COSPAS-SARSAT
MISSION CONTROL CENTRES
STANDARD INTERFACE
DESCRIPTION

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COSPAS-SARSAT MISSION CONTROL CENTRES STANDARD INTERFACE DESCRIPTION

History

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1. INTRODUCTION

1.1 Overview

The purpose of the Cospas-Sarsat System is to provide distress alert and location data for search and rescue (SAR) by using spacecraft and ground facilities to detect and locate distress signals. The computed position of the distress and other related information is transmitted to appropriate SAR authorities.

Distress beacons (Emergency Locator Transmitters - ELTs, Emergency Position Indicating Radio Beacons - EPIRBs, Personal Locator Beacons - PLBs) transmit 406 MHz signals that are detected by Cospas-Sarsat low-altitude polar-orbit spacecraft, medium-altitude Earth orbit GNSS spacecraft, or geostationary spacecraft. These signals are relayed to Cospas-Sarsat ground facilities termed Local User Terminals (LUTs), which process the signals to determine the beacon location. Alerts are then relayed, together with location data, via a Mission Control Centre (MCC), either to another MCC or to the appropriate search and rescue point of contact (SPOC) to initiate SAR activities.

Each MCC distributes Cospas-Sarsat messages according to the System document C/S A.001 "Cospas-Sarsat Data Distribution Plan" which defines the Cospas-Sarsat ground communication network. Most Cospas-Sarsat messages are sent in formats which permit the data to be automatically processed and transmitted. These message formats are described in this document C/S A.002 "Cospas-Sarsat Mission Control Centres Standard Interface Description".

1.2 Document Objective

The Cospas-Sarsat System is operated in accordance with the 1988 International Cospas-Sarsat Programme Agreement and other related documents. The purpose of this document C/S A.002 (SID) is to describe the message formats and communication standards required to transmit data between Cospas-Sarsat MCCs. It is designed to facilitate information exchange between Cospas-Sarsat MCCs and between those MCCs and Rescue Coordination Centres (RCCs) of countries without MCCs.

This document specifies the structure and content of the information portion of Cospas-Sarsat messages regardless of the communication network to be used. For an operational implementation, the information portion will of necessity be framed with the addressing, header and trailer data required by the specific network protocol.

1.3 Required Implementation Data

The following information must be agreed upon between two agencies establishing a communications interface:

a. Network and protocols to be used.
b. Data rate.
c. Addressing/routing.
d. Packet size constraints.
e. Security (e.g., password, call identification and caller user data).

1.4 Reference Documents

a. C/S T.001 “Specification for Cospas-Sarsat 406 MHz Distress Beacons”.
b. C/S A.001 “Cospas-Sarsat Data Distribution Plan”.
c. C/S A.005 “Cospas-Sarsat Mission Control Centre (MCC) Performance Specification and Design Guidelines”.
d. C/S T.002 “Cospas-Sarsat [LEOLUT] Local User Terminal Performance Specification and Design Guidelines”.
e. C/S T.009 “Cospas-Sarsat GEOLUT Performance Specification and Design Guidelines”.
f. C/S T.019 “Cospas-Sarsat MEOLUT Performance Specification and Design Guidelines”.

Other information that is used in this document is contained on the Cospas-Sarsat website, available at http://www.cospas-sarsat.int/en/pro.

A list of the acronyms used in this document is contained in the Cospas-Sarsat Glossary, document C/S G.004, and in the Acronyms and Terminology page on the Cospas-Sarsat website, available at http://www.cospas-sarsat.int/en/pro, under the Documents menu.

1.5 Document Amendments and Updates

a. Amendments of message formats which affect all MCCs require recommendation for change by the Joint Committee (JC) and approval by the Cospas-Sarsat Council (CSC).

b. Formats and content of any messages which are exchanged between two MCCs on a bilateral basis only, may be amended by mutual agreement. Written notification of changes will be provided to the Cospas-Sarsat Secretariat for document control and formal amendment.

c. If any two MCCs find the need to introduce a new message format which is strictly used bilaterally, details will be submitted to the Cospas-Sarsat Secretariat who will assign a Subject Indicator Type (SIT) code to the message and publish the relevant amendment.

- END OF SECTION 1 -

2. COMMUNICATION CHANNEL INTERFACES

Two types of communications are required among the Cospas-Sarsat MCCs. Voice communication is required for general coordination and follow-up/confirmation of certain automated message transmissions. Data communication using formatted messages are required for the transfer of Cospas-Sarsat alert data and System information.

2.1 Voice Communication Facilities

Voice communications are made over the public dial-up telephone network or other available networks. Voice communication will not be discussed further in this document.

2.2 Data Communication Facilities

All text and data transmissions between MCCs, including alert messages and System information messages, shall be made in character text format only. The information transmitted in character format shall be sent in accordance with Table 4.3. Each respective MCC is responsible for:

a. making the necessary provisions for connecting to the appropriate communication networks; and

b. implementing MCC to MCC communications on the selected communication networks in accordance with the standards described in the annexes to this document.

Participating countries may bilaterally choose to implement primary and alternate communications systems.

2.2.1 Cospas-Sarsat Message Text

All Cospas-Sarsat messages contain specified types of information. Each one of these information types, called a Message Field (MF), is described in greater detail in Annex B. These message fields are then grouped as shown in Annex C to produce the messages for the various Subject Indicator Types (SITs) listed in Annex A.

Originators of operational messages should endeavor to provide actual values in all fields indicated by the letter “A” in Tables C-1 and C-2. Fields indicated by the letter “X” must not be omitted, but may use default values if actual data is not available.

2.2.2 Subject Indicator Types (SITs)

The types of messages that are exchanged between the MCCs are listed in Annex A. Each type of message is identified by a SIT. The SIT is used to facilitate automatic message handling. Annex A lists the SIT code numbers and their assigned use. Annex C defines the content of each of the SIT messages.

2.2.3 Character Text

This specification is based on a text format using International Alphabet No.5 representation. To provide for use on networks using the International Telegraph Alphabet No.2 (ITA2) characters, a table of equivalence between the International Alphabet No.5 character representation and ITA2 is provided in Table 4.3.

- END OF SECTION 2 -

3. COMMUNICATION STANDARDS

The message formats presented in this document provide flexibility, efficiency, and compatibility among MCCs. They are independent of the communication network and protocol employed.

All MCC messages are formed as a series of octets (one octet is 8 bits, or one byte, which contains one character and is commonly referred to as a "character"). A message may be made up of any number of octets, subject to the restriction in section 4.

The communication networks accepted for MCC-to-MCC communications are introduced below and the standards to which each MCC must adhere for their use in the Cospas-Sarsat Ground Segment are described in the annexes to this document. Some of these networks provide an error detection and/or error correction capability for detecting and correcting data errors introduced by the communications system.

It is the responsibility of the MCC accepting data to implement adequate security and to co-ordinate security measures with other MCCs from whom it will receive data. All MCCs with an Internet connection must be protected by firewall technology.

3.1 File Transfer Protocol (FTP) Communications

FTP is an Internet based protocol that can be used to exchange messages between Cospas-Sarsat MCCs. It is highly reliable due to its inherent error detection and correction capability. Each MCC communicating via FTP shall comply with the applicable standards described in the Internet Engineering Task Group document RFC 959 - File Transfer Protocol. In addition, MCCs communicating via FTP shall comply with the Cospas-Sarsat standards contained in Annex F.

All FTP servers used for the exchange of SIT messages should be linked exclusively using Internet virtual private networks (VPNs) that meet the Cospas-Sarsat standard provided at Annex G. This is referred to as FTPV communication.

3.2 AFTN/AMHS Communications

The Aeronautical Fixed Telecommunications Network (AFTN) is a worldwide system that provides point-to-point communications for text messages. Access to the AFTN network is restricted to terminals that are operated in controlled locations, such as Air Traffic Control Centres and MCCs. This network may operate at fairly low data rates (i.e., 300 or 9600 baud). Communications procedures for the AFTN are controlled by ICAO and are detailed in Annex 10 to the Convention on International Civil Aviation, Volume II, Communication Procedures. Guidance for using AFTN for MCC-to-MCC communications is provided at Annex H to this document.

AFTN is being upgraded by ICAO to the Aeronautical Message Handling System (AMHS). The transition from AFTN to AMHS will be implemented gradually to meet the requirements of Administrations. This transition is expected to enhance communication services in several regions of the world and should not negatively impact the use of AFTN communications by Cospas-Sarsat.

3.3 Email Communications

Electronic mail is a store-and-forward communication method over the Internet or other networks. It is an optional mode of communications between MCCs and undertaken on a bilateral contingency basis. Guidance on using email is provided at Annex I to this document.

- END OF SECTION 3 -

4. MESSAGE FORMAT

4.1 Format Requirements

All Cospas-Sarsat messages shall be framed as shown in Figure 4.1. The structure of the frames is specified by the host network and does not impact the Cospas-Sarsat information transmitted.

For the entire message, including the required network framing, the number of characters on any one line shall not exceed 69. This does not include the New Line (NL) sequence described below.

Each line shall end with a new line (NL) sequence that is defined as CRCRLF or CRLF where

CR means Carriage Return - Hex 0D (i.e., zero D)

LF means Line Feed - Hex 0A (i.e., zero A)

The entire message including any network required framing shall not exceed 25,000 characters.

However, message originators may need to further limit message size depending on specific network constraints.

Format Frame	Contents
HEADER (network dependent)	Made available to satisfy the host network requirements if any. These contents must be designed into the application software of the agency using the network.
INFORMATION (SIT message)	Cospas-Sarsat message text as defined in this document, irrespective of the network in use.
TRAILER (network dependent)	As per HEADER above.

Figure 4.1: General Message Structure

Since some communication networks may add a header that precedes the SIT message, MCCs must be able to identify the beginning of a SIT message. The presence of SIT Message Fields 1 - 3 shall be used to identify the beginning of a SIT message. That is, Message Fields 1 - 3 shall have the format "/nnnnn nnnnn/nnnn/nnn nn nnnn", where n is a numeral between 0 - 9.

4.2 Character Set

The set of International Alphabet No.5 characters that have an equivalent ITA2 character is the set of allowable characters for the INFORMATION frame of Figure 4.1.

To ensure compatibility, Tables 4.1, 4.2 and 4.3 provide details of those characters. Table 4.1 defines the International Alphabet No.5 characters while Table 4.2 illustrates ITA2 characters. Table 4.3 details the conversions between the two character sets.

Characters not found in Table 4.3 are not permitted.

The octothorpe (#) character shall not be used in the information frame of Cospas-Sarsat messages as it is a command character for some networks.

The "@" (AT sign) and "_" (underscore sign) are not listed in Table 4.3, but are required for some messages.

The "@" (AT sign) should be replaced by "(AT)" and the "_" (underscore sign) should be replaced by "(UNDERSCORE)" in messages exchanged between MCCs.

For consistency this format should apply to all communication modes for MCC-to-MCC message exchange.

Table 4.1

International Alphabet No.5 (IA5)

				b7 ->	0	0	0	0	1	1	1	1
	BITS			b6 ->	0	0	1	1	0	0	1	1
				b5 ->	0	1	0	1	0	1	0	1
b_4	b_3	b_2	b_1	Column->	0	1	2	3	4	5	6	7
				Row								
0	0	0	0	0	NUL	DLE	SP	0	@	P	\	p
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
0	0	1	0	2	STX	DC2	"	2	B	R	b	r
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
0	1	0	0	4	EOT	DC4	$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	10	LF	SUB	*	:	J	Z	j	z
1	0	1	1	11	VT	ESC	+	;	K	[	k	{
1	1	0	0	12	FF	FS	,	<	L	/	l	|
1	1	0	1	13	CR	GS	-	=	M	]	m	}
1	1	1	0	14	SO	RS	.	>	N	^	n	~
1	1	1	1	15	SI	US	/	?	O	___	o	DEL

Table 4.2

International Telegraph Alphabet No.2 (ITA2)

Combination Number	Code Element 1	2	3	4	5	Character Allocations
1	1	1	0	0	0	A -
2	1	0	0	1	1	B ?
3	0	1	1	1	0	C :
4	1	0	0	1	0	D WHO R U
5	1	0	0	0	0	E 3
6	1	0	1	1	0	F
7	0	1	0	1	1	G
8	0	0	1	0	1	H #
9	0	1	1	0	0	I 8
10	1	1	0	1	0	J BELL
11	1	1	1	1	0	K (
12	0	1	0	0	1	L)
13	0	0	1	1	1	M .
14	0	0	1	1	0	N ,
15	0	0	0	1	1	O 9
16	0	1	1	0	1	P 0
17	1	1	1	0	1	Q 1
18	0	1	0	1	0	R 4
19	1	0	1	0	0	S '
20	0	0	0	0	1	T 5
21	1	1	1	0	0	U 7
22	0	1	1	1	1	V =
23	1	1	0	0	1	W 2
24	1	0	1	1	1	X /
25	1	0	1	0	1	Y 6
26	1	0	0	0	1	Z +
27	0	0	0	1	0	Carriage Return
28	0	1	0	0	0	Line Feed
29	1	1	1	1	1	Letters Shift
30	1	1	0	1	1	Figures Shift
31	0	0	1	0	0	Space
32	0	0	0	0	0	Not Used

