 3.- For details on BCH error correcting code see Specification for COSPAS-SARSAT 406 MHZ Distress Beacon (C/S T.001).

**Convention
on International Civil Aviation**

ANNEX 12 - SEARCH AND RESCUE

CHAPTER 2. ORGANIZATION

.../...

2.4 Search and rescue communications

.../...

2.4.1 Each rescue coordination centre shall have means of rapid and reliable two-way communication with:

- a) associated air traffic services units;
- b) associated rescue subcentres;
- c) appropriate direction-finding and position-fixing stations;
- d) where appropriate, coastal radio stations capable of alerting and communicating with surface vessels in the region;
- e) the headquarters of search and rescue units in the region;
- f) all maritime rescue coordination centres in the region and aeronautical, maritime or joint rescue coordination centres in adjacent regions;
- g) a designated meteorological office or meteorological watch office;
- h) search and rescue units;
- i) alerting posts; and
- j) the Cospas-Sarsat Mission Control Centre servicing the search and rescue region.

Note.- Maritime rescue coordination centres are identified in relevant documents of the International Maritime Organization.

.../...

2.6 Search and rescue equipment

.../...

2.6.4 Each search and rescue aircraft shall be equipped with a device for homing on distress frequencies.

Note 1. - Emergency locator transmitter (ELT) carriage requirements are given in Annex 6, Parts I, II and III.

Note 2.- Specifications for ELTs are given in Annex 10, Volume III.

2.6.5 Each search and rescue aircraft, when used for search and rescue over maritime areas, shall be equipped to be able to communicate with vessels.

Note- Many vessels can communicate with aircraft on 2182 kHz, 4125 kHz and 121.5 MHz. However, these frequencies, and in particular 121.5 MHz, may not be routinely monitored by vessels.

.../...

CHAPTER 3. CO-OPERATION

3.2 Co-operation with other services

.../...

3.2.5 States shall designate a search and rescue point of contact for the receipt of Cospas-Sarsat distress data.

- END OF SECTION 4 -

- END OF DOCUMENT -

Cospas-Sarsat Secretariat
1250 René-Lévesque Blvd. West, Suite 4215, Montréal, Québec H3B 4W8 Canada
Telephone: + 1 514 500 7999 Fax: + 1 514 500 7996
Email: mail@cospas-sarsat.int
Website www.cospas-sarsat.int