Table 4.3

Equivalents for Translation between International Telegraph Alphabet No.2 and International Alphabet No.5

ITA2 Combination No. (Table 4.2 refers)	IA5 Column/Row (Table 4.1 refers) Conversion at Interface ITA2 Letters Case			ITA2 Figures Case		
1	A	-	4/1, 6/1	-	-	2/13
2	B	-	4/2, 6/2	?	-	3/15
3	C	-	4/3, 6/3	:	-	3/10
4	D	-	4/4, 6/4	ENQ	-	0/5
5	E	-	4/5, 6/5	3	-	3/3
6	F	-	4/6, 6/6			
7	G	-	4/7, 6/7			
8	H	-	4/8, 6/8	#	-	2/3
9	I	-	4/9, 6/9	8	-	3/8
10	J	-	4/10, 6/10	BEL	-	0/7
11	K	-	4/11, 6/11	(	-	2/8
12	L	-	4/12, 6/12	)	-	2/9
13	M	-	4/13, 6/13	.	-	2/14
14	N	-	4/14, 6/14	,	-	2/12
15	O	-	4/15, 6/15	9	-	3/9
16	P	-	5/0, 7/0	0	-	3/0
17	Q	-	5/1, 7/1	1	-	3/1
18	R	-	5/2, 7/2	4	-	3/4
19	S	-	5/3, 7/3	.	-	2/7
20	T	-	5/4, 7/4	5	-	3/5
21	U	-	5/5, 7/5	7	-	3/7
22	V	-	5/6, 7/6	=	-	3/13
23	W	-	5/7, 7/7	2	-	3/2
24	X	-	5/8, 7/8	/	-	2/15
25	Y	-	5/9, 7/9	6	-	3/6
26	Z	-	5/10, 7/10	+	-	2/11
27	CR	-	0/13			
28	LF	-	0/10			
29	SI	-	0/15			
30	SO	-	0/14			
31	SP	-	2/0			
32	NUL	-	0/0			

- END OF SECTION 4 -

ANNEXES
TO
COSPAS-SARSAT
MISSION CONTROL CENTRES
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ANNEX A

SUBJECT INDICATOR TYPES (SITs)

1. GENERAL

All Cospas-Sarsat messages are identified by a Subject Indicator Type (SIT) number according to the subject matter being transmitted.

Descriptions of the Subject Indicator Types are included in Tables A.1 and A.2.

2. SIT BLOCK ASSIGNMENT

To maintain uniqueness between the SIT numbers for all Cospas-Sarsat agencies, Table A.3 subdivides the range of possible numbers, from 000 to 999 by subject and application.

The proper application of this table will ensure standardization in numbers and usage to facilitate automatic message handling by the MCCs.

Table A.1

Subject Indicator Types for Alert Messages

SIT	Title	Meaning	Page
121	DOPPLER INTERFERER NOTIFICATION	These messages are used for notification of 406 MHz interferer signals.	C-11
141	DOA INTERFERER NOTIFICATION		C-14
122	INCIDENT (NO DOPPLER)	406 MHz alert message with no Doppler or DOA positions. An encoded position may or may not be available.	C-12
142	INCIDENT (NO DOA)		C-15
123	POSITION CONFLICT (LEOSAR/MEOSAR/ GEOSAR; ENCODED ONLY)	406 MHz alert message with no Doppler/DOA positions for which the encoded position differs by more than the match criteria from all previous positions.	C-12
143			C-15
124	POSITION CONFIRMATION (LEOSAR; ENCODED ONLY)	406 MHz alert message with no Doppler/DOA positions that identifies the confirmed position of a 406 MHz alert.	C-12
144	POSITION CONFIRMATION (MEOSAR; ENCODED ONLY)		C-15
125	INCIDENT (LEOSAR)	Beacon alert message computed from 406 MHz incident data. The message contains Doppler/DOA position.	C-13
145	INCIDENT (MEOSAR)		C-14
126	POSITION CONFLICT (LEOSAR)	Beacon alert message computed from 406 MHz incident data. The message contains Doppler/DOA and/or encoded position(s) which may differ from previous position(s) by the match criteria.	C-13
146	POSITION CONFLICT (MEOSAR)		C-14
127	POSITION CONFIRMATION (LEOSAR)	406 MHz alert message with Doppler/DOA positions that identifies the confirmed position of a 406 MHz alert. It may or may not contain an encoded position.	C-13
147	POSITION CONFIRMATION (MEOSAR)		C-14

Table A.1 (Cont.)

Subject Indicator Types for Alert Messages

SIT	Title	Meaning	Page
132	NOTIFICATION OF COUNTRY OF REGISTRATION (LEOSAR/GEOSAR ENCODED ONLY)	Message used between MCCs to notify the country of registration of a 406 MHz beacon (NOCR). This message contains only an encoded position.	C-12
136	NOTIFICATION OF COUNTRY OF REGISTRATION (MEOSAR; ENCODED ONLY)		C-15
133	NOTIFICATION OF COUNTRY OF REGISTRATION (LEOSAR)	Message used between MCCs to notify the country of registration of a 406 MHz beacon (NOCR). This message contains Doppler or DOA position data. It may or may not contain an encoded position.	C-13
137	NOTIFICATION OF COUNTRY OF REGISTRATION (MEOSAR)		C-14
134	NOTIFICATION OF RETURN LINK SERVICE PROVIDER (LEOSAR/GEOSAR; ENCODED ONLY)	Message used between MCCs to notify the responsible MCC (see note 1) of a 406 MHz beacon with RLS capability. This message only contains an encoded position	C-12
138	NOTIFICATION OF RETURN LINK SERVICE PROVIDER (MEOSAR; ENCODED ONLY)		C-15
135	NOTIFICATION OF RETURN LINK SERVICE PROVIDER (LEOSAR/GEOSAR)	Message used between MCCs to notify the responsible MCC (see note 1) of a 406 MHz beacon with RLS capability. This message contains Doppler or DOA position data. It may or may not contain an encoded position.	C-13
139	NOTIFICATION OF RETURN LINK SERVICE PROVIDER (MEOSAR)		C-14
185	COSPAS-SARSAT ALERTS	Message used for alert messages and as NOCR message between MCCs and SPOCs.	C-17 to C-30

Note 1: The responsible MCC for the various GNSS providers is stated in C/S A.001, e.g., for Galileo system it is the FMCC.

Table A.2

Subject Indicator Types for System Information and Narrative Messages

SIT		Meaning	Page
215	ORBIT VECTORS	Sarsat or Cospas spacecraft orbit position and time message.	C-31
216	ORBIT VECTORS	Sarsat or Cospas spacecraft orbit position and time message. Used in special conditions (e.g., after a satellite manoeuvre) when it is required that orbit vectors at the MCC and its associated LUTs be initialized. See C/S A.001, section entitled "Scheduled Satellite Manoeuvres".	C-31
217	ORBIT VECTORS	MEOSAR spacecraft two-line orbital elements (TLE) message.	C-32
415	SARP CALIBRATION	Time and frequency calibration for a SARP.	C-33
416	SARP TELEMETRY	SARP telemetry from a Sarsat spacecraft.	C-34
417	SARP-3 CALIBRATION	Time and frequency calibration for a SARP-3.	C-35
425	SARP OUT OF LIMIT	Warning message to indicate abnormal performance of the SARP.	C-34
435	SARP COMMAND	Command request for the SARP.	C-36
445	SARP COMMAND VERIFICATION	Verification of the execution (or non-execution) of a SARP command as requested by command message.	C-34
510	406 MHz SARR FREQUENCY CALIBRATION OFFSET	Offset between actual and 406 MHz SARR-provided beacon frequencies.	C-37
515	SARR TELEMETRY	SARR telemetry from a Sarsat spacecraft.	C-34
525	SARR OUT OF LIMIT	Warning message to indicate abnormal performance of the SARR.	C-34
535	SARR COMMAND	Command request for the SARR.	C-36
545	SARR COMMAND VERIFICATION	Verification of the execution (or non-execution) of a SARR command as requested by a SARR COMMAND message.	C-34
605	SYSTEM STATUS AND BEACON TEST NOTIFICATION TO ALL MCCs	Narrative message transmitted to all MCCs to indicate changes in System status and provide beacon test notification. System status messages include System element and System function failures, scheduled maintenance, integration or testing of new System elements, and the commissioning of new equipment or new capabilities of existing equipment.	C-34 & C-38 to C-42
915	FOR MCC INFORMATION TRANSMISSION TO A SINGLE MCC	Narrative message for MCC to MCC operator. This is a free format message, except when a specific format is defined (Note 1).	C-34
925	406 BEACON REGISTRATION INFORMATION	This message is used between MCCs to provide 406 MHz beacon registration information.	C-43

Note 1: Free format applies only to the message text. The complete message must still be formatted as per the host communication networks procedures.

Table A.3

SIT Number Assignment

Subject Matter	Between Cospas-Sarsat MCCs	Internally by each Cospas-Sarsat Participant	Between Cospas-Sarsat MCCs and non Cospas-Sarsat Agencies	Future Growth
				000 - 099
INCIDENTS	100 - 149	150 - 179	180 - 199	
ORBIT	200 - 249	250 - 279	280 - 299	
				300 - 399
SARP	400 - 449	450 - 479	480 - 499	
SARR	500 - 549	550 - 579	580 - 599	
STATUS	600 - 649	650 - 679	680 - 699	
LUT	700 - 749	750 - 779	780 - 799	
				800 - 899
NARRATIVE	900 - 949	950 - 979	980 - 999	

Note 1: SIT for new messages other than those used internally by each Cospas-Sarsat participant must be coordinated with all Cospas-Sarsat MCCs before being placed in use.

- END OF ANNEX -

ANNEX B

MESSAGE FIELD DESCRIPTION

1. GENERAL

All Cospas-Sarsat messages can be divided into a series of fields, each field containing unique information. Each Message Field (MF) is described in this Annex in terms of possible characters and range of numbers.

All fields must be present when required for a specific SIT message; no positional field can be omitted from a SIT message.

Message formats and examples by SIT numbers are given in Annex C.

2. MESSAGE FIELD LIST

A detailed description of each Message Field is given in this Annex. Once it is known which MFs form a particular SIT, their corresponding formats are concatenated to form the information frame of the message.

The list in Table B.1 is composed of four columns:

a. Message Field Number (MF #)
b. Message Field Name (Name)
c. Content
d. Character Text

2.1 MF

The numbers in this column are for simplicity of reference in Annex C.

2.2 Name

This column contains the name of the message field.

2.3 Content

This column contains the value ranges and meanings of the numbers of each MF.
The listed default values are inserted in the field only when the MCC has no proper value to insert.

2.4 Character Text

This column contains the format for each MF. Note that for MF #1 to MF #44, MF # 64 to 84 and MF # 87 to 89, fields are separated by a "/" inserted at the beginning of the field, while the elements within a field are separated by a space (indicated as "b"). For all other message fields, all required "/" and spaces (b) are indicated where they are needed.
The following legend applies:

all upper case = the actual transmitted character
a = all transmittable characters
h = Hexadecimal characters (0-9, A-F)
s = sign symbol, plus (+) or minus (-)
n = numerals 0 to 9
b = space.

Ensure the 25,000 character transmission limit is not exceeded.

Table B.1

Message Fields Description

MF #	NAME	CONTENT	CHARACTER TEXT	
1	MESSAGE NUMBER	CURRENT MESSAGE ORIGINAL MESSAGE RANGES = 00001 -> 99999	nnnnn nnnnn	(Note 1)
2	REPORTING FACILITY	(See www.cospas-sarsat.int)	nnnn	
3	MESSAGE TRANSMIT TIME	YEAR = 00 -> 99 DAY (JULIAN) = 001-> 366 UTC - HRS = 00 -> 23 MINS = 00 -> 59	nn nnn nnnn	
4	SIT	(SEE TABLE A.1 & A.2) RANGE = 000 -> 999	nnn	
5	DESTINATION MCC	(See www.cospas-sarsat.int)	nnnn	
6	SPACECRAFT ID	Sarsat = 001 -> 099 Cospas = 101 -> 199 GOES = 201 -> 220 Electro-L / Louch-5 = 221 -> 240 INSAT-2, INSAT-3 = 241 -> 260 MSG = 261 -> 280 GPS = 300 -> 399 Galileo = 400 -> 499 Glonass = 500 -> 599 (See www.cospas-sarsat.int for spacecraft status)	nnn	
	For MEOSAR satellites the sequence within the range corresponds to the Pseudo Random Noise (PRN) number for the spacecraft (e.g., GPS PRN 23 would be 323).			
7	ORBIT NUMBER	RANGE = 00000 -> 99999	nnnnn	
8	NUMBER OF ALERTS WITH DOPPLER/DOA POSITIONS	01 -> 99	nn	
9	NOT USED (previously Number of Images Reported)			
10	NUMBER OF ALERTS WITHOUT DOPPLER/DOA POSITIONS	01 -> 99	nn	

Note 1: If the outgoing message is not a retransmission, "00000" will be inserted as the original message number.

Table B.1 (Cont.)

Message Fields Description

MF #	NAME	CONTENT	CHARACTER TEXT
11	SOURCE ID	(See www.cospas-sarsat.int)	nnnn
12	LOCAL / GLOBAL FLAG	LOCAL = + GLOBAL or LOCAL&GLOBAL = -	sn
	FREQUENCY BAND	BAND 1 - not used 2 - not used 3 - not used 4 - 406 SARP (Note 2) 5 - 406 COMBINED LEO/GEO WITH SARP 6 - 406 COMBINED LEO/GEO WITH SARR 7 - 406 COMBINED LEO/GEO WITH SARP AND SARR 8 - 406 SARR 9 - 406 COMBINED SARP AND SARR	
13	BIAS (Hz)	- 30000.0 -> + 75000.0 DEFAULT VALUE = +99999.9	snnnnn.n
	BSDEV (Hz)	000.0 -> 900.0 DEFAULT VALUE = 999.9	nnn.n
	DRIFT (Hz/min)	-99.00 -> +99.00 DEFAULT VALUE = +99.99	snn.nn
14	TCA	YEAR = 00 -> 99 DAY (JULIAN) = 001 -> 366 UTC - HRS = 00 -> 23 MINS = 00 -> 59 SECS = 00.00 -> 59.99	nn nnn nnnn nn.nn
15	WINDOW FACTOR (WF)	0 = IN WINDOW 1->9 = OUTSIDE WINDOW WF = Integer of the Quotient $\left\lvert \frac{TCA - \frac{1}{2}(Tf + Tl)}{\frac{1}{2}(Tf - Tl)} \right\rvert$ where: TCA = Time of closest approach Tf = Time of first data point Tl = Time of last data point All times are in an absolute time reference (e.g., seconds since 1980)	n
16	NUMBER OF ITERATIONS	1 -> 9 DEFAULT VALUE = 0	n
17	CTA (DEGREE)	00.000 -> 33.000	nn.nnn
18	SECONDARY SOURCE ID	(See www.cospas-sarsat.int) DEFAULT VALUE = 0000	nnnn

Note 2: Value to be used for SIT 121 messages (406 MHz interferer notification).

Table B.1 (Cont.)

Message Fields Description

MF #	NAME	CONTENT	CHARACTER TEXT	
19	NUMBER OF SIDEBANDS	00 -> 99 DEFAULT VALUE = 00	nn	
20	SWEEP PERIOD (mSec) SPSDEV (mSec)	SPERIOD = 0001 -> 9999 DEFAULT VALUE = 0000 SPSDEV = 01 -> 90 DEFAULT VALUE = 99	nnnn nn	
21	NUMBER OF POINTS	01 -> 99 DEFAULT VALUE=99	nn	(Note 1)
22	BEACON ID (SEE C/S T.001)	15 HEX CHARACTERS (BITS 26-85)	hhhhhhhhhhhhhhh	
23	406 MESSAGE (SEE C/S T.001)	30 HEX CHARACTERS (BITS 25-144)	h.....h	
24	DDR/SERVICE AREA PS FLAG	MCC COUNTRY CODE = 100-> 999 POSITION STATUS (PS) FLAG: "+" IN 'A' AND 'B' = NO CONFIRMED POSITION "+" = CONFIRMED 'A', 'B', or DOA OR NON-IMAGE UNCONFIRMED 'A' or 'B' POSITION "-" = INCORRECT 'A', 'B', or DOA, OR UNCONFIRMED DOA POSITION	snnn	
25	LATITUDE (DEGREE)	LAT: ±00.000 -> ±90.000 WHERE: + = NORTH and - = SOUTH	snn.nnn	
26	LONGITUDE (DEGREE)	LONG: ± 000.000 -> ±180.000 WHERE: + = EAST and - = WEST	snnn.nnn	
27	ERROR ELLIPSE: ANGLE (DEGREES) MAJ AXIS (km) MIN AXIS (km)	 000 -> 359 000.1 -> 999.9 000.1 -> 999.9	 nnn nnn.n nnn.n	
28	PROBABILITY (%)	01 -> 99	nn	
29	NEXT TIME OF VISIBILITY	(SAME AS MF #3) DEFAULT VALUE = ALL 0s	(SAME AS MF #3)	
30	CONFIDENCE FACTOR	1 -> 4	n	
31	DATA RESIDUAL: SDEV (Hz) TREND (Hz)	 SDEV: 000.0 -> 250.0 DEFAULT VALUE = 255.0 TREND: 000.0 -> 250.0 DEFAULT VALUE = 255.0	 nnn.n nnn.n	

Note 1: Set to 99 if value exceeds 99.

Table B.1 (Cont.)

Message Fields Description

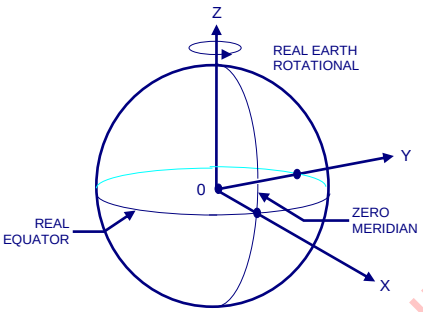
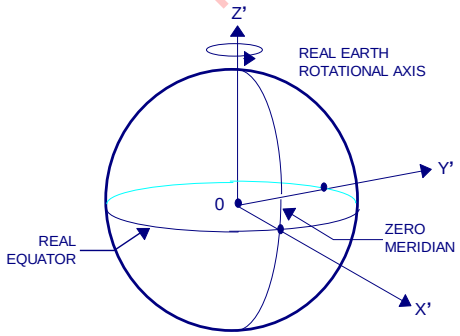
MF#	NAME	CONTENT	CHARACTER TEXT
32	NUMBER OF ORBIT VECTORS	01	nn
33	NUMBER OF PROCEDURE NAMES	01 -> 99	nn
34	ORBIT TIME	YEAR = 00 - 99 DAY (JULIAN 001 - 366) UTC - HOURS 00 - 23 - MINUTES 00 - 59 - SECONDS 00.000 - 59.999	nn nnn nnnn nn.nnn
35	ORBIT POSITION (km)	X = ± 0000.0000 -> ± 9999.9999	snnnn.nnnn
		Y = ± 0000.0000 -> ± 9999.9999	snnnn.nnnn
		Z = ±0000.0000 -> ±9999.9999	snnnn.nnnn
36	ORBIT VELOCITY (km/sec)	X' = ±000.00000 -> ±999.99999	snnn.nnnnn
		Y' = ±000.00000 -> ±999.99999	snnn.nnnnn
		Z' = ±000.00000 -> ±999.99999	snnn.nnnnn

Table B.1 (Cont.)

Message Fields Description

MF #	NAME	CONTENT	CHARACTER TEXT
37	CALIBRATION TIME	(SAME AS MF #34)	(SAME AS MF #34)
38	USO FREQUENCY (Hz)	0000000.000 -> 9999999.999	nnnnnnn.nnn
38a	USO FREQUENCY (Hz)	00000000.000 -> 99999999.999	nnnnnnnn.nnn
39	COMMAND PROCEDURE NAME	DEFINED BY MCC/MCC REQUIREMENT	aaaaaaaaaaa
	PRIORITY	R -> ROUTINE E -> EMERGENCY DEFAULT = R	a
40	EXECUTE TIME	(SAME AS MF #14)	(SAME AS MF #14)
41	NARRATIVE TEXT	69 CHARACTERS PER LINE, TERMINATED WITH "QQQQ" SUCH THAT MSG <25,000 CHARACTERS	a.....a a.....a QQQQ
42	ENDSIT LASSIT	LASSIT	
43	ENDMSG ENDMSG	ENDMSG	
44	NUMBER OF SPACECRAFT	01 -> 99	nn
45	MESSAGE TYPE	HEADING	1.bbDISTRESSbbCOSPAS-SARSATbaaaaa...a or 1.bbSHIPbbSECURITY bbCospas-Sarsatbaaaaa...a
46	CURRENT MSG NO MESSAGE NUMBER	HEADING CURRENT MESSAGE NUMBER	2.bbMSGbNOb nnnnnbb
47	MCC REFERENCE MESSAGE NUMBER	HEADING REFERENCE MESSAGE NUMBER	aaaaabREFbNOb nnnnn
48	DETECTION TIME & SPACECRAFT ID	HEADING	3.bbDETECTED AT
	DETECTION TIME	DAY = 01 -> 31 MONTHS = (SEE APPENDIX B.1) YEAR = 00 -> 99 UTC-HRS = 00 -> 23 MINS = 00 -> 59	nnbaaabnnbnnnnbUTCbBYb
	SPACECRAFT ID	Cospas xx, Sarsat xx, GOES xx, INSAT-2 x, INSAT-3 x, MSG x, or Electro-L / Louch-5, MEOSAR	aaaaaaabnn

Table B.1 (Cont.)

Message Fields Description

MF #	NAME	CONTENT	CHARACTER TEXT
49	DETECTION FREQUENCY	HEADING	4.bbDETECTIONbFREQUENCYbb
	DETECTION FREQUENCY	THE ACTUAL DETECTION FREQUENCY:	406.nnnnbMHZ
50	COUNTRY OF BEACON REGISTRATION	HEADING	5.bbCOUNTRYbbOFbbBEACON REGISTRATION
	COUNTRY NAME	COUNTRY CODE/ TEN CHARACTER ABBREVIATION OF COUNTRY (See www.cospas-sarsat.int)	nnn/aaaaaaaaaa
51	USER CLASS OF BEACON	HEADING	6.bbUSERbCLASSbb
	USER CLASS	(SEE APPENDIX B.1)	aaaaaaaaaaaaaa
52	IDENTIFICATION	HEADING	/IDENTIFICATIONbb
	IDENTIFICATION	(SEE C/S T.001) or UNKNOWN UNIDENTIFIED MODIFIED-BAUDOT CODE CHARACTER = "?"	aaaaaa
53	EMERGENCY CODE	HEADING	7.bbEMERGENCYbCODEbb
	EMERGENCY CODE	(SEE C/S T.001) or NIL	aaaaaaaaaaaaaa
54	POSITIONS (Note 3)		HEADING 8.bbPOSITIONS
54a	CONFIRMED POSITION	HEADING	bbbbbbbbCONFIRMEDbb-b
	CONFIRMED LATITUDE	LAT	nnbnn.na
	DEGREES	00 -> 90	
	MINUTES	00.0 -> 59.9	
	NORTH OR SOUTH	N or S	
	CONFIRMED LONGITUDE	LONG	bbnnnbnn.na
	DEGREES	000 -> 180	
	MINUTES	00.0 -> 59.9	
	EAST OR WEST	E or W	

Note 3: If the latitude is exactly 90 degrees (North or South) or if the longitude is exactly 180 degrees (East or West) for a Confirmed, DOA or Doppler Position, then the corresponding value for minutes must be exactly 00.0.

Table B.1 (Cont.)

Message Fields Description

MF #	NAME	CONTENT	CHARACTER TEXT
54b	A POSITION & PROBABILITY	HEADING	bbbbbbbbDOPPLERbAb-b
	A LATITUDE	LAT	nnbnn.na
	DEGREES	00 -> 90	
	MINUTES	00.0 -> 59.9	
	NORTH OR SOUTH	N or S	
	A LONGITUDE	LONG	bbnnnbnn.nabbbb
	DEGREES	000 -> 180	
	MINUTES	00.0 -> 59.9	
	EAST OR WEST	E or W	
	A PROBABILITY(%)	PROB	PROBbnn
		01 -> 99	
54c	B POSITION & PROBABILITY	HEADING	bbbbbbbbDOPPLERbBb-b
	B LATITUDE	(AS IN MF #54b)	nnbnn.na
	B LONGITUDE	(AS IN MF #54b)	bbnnnbnn.nabbbb
	B PROBABILITY(%)	(AS IN MF #54b)	PROBbnn
54d	DOA POSITION AND ALTITUDE	HEADING	bbbbbbbDOAbbb-b
	DOA LATITUDE	(AS IN MF #54b)	nnbnn.nna
	DOA LONGITUDE	(AS IN MF #54b)	bbnnnbnn.nnabbbb
	DOA ACCURACY[1]	USE MF #89, ROUNDED UP	EXPECTED ACCURACY
		000.00 -> “UNKNOWN”	bnnnbNMS
		>277.8 -> “OVER 150 NMS”	
	DOA ALTITUDE	ALTITUDE	ALTITUDEbnnnnnbMETRES
54e	ENCODED POSITION &TIME OF UPDATE	HEADING	bbbbbbbbENCODEDbbb-b
	ENCODED LATITUDE	(AS IN MF #54b)	nnbnn.nna
	ENCODED LONGITUDE	(AS IN MF #54b)	bbnnnbnn.nnabbbb
	TIME OF UPDATE	TIME OF UPDATE	UNKNOWN

[1] During the MEOSAR EOC phase or until otherwise indicated, the expected horizontal error shall be defaulted in message field #54d (text set to UNKNOWN).

Table B.1 (Cont.)

Message Fields Description

MF #	NAME	CONTENT	CHARACTER TEXT
55	SOURCE OF ENCODED POSITION DATA	HEADING (SEE APPENDIX B.1)	9.bbENCODEDbPOSITIONb PROVIDEDbBYb aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
56	NEXT PASS TIMES	HEADING	10.bbNEXTbPASSbTIMES
56a	NEXT TIME OF VISIBILITY OF CONFIRMED POSITION	HEADING DAY/MONTH/YEAR HOURS/MINUTES (UTC) 0000-> 2359 UTC or UNKNOWN	bbbbbbbbCONFIRMED bbb-b DDbMMMbYYbb HHMMbUTC
56b	NEXT TIME OF VISIBILITY A POSITION	HEADING (SAME AS MF #56a)	bbbbbbbbDOPPLERbAb-b
56c	NEXT TIME OF VISIBILITY B POSITION	HEADING (SAME AS MF #56a)	bbbbbbbbDOPPLERbBb-b
56d	NEXT EXPECTED DATA TIME OF DOA POSITION	HEADING	10. MEOSAR DATA USUALLY SENT WITHIN 15 MINUTES
56e	NEXT TIME OF VISIBILITY OF ENCODED POSITION	HEADING (SAME AS MF #56a)	bbbbbbbbENCODEDbb-b
57	BEACON HEX ID & HOMING SIGNAL HEX ID HOMING SIGNAL	HEADING (SEE APPENDIX B.1) (SEE APPENDIX B.1)	11.bbHEXbIDbb hhhhhhhhhhhhhhh bbbbHOMINGbSIGNALbb aaaaaaaaaa

Table B.1 (Cont.)

Message Fields Description

MF #	NAME	CONTENT	CHARACTER TEXT
58	ACTIVATION TYPE	HEADING UNKNOWN or MANUAL	12.bbACTIVATIONbTYPE aaaaaaaaa
59	BEACON NUMBER	HEADING NUMBER OR NIL	13.bbBEACONbNUMBERbON bAIRCRAFTbORbVESSELbNO.b aaa
60	OTHER ENCODED INFORMATION (SEE APPENDIX B.1)	HEADING aaa.....a	14.bbOTHERbENCODEDb INFORMATION
61	OPERATIONAL INFORMATION	HEADING (SEE APPENDIX B.1)	15.bbOPERATIONALb INFORMATION aaa.....a
62	REMARKS HEADING	(SEE APPENDIX B.1)	16.bbREMARKS aaa.....a
63	END OF MESSAGE	HEADING	ENDbOFbMESSAGE
64	406 MHz SARR FREQ. CALIBR. OFFSET (Hz)	-9999.999 -> +9999.999	snnnn.nnn
65	406 MHz SARR FREQ. CALIB. DRIFT (Hz/day)	-99.999 -> +99.999 DEFAULT VALUE = +00.000	snn.nnn
66	TIME OF 406 MHz SARR FREQ. CALIB. DETERMINATION	(SAME AS MF #3)	(SAME AS MF #3)
67	UPLINK TOA	YEAR = 00 -> 99 DAY(JULIAN) = 001 -> 366 UTC - HRS = 00 -> 23 MINS = 00 -> 59 SECS = 00.000000 -> 59.999999	nn nnn nnnn nn.nnnnnn
68	UPLINK FOA (Hz)	406000000.000 -> 406100000.000	nnnnnnnnn.nnn
69	TIME OFFSET (sec)	0.000000 -> 9.999999 DEFAULT VALUE = 0.000000	n.nnnnnn
70	FREQUENCY OFFSET (Hz)	-90000.000 -> +90000.000 DEFAULT VALUE = +99999.999	snnnnn.nnn

Table B.1 (Cont.)

Message Fields Description

MF #	NAME	CONTENT	CHARACTER TEXT
71	ANTENNA ID	00 -> 99	nn
72	C/N0 (dBHz)	00.0 -> 99.9 DEFAULT VALUE = 00.0	nn.n
73	BIT RATE	000.000 -> 999.999 DEFAULT VALUE = 000.000	nnn.nnn
74	SPARE DATA	FFFF DEFAULT VALUE = 0000	hhhh
75	SATELLITE POSITION (km)	X=-99999.9999 ->+99999.9999 DEFAULT VALUE = +00000.0000 Y=-99999.9999 ->+99999.9999 DEFAULT VALUE = +00000.0000 Z=-99999.9999 ->+99999.9999 DEFAULT VALUE = +00000.0000	snnnnn.nnnn snnnnn.nnnn snnnnn.nnnn
76	SATELLITE VELOCITY (km/s)	X=-999.999999 ->+999.999999 DEFAULT VALUE = +000.000000 Y=-999.999999 ->+999.999999 DEFAULT VALUE = +000.000000 Z=-999.999999 ->+999.999999 DEFAULT VALUE = +000.000000	snnn.nnnnnn snnn.nnnnnn snnn.nnnnnn
77	FULL 406 MESSAGE	36 HEX CHARACTERS DEFAULT VALUE = All zeroes (BITS 1-144) (SEE C/S T.001)	h.....h
78	DOA QUALITY FACTOR	000 -> 999	nnn
79	AVERAGE CARRIER TO NOISE RATIO	00.00 -> 99.99 DEFAULT VALUE = 99.99	nn.nn
80	SPARE	DEFAULT VALUE =00	nn
81	ANTENNAS	01-> 99 DEFAULT VALUE = 00	nn
82	ALTITUDE	00.000000 ->99.999999 DEFAULT VALUE = 99.999999	nn.nnnnnn
83	MEOSAR SATELLITE IDS	001-> 999 DEFAULT VALUE = 000	nnn nnn nnn … (list of 17 satellites)

Table B.1 (Cont.)

Message Fields Description

MF #	NAME	CONTENT	CHARACTER TEXT
84	QUALITY INDICATOR & FOOTPRINT CHECK STATUS	00-> 99 DEFAULT VALUE = 00	nn
85	MEOSAR TLES TWO-LINE ELEMENT LINE ONE	69 chars	aaa…aaa
86	MEOSAR TLES TWO-LINE ELEMENT LINE TWO	69 chars	aaa…aaa
87	ORBIT REFERENCE COORDINATE SYSTEM	Chars ”ECEF” or “ECIb”	aaaa
88	NUMBER OF PACKETS	001-> 999	nnn
89	EXPECTED HORIZONTAL ERROR	000.00->999.99 DEFAULT VALUE = 000.00 (UNKNOWN) 999.99 indicates >= 999.99 kilometres	nnn.nn

APPENDIX B.1 TO ANNEX B

MESSAGE FIELDS DEFINITION

MF # Message Fields Definition

1. Message Number

If the outgoing message is a retransmission of a previous message, the current message number will be followed by the message number of the original message.

For message accountability it is recommended that the outgoing message number be unique and sequential for each destination. See Appendix B.3 for a suggested algorithm for message sequence tracking.

2. Reporting Facility

The identification code corresponding to the Ground Segment Facility sending the current message.

3. Message Transmit Time

The time at which the current message is placed on the communication channel by the reporting agency.

4. SIT

The Subject Indicator Type corresponding to the format required for the message being sent.

5. Destination MCC

The identification code corresponding to the destination of the SIT message. For the SIT 915 and 925 messages this is the final destination of the SIT message, for all other SIT messages this is the MCC receiving the current message.

6. Spacecraft ID

The satellite identification to which the message data applies.

7. Orbit Number

The orbit number of the spacecraft designated in MF #6. If the number exceeds 99,999, then the last five (5) digits of the actual orbit number are provided; for example, orbit number 100,001 is provided as “00001”.

8. Number of Alerts with Doppler/DOA Positions

The number of alerts of this SIT format with Doppler or DOA positions, that are included between the SIT header and the SIT trailer as specified in Table C.1.

9. Not Used (previously: Number of Images Reported)

10. Number of Alerts without Doppler/DOA Positions

The number of alerts of this SIT format without Doppler or DOA positions, that are included between the SIT header and the SIT trailer as specified in Table C.1.

11. Source ID

The identification code corresponding to the MCC / LUT Ground Segment Facility that originally provided the solution data being reported on in the SIT message.

12. Local/Global Flag

Indicates if the reported Doppler location has been obtained from the local mode or from the global mode of operation. If the Doppler location is a mixture of global and real time data and the time of the first data point is before the AOS of the LUT, the flag is set as GLOBAL.

Processing Channel

The processing channel used to produce a solution. 406 SARP solutions only use data bursts processed through the SARP channel on-board the satellite. 406 SARR solutions only use data bursts relayed through the repeater on-board the satellite. 406 COMBINED SARP and SARR are solutions where the data bursts or the solutions are combined at the LUT.

406 MHz combined LEO/GEO solutions contain Doppler locations that have been produced by LEO/GEO processing.

The value for this field shall be computed from the 'A' solution.

13. Bias

The frequency offset of the detected signal around the frequency of 406.025000 MHz.

For GEOSAR alerts bias is given for the last detected burst.

BSDEV

The standard deviation of the bias measurement.

For GEOSAR alerts BSDEV is the absolute value of the difference between the first and last detected bursts.

A standard deviation of the bias measurement greater than 999 will be limited to 900.0.

Drift

The rate of frequency change of the beacon carrier frequency with time.

A drift rate greater than +/- 99.00 will be limited to +/- 99.00.

For GEOSAR alerts drift is the average frequency drift between the first and last detected burst ('+' if frequency increases verses time).

The value for this field shall be computed from the 'A' solution.

14. TCA

For LEOSAR Doppler location data, the Time of Closest Approach (TCA) indicates the time at which the satellite was closest to the beacon. For LEOSAR detect only solutions, the TCA is the time of the last data point. For LEOSAR alerts, the value for this field shall be computed from the 'A' solution.

For GEOSAR, the TCA field contains the time of the first beacon burst for the alert.

For MEOSAR, the TCA field contains the time associated with this solution, as computed by averaging the associated TOA measurements; the time of the first burst (field 14a) and the time of the last burst (field 14b) are provided separately.

15. Window Factor

The Window Factor is an indicator of the position of the data points relative to the TCA.

If the TCA is included in the set of data points, then the Window Factor is set to "0". If the TCA is not included in the set of data points, then the Window Factor has a range between "1" and "9". All values greater than "9" are set to "9".

For a LEOSAR solution the value for this field shall be computed from the 'A' solution.

16. Number of Iterations

The number of times the LUT computer had to process the detected incident data to arrive at the solution being reported on.

If the number of iterations is greater than 9, it shall be reported as a value of 9.

For a LEOSAR solution the value for this field shall be computed from the 'A' solution.

17. CTA

The Cross Track Angle (CTA) is the angle at the centre of the earth, between the satellite and the beacon at TCA.

For a LEOSAR solution the value for this field shall be computed from the 'A' solution.

18. Secondary Source ID (previously: Power Indicator)

For 406 MHz combined LEO/GEO data, the identification code corresponding to the GEOLUT that originally provided the GEOSAR data for combined processing.

The default value for this field is "0000".

19. Number of Sidebands

The number of identified sideband components around the solution curve that have been removed (filtered out) by the LUT/MCC.

20. Sweep Period

For 406 MHz interferers, use the default value (0000).

(Previously the time taken by the amplitude modulation (AM) of the 121.5/243 MHz beacon signal to change from the higher to the lower AM frequency limit.)

SPSDEV

For 406 MHz interferers, use the default value (99).

(Previously the Sweep Period Standard Deviation, defined as the measured standard deviation of the sweep period for the solution being reported, computed from the 'A' solution.)

21. Number of Points

For data originating from the LEOSAR system: The number of bursts detected by the LEOLUT for each 406 MHz beacon identification, used to develop a solution. For combined SARP and SARR, it is the number of unique time-frequency data points after the two processes have been merged.

For data originating from the GEOSAR system: The number of independent integrations performed to produce a 406 MHz beacon message as described in document C/S T.009. For unconfirmed messages, the number of points shall be set to "1". For confirmed messages the number of independent integrations shall be reported.

For combined LEO/GEO processing, it is the number of data points used from the LEOSAR channel in the combined processing.

For LEOSAR Doppler solutions, the value for this field shall be computed from the 'A' solution.

For data originating from the MEOSAR system: the number of bursts used to develop the DOA position or, when no DOA position is provided, the number of bursts associated with the alert.

The value for this field shall be set to 99 if the "Number of Points" value exceeds 99.

22. Beacon ID

Bits 26-85 of the Beacon Message, shown in 15-haracter hexadecimal representation. For location protocol beacons, the bits are defaulted according to document C/S T.001.

23. Beacon Message

The 406 MHz binary message of the solution, in its undecoded form, shown in the full 30-hexadecimal character representation. Short format messages are left justified and zero-filled.

24. DDR/Service Area

The MCC country code for the individual MCC service area or the MCC country code of the nodal MCC for the DDR as provided on the Cospas-Sarsat website (www.cospas-sarsat.int).

Nodal MCCs will fill this field with service area.

Position Status Flag (PS Flag)

Indicates the position status as confirmed, image, non-image, unconfirmed or incorrect.

For position confirmation messages and messages after position confirmation, "+" indicates the confirmed position and "-" indicates an incorrect position. For position confirmation messages, a "-" in both the "A" and "B" Doppler solution, or in the DOA solution, indicates that the confirmed position is the encoded position contained in the Beacon Message.

For messages with Doppler position prior to position confirmation, a "+" in both the "A" and "B" solution indicates that no position is confirmed. If one ("A" or "B") solution is set to "-" and the other solution is set to "+", then a "-" indicates that this position is an image (incorrect) and a "+" indicates that this position is a non-image, as determined by the "406 MHz LEOSAR Image Position Determination" algorithm in Appendix B.2 to Annex B. Determining that a position is an image prior to position confirmation is optional.

For messages with DOA position prior to position confirmation, a "-" indicates that the position is unconfirmed.

25. Latitude

The calculated latitude of the solution.

26. Longitude

The calculated longitude of the solution.

27. Error Ellipse

An ellipse centred at latitude (MF #25) and longitude (MF #26) and containing the true location with a 50% probability.

Angle

The orientation to true north of the major axis of the error ellipse, in a clockwise direction.

Major Axis

The halflength, in kilometres, of the major axis of the ellipse.

Any halflength axis value greater than 999.9 kilometres will be limited to 999.9.

Minor Axis

The halflength, in kilometres, of the minor axis of the ellipse.

Any halflength axis value greater than 999.9 kilometres will be limited to 999.9.

28. Probability

The probability that the Doppler A location reported in the SIT message is the actual solution and not the image solution.

29. Next Time of Visibility

The predicted time (predicted Loss of Signal - LOS) at which the next beacon event (in local mode) for the position being reported will occur. This time is provided by the originating MCC or a nodal MCC (only if an earlier time is available at the node). The default value of zeros shall be used when the next time of visibility is not calculated.

30. Confidence Factor

An indication of the accuracy of the calculated solution based on a correlation between a variety of parameters.

Confidence Factor No.	Meaning
4	Within 5.0 nautical miles
3	Within 20.0 nautical miles
2	Within 50.0 nautical miles
1	Less accurate than the above

31. Data Residual

SDEV

The standard deviation of the actual data points to the solution Doppler curve.

A small number is desirable.

TREND

The standard deviation on the time shifted solution Doppler curve.
It is an indication of the curve dispersion and a number higher than SDEV is desirable.

32. Number of Orbit Vectors

The number of orbit vectors (MF #s 34, 35 and 36) that are being transmitted in the SIT message.

33. Number of Procedure Names

The number of SARR or SARP commands that are being transmitted in the SIT message.

34. Orbit Time

The time at which the position (MF #35) and the velocity (MF #36) vectors of the satellite, are valid.

35. Orbit Position

The position of the satellite in relation to the centre of the earth in X, Y and Z co-ordinate, in effect at the time specified by MF #34.

36. Orbit Velocity

Velocity of the spacecraft relative to the earth-fixed co-ordinate system shown for MF #35, expressed in that same co-ordinate system.

37. Calibration Time

The time at which the Ultra-Stable Oscillator (USO) time reference on Sarsat was rolled over as per MF #38.

38. USO Frequency

The oscillator frequency that was measured at the time specified in MF #37.

38a. USO Frequency for SARP-3

The same as MF #38 above but with an additional integer to accommodate SARP-3 frequencies.

39. Command Procedure Name

The name of the commands to be executed at the time specified by MF # 40 for both SARR and SARP command messages.

Priority
The indication of urgency for the execution of the spacecraft command procedure.

40. Execute Time

The time at which the command procedure name specified in MF #39 is to be executed.

41. Narrative Text

The character text to be transmitted as part of SIT message. Always terminated by 2 Carriage Returns, 1 Line Feed, 4 Qs, 2 Carriage Returns and 1 Line Feed. In SIT 605, 915 and 925 messages, the originating MCC shall identify itself and the final destination MCC(s) in plain text; in SIT 605 messages, the final destination is "ALL MCCs".

42. ENDSIT

This field always contains the code LASSIT at the end of every SIT message.

43. ENDMSG

This field is inserted at the end of every current message to be transmitted. It will always follow the ENDSIT field (MF #42) LASSIT.

44. Number of Spacecraft

The number of spacecraft for which orbit vectors are being transmitted in the SIT message.

45. Message Type

For a ship security alert, the message type begins with "SHIP SECURITY COSPAS-SARSAT…", otherwise, the message type begins with "DISTRESS COSPAS-SARSAT …".

Indicates type of alert message:

- DISTRESS COSPAS-SARSAT POSITION CONFIRMED ALERT
- DISTRESS COSPAS-SARSAT POSITION CONFIRMED UPDATE ALERT
- DISTRESS COSPAS-SARSAT POSITION CONFLICT ALERT
- DISTRESS COSPAS-SARSAT POSITION UPDATE ALERT
- DISTRESS COSPAS-SARSAT INITIAL ALERT
- DISTRESS COSPAS-SARSAT UNRESOLVED DOPPLER POSITION MATCH ALERT
- DISTRESS COSPAS-SARSAT NOTIFICATION OF COUNTRY OF BEACON REGISTRATION ALERT
- SHIP SECURITY COSPAS-SARSAT POSITION CONFIRMED ALERT
- SHIP SECURITY COSPAS-SARSAT POSITION CONFIRMED UPDATE ALERT
- SHIP SECURITY COSPAS-SARSAT POSITION CONFLICT ALERT
- SHIP SECURITY COSPAS-SARSAT POSITION UPDATE ALERT
- SHIP SECURITY COSPAS-SARSAT INITIAL ALERT

If the alert message is sent because the encoded position does not meet the encoded to encoded position match criterion (per C/S A.001) and the encoded position differs from a previous encoded position by less than 20 km, then the message type shall indicate "POSITION UPDATE ALERT" (e.g., DISTRESS COSPAS-SARSAT POSITION UPDATE ALERT).

46. Current Message Number

The message number assigned to this message by the transmitting MCC.

47. MCC Reference

This reference is a unique designator supplied by the MCC to identify all messages sent for that beacon.

48. Detection Time & Spacecraft ID

The detection time is TCA (as defined at MF #14) and abbreviation for months is as per table below. The time is followed on the same line by the identity of the LEOSAR or GEOSAR satellite which provided the alert data. For MEOSAR alerts, the time of the first burst is provided and is followed on the same line by "MEOSAR". For MEOSAR alerts the time of the last burst is provided in Message Field 61.

Abbreviation	Month	Abbreviation	Month
JAN	January	JUL	July
FEB	February	AUG	August
MAR	March	SEP	September
APR	April	OCT	October
MAY	May	NOV	November
JUN	June	DEC	December

49. Detection Frequency

Actual values will be reported when available. If actual values are not available, then the value 406 MHz will be reported. The value 406 MHz shall be reported for a LEOSAR solution without Doppler location.

50. Country of Beacon Registration

Three numeric characters of the Country Code followed by the ten character abbreviation of the country where the detected beacon is registered as defined on the Cospas-Sarsat website (www.cospas-sarsat.int).

Enter "NIL" if the Beacon Message is invalid per C/S A.001, section II/B.1.1.3.

51. User Class of Beacon

User class information as per table below and produced from beacon information by the MCC.

Enter "NIL" if the Beacon Message is invalid per C/S A.001, section II/B.1.1.3.

Beacon Protocol	**User Class in RCC Message**
Standard Location Protocol	STANDARD LOCATION - followed by ELT - AIRCRAFT SERIAL NO: ELT - AIRCRAFT 24-BIT ADDRESS 6 HEX CHARACTERS: ELT - AIRCRAFT OPERATOR DESIGNATOR OPERATOR: SERIAL NO:
Maritime	EPIRB - SERIAL NO: EPIRB - MMSI LAST 6 DIGITS:
PLB - SERIAL NO:	Ship Security SHIP SECURITY - MMSI LAST 6 DIGITS:
National Location Protocol	NATIONAL LOCATION - followed by
Aviation	ELT - SERIAL NO:
Aviation	ELT (RETURN LINK) - SERIAL NO:
Maritime	EPIRB - SERIAL NO:
Maritime	EPIRB (RETURN LINK) - SERIAL NO:
Personal Locator Beacon	PLB - SERIAL NO:
Personal Locator Beacon	PLB (RETURN LINK) - SERIAL NO:
User/User Location protocol	USER/USER LOCATION - followed by
Maritime	EPIRB USER MMSI - LAST 6 DIGITS: (OR) RADIOCALLSIGN:
Radio Call Sign	EPIRB USER RADIO CALLSIGN:
Aviation	ELT USER

	AIRCRAFT REGISTRATION
Serial:	SERIAL USER/USER LOCATION - followed by
(a) Aviation	ELT - AIRCRAFT SERIAL NO:
(b) Maritime (Float-Free)	EPIRB (FLOAT FREE) SERIAL NO:
(c) Maritime (Non Float-Free)	EPIRB (NON FLOAT FREE) SERIAL NO:
(d) Personal Locator Beacon	PLB SERIAL NO:
(e) Aircraft 24-Bit Address	ELT - AIRCRAFT 24-BIT ADDRESS 6 HEX CHARACTERS:
(f) Aircraft Operator Designator	ELT - AIRCRAFT OPERATOR DESIGNATOR OPERATOR: SERIAL NO:
(g) Not assigned	UNKNOWN
Spare	UNKNOWN
Test	TEST

52. Identification

The identification information as described in the Cospas-Sarsat beacon specifications.

Enter “NIL” if the Beacon Message is invalid per C/S A.001, section II/B.1.1.3.

53. Emergency Code

The emergency code as indicated by the beacon coding as described in the Cospas-Sarsat beacon specification.

Enter “NIL” if the Beacon Message is invalid per C/S A.001 section II/B.1.1.3.

54. Position Information

The position information associated with the confirmed position, A & B Doppler positions, DOA position and the encoded position as appropriate.

54a. Confirmed Position

Latitude and longitude of confirmed position. This position may be formed by a merge of matching positions, which may be based on a weighting factor assigned to each matching position.

54b. A Position & Probability

The latitude and longitude of the A Doppler Position and the percentage probability that the A Position is the actual position of the incident.

54c. B Position & Probability

Same as MF #54b above but for B Position.

54d. DOA Position, Accuracy and Altitude

Latitude and longitude of the DOA position with expected accuracy in nautical miles. The accuracy uses the value of the expected horizontal error, rounded up. If the expected horizontal error has the default value of 000.00, the accuracy[1] is UNKNOWN. If the expected horizontal error is greater than 277.8 km (150 NM), the accuracy is shown as OVER 150 NM. The altitude of the DOA position is provided from the mean sea level in metres. Note that the altitude is considered to be auxiliary information and is not verified as part of MEOLUT commissioning.

54e. Encoded Position and Time of Update

Latitude and longitude of encoded position. Time of update is NIL.

Enter "NIL" if the Beacon Message is invalid per C/S A.001, section entitled "Alert Message Validation (Filtering Anomalous Data)".

55. Source of Encoded Position Data

This indicates whether the encoded position data was provided to the beacon by an internal or external device. Enter "NIL" if the Beacon Message is invalid per C/S A.001, section entitled Alert Message Validation (Filtering Anomalous Data)".

56. Next Expected Data Times

The predicted time (predicted Loss of Signal - LOS) at which the next beacon event (in local mode) for the position being reported will occur or the time period for which MEOSAR alert data is expected to be distributed.

56a. Next Time of Visibility/Expected Data Time of Confirmed Position

1. LEOSAR/GEOSAR: Optional information indicating the next time of visibility from the confirmed position to a LEOSAR satellite; "NIL" if the information is not available.

2. MEOSAR: Enter "NIL" as default. After position confirmation, optionally provide the time period for which the DOA position is provided; e.g., DATA USUALLY SENT WITHIN 15 MINUTES".

[1] During the MEOSAR EOC phase or until otherwise indicated, the expected horizontal error shall be defaulted in message field #54d (text set to UNKNOWN).

56b. Next Time of Visibility A Doppler Position

Same as MF #56a above but for A Position.

56c. Next Time of Visibility B Doppler Position

Same as MF #56a above but for B Position.

56d. Next Expected Data Time of DOA Position

Same as MF #56a.2.

56e. Next Time of Visibility of Encoded Position

LEOSAR/GEOSAR: Same as for MF#56a but for the Encoded Position.

MEOSAR: Same as for MF#56a.2 but for the Encoded Position.

57. Beacon HEX ID & Homing Signal

Fifteen character hexadecimal representation of beacon identification code and type of homing signal as per table below. Information is taken from the Beacon Message (reference MF #23) by the MCC. If the Beacon Message is invalid per C/S A.001, section entitled "Alert Message Validation (Filtering Anomalous Data)", then the fifteen character hexadecimal representation shall be based on bits 26 - 85 of the Beacon Message with no bits defaulted.

Homing Signal Interpretation

Term	Meaning
NIL	no homing transmitter
121.5	121.5 MHz ELT/EPIRB signal in addition to 406 MHz
Maritime	9 GHz Search and Rescue Radar Transponder (SART) in addition to 406 MHz
Other	a nationally assigned signal has been included in the beacon.

58. Activation Type

Type of beacon activation for USER protocols only (non-location protocols).

MANUAL	IF BIT 108 IS SET TO 0
AUTOMATIC OR MANUAL	IF BIT 108 IS SET TO 1

For Ship Security (Standard Location Protocol), enter MANUAL.

Enter "NIL" if the Beacon Message is invalid per C/S A.001, section entitled "Alert Message Validation (Filtering Anomalous Data)".

59. Beacon Number

Beacon number on the vessel or aircraft, with the first beacon on the vessel or aircraft designated as "0". Information is determined by decoding the 406 MHz message.
Enter "NIL" if the Beacon Message is invalid per C/S A.001, section entitled "Alert Message Validation (Filtering Anomalous Data)".

60. Other Encoded Information

Other information decoded from the Beacon Message as determined by the servicing MCC. Could include such information as Cospas-Sarsat certificate number, resolution of the encoded position data, or data according to national assignment.

When encoded position data is present, the degree of uncertainty (i.e., the maximum possible difference between the GNSS position processed by the beacon and the encoded position transmitted in the SIT 185 message) may be provided by the following:

For user location protocol beacons when location data is present in PDF-2 enter 'ENCODED POSITION UNCERTAINTY PLUS-MINUS 2 MINUTES OF LATITUDE AND LONGITUDE'.

For Return Link Service (RLS), standard and national location protocol beacons when location data is present in PDF-2 enter 'ENCODED POSITION UNCERTAINTY PLUS-MINUS 2 SECONDS OF LATITUDE AND LONGITUDE'.

For standard location protocol beacons when location data is present in PDF-1 and missing in PDF-2 enter 'ENCODED POSITION UNCERTAINTY PLUS-MINUS 30 MINUTES OF LATITUDE AND LONGITUDE'.

For national location protocol beacons when location data is present in PDF-1 and missing in PDF-2 enter 'ENCODED POSITION UNCERTAINTY PLUS-MINUS 4 MINUTES OF LATITUDE AND LONGITUDE'.

For RLS location protocol beacons when location data is present in PDF-1 and missing in PDF-2 enter 'ENCODED POSITION UNCERTAINTY PLUS-MINUS 15 MINUTES OF LATITUDE AND LONGITUDE'.

Enter 'NIL' if no other encoded information is available or if the Beacon Message is invalid per C/S A.001, section entitled "Alert Message Validation (Filtering Anomalous Data)".

For protocol containing the aircraft 24-bit address, the country which assigned the 24-bit address will be indicated. If the country that assigned the 24-bit address is unknown, this value will be set to "UNKNOWN". If the registration marking corresponding to the 24-bit address is known, it will be given. If the registration marking is unknown, the full 24-bit address will be given as a 6 character hexadecimal number.

61. Operational Information

Operational information obtained separately from encoded beacon information such as:

- reliability indicator for encoded, DOA or Doppler position data *
- database registry information
- people on board
- 'NIL' if not available.

The statement, “THE [A|B] POSITION IS LIKELY TO BE AN IMAGE POSITION.” shall be included, as appropriate, per the “LEOSAR Image Position Determination” algorithm in Appendix B.2 to Annex B.

For MEOSAR alerts, the time of the last burst shall be included in the format “MEOSAR ALERT LAST DETECTED AT nnbaaabnnbnnnnbUTC”, per the definition of DETECTION TIME in Message Field 48.

Note 1: * The warning “RELIABILITY OF DOPPLER POSITION DATA – SUSPECT DUE TO TECHNICAL PARAMETERS” for DOPPLER 406 MHz solutions shall be included on the SIT 185 message when at least one of the following criteria from the alert data values is satisfied:
- Window factor ≥ 3, or
- Bias standard deviation > 20 Hz, or
- The absolute value of the cross track angle is < 1 or > 22, or
- Position calculated from < 4-point solution.
This warning is only included in messages before position confirmation.

Note 2: * The warning “RELIABILITY OF DOPPLER POSITION DATA - SUSPECT DUE TO SATELLITE MANOEUVRE.” shall be included in the SIT 185 message during the 24-hour period after the manoeuvre, when the maximum expected error in Doppler location exceeds 10 kilometres within 24 hours of the manoeuvre. See document C/S A.001, section entitled “Scheduled Satellite Manoeuvres”.

Note 3: * The warning “WARNING: AMBIGUITY IS NOT RESOLVED” shall be included in the SIT 185 message for an Unresolved Doppler Position Match, as defined in document C/S A.001, section entitled “Position Matching”

Note 4: * The warning “RELIABILITY OF DOA POSITION DATA - SUSPECT DUE TO SATELLITE FOOTPRINT CHECK” shall be included in the SIT 185 message if the MCC determines that the DOA position is outside the footprint of any reporting satellite. See Figure B.2.

Note 5: * The warning “RELIABILITY OF DOPPLER POSITION DATA - SUSPECT DUE TO SATELLITE FOOTPRINT CHECK” shall be included in the SIT 185 message if the MCC determines that the

DOPPLER position is outside the footprint of any reporting satellite. See Figure B.2.

If the Beacon Message is invalid per document C/S A.001, section entitled "Alert Message Validation (Filtering Anomalous Data)" - then the warning "DATA DECODED FROM THE BEACON MESSAGE IS NOT RELIABLE" shall be included in SIT 185 message.

The statement "POSITION CONFLICT BASED ON DISTANCE SEPARATION OF AT LEAST 20 KM" shall be included in the SIT 185 Position Conflict message.
The statement "POSITION UPDATE BASED ON DISTANCE SEPARATION OF 3 TO 20 KM OR FIRST REFINED ENCODED POSITION" shall be included in the SIT 185 message if the alert message is sent because:

a) the encoded position does not meet the encoded position match criterion (per document C/S A.001, section entitled "Position Matching") and the encoded position differs from a previous encoded position by less than 20 km, or

b) the new encoded position is refined, no previous refined encoded position has been sent, and a coarse encoded position was previously sent.

If a MEOSAR alert is distributed from a single packet (i.e., a single detection from a single antenna) and no previous alert was generated for the beacon activation, then the warning "SUSPECT ALERT: SINGLE UNCORROBORATED DETECTION" shall be provided in the SIT 185 message. Note that suspect MEOSAR alerts are not normally distributed to SPOCs; see document C/S A.001, section "Single Packet MEOSAR Alerts".

62. Remarks

Heading for the variable length section of the message. Additional information may be provided at the discretion of the originating MCC as illustrated in the sample alert messages. 'NIL' if no Remarks are available. Remarks about beacon type (e.g., for ship security beacons and return link beacons) are not provided if the Beacon Message is invalid per C/S A.001, section entitled "Alert Message Validation (Filtering Anomalous Data)".

For ship security alerts the following should be included: "THIS IS A SHIP SECURITY ALERT. PROCESS THIS ALERT ACCORDING TO RELEVANT SECURITY REQUIREMENTS."

If the second protected data field (bits 107-132) is not usable for a return link beacon alert, then indicate "THIS BEACON HAS RETURN LINK CAPABILITY".

If the second protected data field is usable for a return link beacon alert, then provide two lines in the following format, based on information provided in beacon message bits 109 - 114 (per document C/S T.001).

THIS BEACON HAS [RLS-ID] RETURN LINK CAPABILITY
RLM TYPE-[X] [RECEIVED/CAPABLE] ([AUTO/MANUAL] ACKNOLEDGEMENT)

In Line 1, replace [RLS-ID] with GALILEO, GLONASS or blank based on bits 113 - 114. In line 2, replace [X] with 1 or 2, replace [RECEIVED/CAPABLE] with RECEIVED or CAPABLE, and replace [AUTO/MANUAL] with AUTOMATIC or MANUAL based on bits 109 - 112. Note: TYPE-1 provides AUTOMATIC acknowledgement and TYPE-2 provides MANUAL acknowledgment.

63. End of Message

To indicate to the message recipient that no more information is to come on this message.

64. SARR Frequency Calibration Offset

Difference (in Hz) between the computed frequency produced by the calibration LEOLUT and the known transmit frequency of a reference beacon.

The SARR frequency calibration offset prepared for distribution to other MCCs shall be based on the average of a minimum of twenty satellite passes, each of which includes at least ten data measurements and each of which is associated with a computed location which is accurate to within three kilometres.

65. SARR Frequency Calibration Drift

Drift (in Hz/day) of the SARR frequency provided by the LEO satellite.

66. Time of SARR Frequency Calibration Determination

Time when a SARR frequency calibration offset for a given LEO satellite was determined through the procedure described for MF #64.

67. Uplink TOA ǂ

Time that the burst is received at the satellite as calculated by the MEOLUT. The time reference point (anchor) of a 406 MHz SAR burst is the end of the 24th bit in the message Preamble. The end of the 24th bit is defined as the mid point of the 50% phase crossing (i.e., “zero-crossing”) of the mid-transitions of the 24th and 25th bit.

See the note under MF #69.

68. Uplink FOA ǂ

Burst frequency measured at the time of the Uplink TOA.

See the note under MF #70.

69. Time Offset †

This is the calculated difference in time between the reception of the beacon burst at the satellite and the ground station. Adding this offset to the Uplink TOA provides the time the burst was received at the ground station.

† If the offset is set to the default value, the Uplink TOA refers to the time the end of bit 24 was received at the ground station (i.e., offset is included). The intended use of the default value pertains to "antenna only" installations that may not have the capacity to compute this offset.

70. Frequency Offset †

This is the calculated difference of the burst frequency received by the satellite and the burst frequency as estimated by the ground station. Adding this offset to the Uplink FOA provides the frequency of the burst as estimated by the ground station in the 406 MHz frequency band. If the offset is set to the default value, the Uplink FOA refers to the frequency measured at the ground station (i.e., offset is included). The intended use of the default value pertains to "antenna only" installations that may not have the capacity to compute this offset.

† If the offset is set to the default value, the Uplink TOA refers to the time the end of bit 24 was received at the ground station (i.e., offset is included). The intended use of the default value pertains to "antenna only" installations that may not have the capacity to compute this offset.

71. Antenna ID

The identification code corresponding to the individual antenna associated with the ground station that originally provided the burst data being reported in the SIT message.

72. C/N_0

The Carrier over Noise Density of the detected burst as determined by the ground station.

73. Bit Rate

The number of bits per second as measured by the ground station.

74. Spare Data

This field consists of four hexadecimal characters as place holders for additional information.

75. Satellite Position (Optional)

The X, Y and Z components of the satellite position with respect to the centre of the earth in kilometres, in the earth-fixed co-ordinate system and in effect at the time specified by MF #67.

76. Satellite Velocity (Optional)

The X, Y and Z components of the satellite velocity vectors with respect to the centre of the earth in kilometres per second, in the earth-fixed co-ordinate system and in effect at the time specified by MF #67.

77. Full 406 Message

The 406 MHz binary message of the solution, in its undecoded form, shown in the full 36-hexadecimal character representation. Set to all zeroes for interference data (SIT 141 message).

78. DOA Quality Factor

A measure of quality associated with the DOA position (algorithm TBD). A higher number indicates higher quality.

79. Average Carrier to Noise Ratio

The average Carrier to Noise Ratio (dB-Hz) as computed from all contributing TOA/FOA measurements, computed by taking the log of the average of inverse logs of all measurements.

80. Spare

This field is not used.

81. Antennas

Number of unique antennas used to generate this alert.

82. Altitude

The calculated altitude of the DOA position relative to mean sea level, given in kilometres.

83. Satellite IDs

The list of unique satellites used to compute the DOA position for this alert. Unused satellite slots are filled with zeroes.

84. Quality Indicator

This field is used to provide additional information regarding the quality or quality related processing performed by MEOLUTs and/or MCCs. If not used it contains the default value (00). Otherwise the following values are defined: Bit values are defined to be additive (i.e., value 6 = 2 + 4), where the “1” bit is the least significant digit and the “8” bit is the most significant digit.

1 MEOLUT Single Burst Location Confirmation performed: position confirmed
2 MEOLUT Single Burst Location Confirmation performed: position not confirmed
4 DOA Position Outside Satellite Footprint.

85. Two-Line Element (TLE) Set Format - Line 1

1 NNNNNU NNNNNAAA NNNNN.NNNNNNNN +.NNNNNNNN +NNNNN-N +NNNNN-N N NNNNN

Column	Description
01	Line Number of Element Data
03-07	Satellite Number
08	Classification (U=Unclassified)
10-11	International Designator (Last two digits of launch year)
12-14	International Designator (Launch number of the year)
15-17	International Designator (Piece of the launch)
19-20	Epoch Year (Last two digits of year)
21-32	Epoch (Day of the year and fractional portion of the day)
34-43	First Time Derivative of the Mean Motion
45-52	Second Time Derivative of Mean Motion (decimal point assumed)
54-61	BSTAR drag term (decimal point assumed)
63	Ephemeris type
65-68	Element number
69	Checksum (Modulo 10) (Letters, blanks, periods, plus signs = 0; minus signs = 1)

86. Two-Line Element (TLE) Set Format - Line 2

2 NNNNN NNN.NNNN NNN.NNNN NNNNNNN NNN.NNNN NNN.NNNN NN.NNNNNNNNNNNNNN

Column	Description
01	Line Number of Element Data
03-07	Satellite Number
09-16	Inclination [Degrees]
18-25	Right Ascension of the Ascending Node [Degrees]
27-33	Eccentricity (decimal point assumed)
35-42	Argument of Perigee [Degrees]
44-51	Mean Anomaly [Degrees]

Column	Description
53-63	Mean Motion [Revs per day]
64-68	Revolution number at epoch [Revs]
69	Checksum (Modulo 10)

87. MEOSAR orbit reference coordinate system

Has one of two possible values:

- ECEF - Earth-Centred Earth-Fixed (a coordinate system that rotates with the Earth),
- ECI - Earth-Centred Inertial (a coordinate system that does not rotate with the Earth).

88. Number of Packets

Number of packets (i.e., distinct TOA/FOA measurements) used to generate this alert.

89. Expected Horizontal Error

The expected horizontal error is a value between 000.00 and 999.99 kilometres and provides an indication of the accuracy of a DOA location. The value of 999.99 is used if the expected horizontal error is greater than 999.99. The default value of 000.00 indicates that the expected horizontal error is unknown.

APPENDIX B.2 TO ANNEX B

DETERMINING THE LEOSAR IMAGE POSITION AND VALIDATING THE SATELLITE FOOTPRINT

The LEOSAR Doppler processing produces two solutions for each satellite pass; a "real" position corresponding to the actual location of the beacon and an "image" position on the opposite side of the satellite track. Prior to determining the "real" position of a beacon, it is possible to use unlocated alert data to determine if one position is an image, as summarised in Figure B.2.

The LEOSAR image position can be determined using the following inputs:

a) LEOSAR Doppler alert, including beacon ID, A and B latitude/longitude positions (defined as Input "I_2" in the DDP);

b) GEOSAR or LEOSAR unlocated alert with beacon ID (defined as Input "I_1" in DDP); and

c) ephemeris data and orbit propagation software, if the unlocated alert originated from a LEOSAR satellite, or the position of the GEOSAR satellite if the alert originated from a GEOSAR satellite.

Figure B.1 and the text below document the procedures for MCCs to follow to determine if a position is inside the footprint of the LEOSAR or GEOSAR satellite at time of detection, and whether a position is an image.

The process of determining an image position is triggered when a LEOSAR Doppler alert (I_2) is received at the MCC (reference process 1 in Figure B.1) for a beacon which has been previously detected, but no location information is available (I_1). The status of the MCC processing prior to receiving the LEOSAR Doppler alert must be at Sw_1 (i.e., only identification information available, no location information present). If the status of the MCC processing is not at Sw_1, then an image position will not be indicated when the alert message is sent by the MCC.

All unlocated alerts on file with a detect time within 60 minutes of the Doppler TCA are examined (reference 3) to determine if the image position can be determined. For LEOSAR unlocated alerts the time of the detection, along with orbit propagation software, is used to determine the sub-satellite position of the LEOSAR satellite at time of detection (reference 4). For GEOSAR satellites the sub-satellite position is obtained from www.cospas-sarsat.int (reference 5).

Each of the LEOSAR Doppler positions are analysed to determine if they are within the GEOSAR or LEOSAR unlocated footprint using the algorithm shown in Figure B.2 and using the sub-satellite points as input (reference 6). Each unlocated footprint must be analysed before a position can be determined to be an image.

If one of the LEOSAR Doppler positions is conclusively outside the footprint for at least one unlocated alert, then it is the image position, as long as the other position is inside the

footprint of every unlocated alert. If neither position is outside of any footprint or each position is outside of any footprint, then the image position cannot be determined.

When a position has been determined to be an image, this will be indicated on the alert message sent by the MCC, as specified in the description of Message Fields 24 and 61 in Appendix B.1 to Annex B.

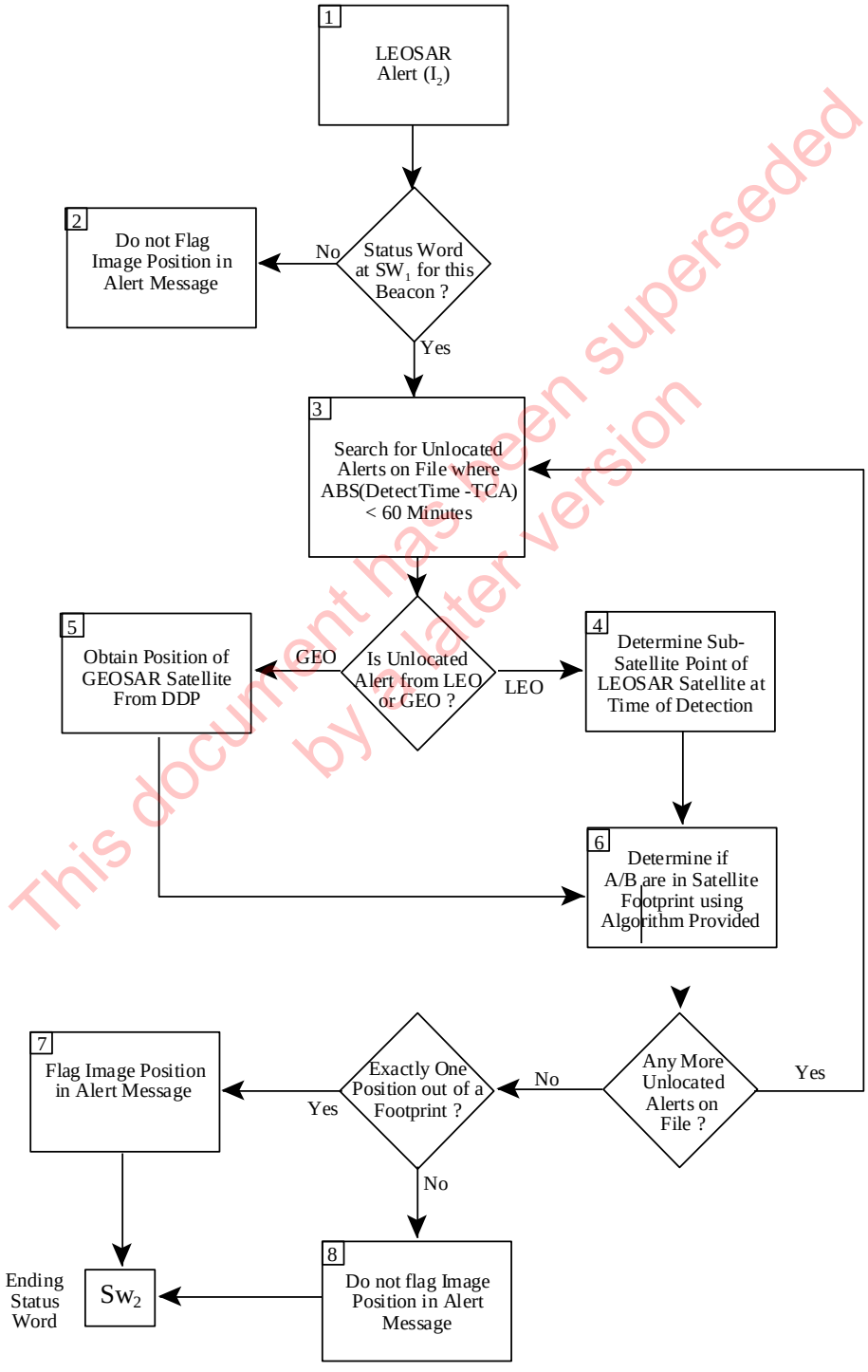


Figure B.1: Using Unlocated Alerts to Determine and Flag the Image Position

To determine if MEOSAR DOA and/or encoded position is within the footprint of the associated MEOSAR satellite(s), the time of the detection, along with orbit propagation software, is used to determine the sub-satellite position of the MEOSAR satellite at time of detection. The algorithm to determine this is provided at Figure B.2.

When a DOA or encoded position has been determined to be outside the footprint of any reporting MEOSAR satellite, then the action described in the Annex to C/S A.001, entitled Alert Message Validation (Filtering Anomalous Data) is to be followed.

Input:	lat	estimated position latitude in degrees
	lon	estimated position longitude in degrees
	llat	sub-satellite point at time of detection, latitude in degrees
	llon	sub-satellite point at time of detection, longitude in degrees
	Emin	Minimum elevation angle required (set to -5 degrees)
Constants:	Rg	altitude of satellite (note differences among the various satellite constellations)
	Re	Equatorial radius of earth = 6378 km
	ro	Re / (Re + Rg)
	PI	3.1415927
Compute:	rlat =	PI * lat / 180
	rlon =	PI * lon / 180
	rllat =	PI * llat / 180
	rllon =	PI * llon / 180
	c =	sin(rlat) * sin(rllat) + cos(rlat) * cos(rllat) * cos(rllon - rlon)
	e =	(c - ro) / sqrt (1 - c^2)
	E =	180 * arctan (e) / PI
Output:	If E ≥ Emin then estimated position is within satellite footprint, else If E < Emin then estimated position is outside satellite footprint.	

Figure B.2: Algorithm to Determine if Computed Position is Inside LEOSAR, GEOSAR or MEOSAR Satellite Footprint

APPENDIX B.3 TO ANNEX B

SUGGESTED ALGORITHM FOR MESSAGE SEQUENCE TRACKING

The flowcharts in this Appendix define a procedure for the identification of missed messages through message sequence tracking. The procedure relies on the following data items or structures:

Data Item	Purpose
CurMsgNo	The current message number contained in MF # 1 of the arriving message
PrvMsgNo	The previous message number contained in MF # 1 of the arriving message
NextExpected	The next message number expected from a given source. This item could be represented as an array indexed by source: Next Expected [MF #2] i.e., each MCC must maintain a table of Next Expected message numbers – one such number for each reporting MCC. When a message is received, the reporting MCC in MF #2 is used to lookup the appropriate NextExpected message number from the table.
MissedMsgList	A list of messages that have been identified (by the sequence checking procedure) as overdue. MCCs may choose to implement this as a single list of MF #2: MF #1 pairs or maintain a separate list for each source.
TimeMissed	The time at which a message was declared "missing" by the message sequence tracking facility. The message would be added to the MissedMsgList at that time.
MAX_MISSING	A configuration constant that limits the number of missed messages that can be generated by a single sequence check. This minimises the impact of an MCC unilaterally resetting its message sequence generator to an arbitrary value. Set to 15.
MAX_MSGNO	A configuration constant that defines the largest message number before message number wrap around is to occur. Set to 99999.
MAX_WAIT_TIME	A configuration constant that defines the length of time the MCC will wait for an out of sequence message to arrive before a lost message is declared (and recovery action initiated). Set to 15 minutes.

The procedure is executed in two threads (parallel streams of execution):

1. message-checking thread, where each arriving message is subjected to a message sequence check; and
2. monitor thread which constantly checks the missed message list for lost messages.

The two threads are represented in separate flowcharts.

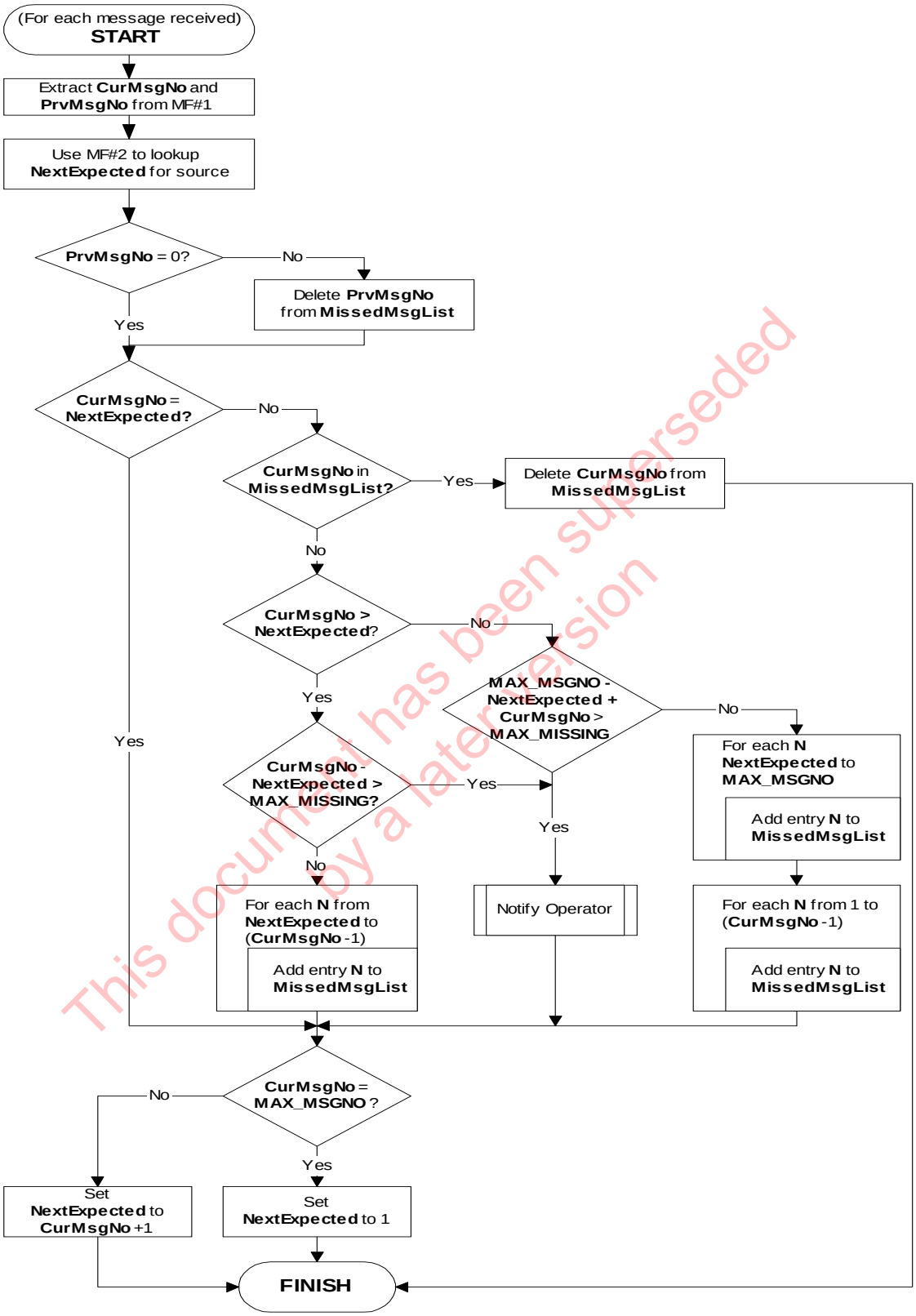


Figure B.3: Message Sequence Checking Flowchart

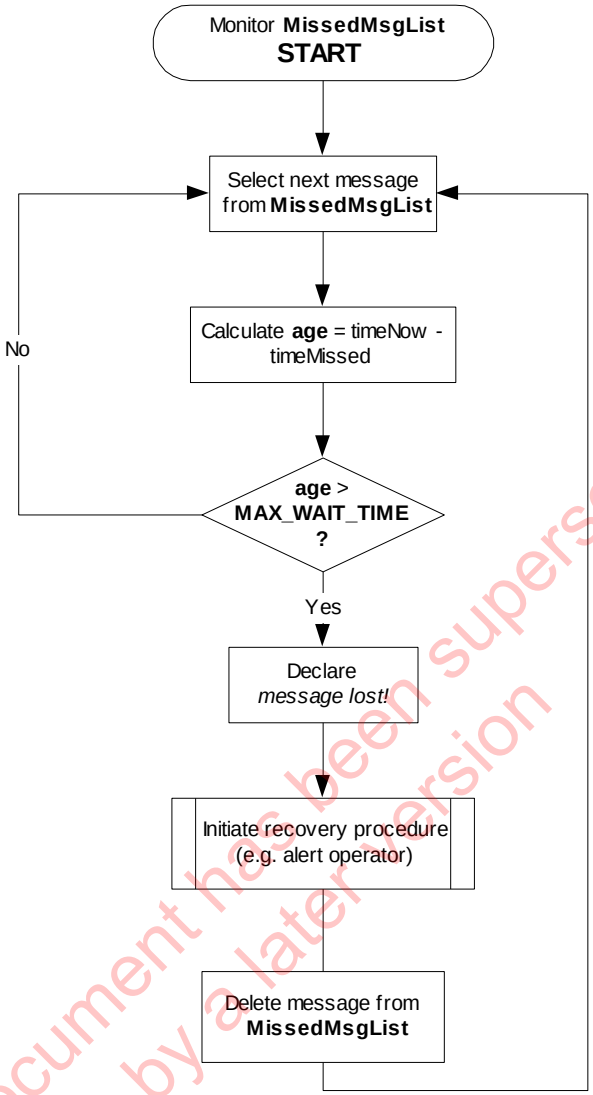


Figure B.4: Missed Message List Monitoring Flowchart

- END OF ANNEX B –

ANNEX C

MESSAGE CONTENT BY SIT

1. MESSAGE TEXT FORMATS

Cospas-Sarsat messages are uniquely identified by specific Subject Indicator Types (SITs). The SIT specifies the format and category of content within the message. MCCs process messages automatically. Therefore it is mandatory that the structure of the message formats be adhered to, so that each MCC can route and / or take action as required by the message. Tables C.1, C.2 and C.3 detail the format of the text for all messages exchanged between the MCCs in terms of Message Fields (MFs) used.

Once the SIT is known for the desired message, the corresponding column identifies which Message Field numbers (MF #) are necessary to produce the message. Annex B is then used to find the format and the produced message will be similar to those given in the appendices to this annex.

2. SAMPLE MESSAGE TEXT

For SIT messages depicted in Tables C.1, C.2 and C.3, sample messages are given in Appendix 1 to this Annex. The sample messages in Appendix 1 also indicate the message line that contains the individual MF #.

Table C.1

MESSAGE CONTENT FOR ALERT MESSAGES

MESSAGE FORMAT	MF #	TITLE	SIT NUMBERS 121	122	123 124
MESSAGE HEADER	1	MESSAGE NUMBER	A	A	A (1)
	2	REPORTING MCC	A	A	A
	3	MESSAGE TRANSMIT TIME	A	A	A (2)
SIT HEADER	4	SIT	A	A	A
	5	DESTINATION MCC	A	A	A
	6	SPACECRAFT ID	A	A	A
	8	NUM. OF ALERTS WITH DOPPLER POSITIONS	A	.	.
	10	NUM. OF ALERTS WITHOUT DOPPLER POSITIONS (406 ONLY)	.	A	A
	11	SOURCE ID	A	A	A
	12	LOCAL/GLOBAL FLAG AND FREQ BAND	A	.	.
	13	BIAS, BSDEV AND DRIFT	X	X	X
	14	TCA	A	A	A
	15	WINDOW FACTOR	A	.	.
SOLUTION HEADER	16	NUMBER OF ITERATIONS	X	.	.
	17	CROSS TRACK ANGLE	A	.	.
	18	SECONDARY SOURCE ID	X	.	.
	19	NUMBER OF SIDEBANDS	X	.	.
	20	SWEEP PERIOD AND SPSDEV	X	.	.
	21	NUMBER OF POINTS (406 MHz)	.	A	A
	23	406 MESSAGE	.	A	A
	24	DDR/SERVICE AREA AND AR FLAG	A	.	.
	25	LATITUDE	A	.	.
	26	LONGITUDE	A	.	.
A DATA	27	ERROR ELLIPSE	A	.	.
	28	PROBABILITY	A	.	.
	29	NEXT TIME OF VISIBILITY	X	.	.
	30	CONFIDENCE FACTOR	A	.	.
	31	DATA RESIDUAL: SDEV AND TREND	X	.	.
B DATA		REPEAT MF #s 24 TO 31 AS REQUIRED BUT WITH DATA FOR B LOCATION	A	.	.
		REPEAT MF #s 11 TO 31 AS REQUIRED, BY MF #8 OR 10 AND B DATA AS REQUIRED BY MF #8	A	A	A
SIT TRAILER	42	ENDSIT	A	A	A
MSG TRAILER	43	ENDMSG	A	A	A

Note 1: "A" - indicates actual values.
"X" - indicates default values are allowed.

Note 2: The underline "__" is an indication where the New Line (NL) code is to be inserted.

Table C.1 (Cont.)

MESSAGE CONTENT FOR ALERT MESSAGES

MESSAGE FORMAT	MF #	TITLE	SIT NUMBERS 141	142	143 144
MESSAGE HEADER	1	MESSAGE NUMBER	A	A	A (1)
	2	REPORTING MCC	A	A	A
	3	MESSAGE TRANSMIT TIME	A	A	A (2)
SIT HEADER	4	SIT	A	A	A
	5	DESTINATION MCC	A	A	A
	8	NUM. OF ALERTS WITH DOA POSITIONS	A	A	A
	11	MEOLUT SOURCE ID	A	A	A
	13	FREQUENCY	X	X	X
	14a	TIME OF FIRST BURST (AVERAGE TOA)	A	A	A
	14b	TIME TAG LAST BURST (AVERAGE TOA)	A	A	A
INFO	21	BURSTS	A	A	A
	77	36 CHARACTER 406 MESSAGE	A	A	A
	24	DDR/SERVICE AREA	A	.	.
	25	LATITUDE	A	.	.
	26	LONGITUDE	A	.	.
	78	DOA QUALITY FACTOR	A	.	.
	89	EXPECTED HORIZONTAL ERROR	A	.	.
	79	AVERAGE C/No	X	X	X
	80	RTBs	X	X	X
	81	ANTENNAS	X	X	X
	82	ALTITUDE	X	.	.
	84	QUALITY INDICATOR	X	.	.
	88	NUMBER OF PACKETS	A	A	A
	27	ERROR ELLIPSE	A	.	.
	83	MEOSAR SATELLITE IDs	A	A	A

REPEAT SOLUTION HEADER & DOA/POSITION INFORMATION AS REQUIRED BY MF #8

SIT TRAILER	42	ENDSIT	A	A	A
MSG TRAILER	43	ENDMSG	A	A	A

Note 1: "A" - indicates actual values.
"X" - indicates default values are allowed.
Note 2: The underline "__" is an indication where the New Line (NL) code is to be inserted.

Table C.1 (Cont.)

MESSAGE CONTENT
FOR
ALERT MESSAGES

MESSAGE FORMAT	MF #	TITLE	SIT NUMBERS 125 126 127	132 134	133 135
MESSAGE HEADER	1	MESSAGE NUMBER	A	A	A (1)
	2	REPORTING MCC	A	A	A
	3	MESSAGE TRANSMIT TIME	A	A	A (2)
SIT HEADER	4	SIT	A	A	A
	5	DESTINATION MCC	A	A	A
	6	SPACECRAFT ID	A	A	A
	8	NUM. OF ALERTS WITH DOPPLER POSITIONS	A	.	A
	10	NUM. OF ALERTS WITHOUT DOPPLER POSITIONS (406 ONLY)	.	A	.
	11	SOURCE ID	A	A	A
	12	LOCAL/GLOBAL FLAG AND FREQ BAND	A	.	A
	13	BIAS, BSDEV AND DRIFT	X	X	X
	14	TCA	A	A	A
	15	WINDOW FACTOR	A	.	A
SOLUTION HEADER	16	NUMBER OF ITERATIONS	X	.	X
	17	CROSS TRACK ANGLE	X	.	X
	18	SECONDARY SOURCE ID	X	.	X
	19	NUMBER OF SIDEBANDS	.	.	.
	21	NUMBER OF POINTS (406 MHz)	A	A	A
	23	406 MESSAGE	A	A	A
	24	DDR/SERVICE AREA AND PS FLAG	A	.	A
	25	LATITUDE	A	.	A
	26	LONGITUDE	A	.	A
A DATA	27	ERROR ELLIPSE	A	.	A
	28	PROBABILITY	A	.	A
	29	NEXT TIME OF VISIBILITY	X	.	X
	30	CONFIDENCE FACTOR	A	.	A
	31	DATA RESIDUAL: SDEV AND TREND	X	.	X
B DATA		REPEAT MF #s 24 TO 31 AS REQUIRED BUT WITH DATA FOR B LOCATION	A	.	A
		REPEAT MF #s 11 TO 31 AS REQUIRED, BY MF #8 OR 10 AND B DATA AS REQUIRED BY MF #8	A	A	A
SIT TRAILER	42	ENDSIT	A	A	A
MSG TRAILER	43	ENDMSG	A	A	A

Note 1: "A" - indicates actual values.
"X" - indicates default values are allowed.
Note 2: The underline "__" is an indication where the New Line (NL) code is to be inserted.

Table C.1 (Cont.)

MESSAGE CONTENT
FOR
ALERT MESSAGES

MESSAGE FORMAT	MF #	TITLE	SIT NUMBERS 145 146 147	136 138	137 139
MESSAGE HEADER	1	MESSAGE NUMBER	A	A	A (1)
	2	REPORTING MCC	A	A	A
	3	MESSAGE TRANSMIT TIME	A	A	A (2)
SIT HEADER	4	SIT	A	A	A
	5	DESTINATION MCC	A	A	A
	8	NUM. OF ALERTS WITH DOA POSITIONS	A	A	A
	11	MEOLUT SOURCE ID	A	A	A
	13	FREQUENCY	X	X	X
	14a	TIME OF FIRST BURST (AVERAGE TOA)	A	A	A
	14b	TIME TAG LAST BURST (AVERAGE TOA)	A	A	A
INFO	21	BURSTS	A	A	A
	77	36 CHARACTER 406 MESSAGE	A	A	A
	24	DDR/SERVICE AREA	A	.	A
	25	LATITUDE	A	.	A
	26	LONGITUDE	A	.	A
	78	DOA QUALITY FACTOR	A	.	A
	89	EXPECTED HORIZONTAL ERROR	A	.	A
	79	AVERAGE C/No	X	X	X
	80	RTBs	X	X	X
	81	ANTENNAS	X	X	X
	82	ALTITUDE	X	.	X
	84	QUALITY INDICATOR	X	.	X
	88	NUMBER OF PACKETS	A	A	A
	27	ERROR ELLIPSE	A	.	A
	83	MEOSAR SATELLITE IDs	**A**	**A**	**A**
REPEAT SOLUTION HEADER & DOA/POSITION INFORMATION AS REQUIRED BY MF #8					
SIT TRAILER	42	ENDSIT	A	A	A
MSG TRAILER	43	ENDMSG	A	A	A

Note 1: "A" - indicates actual values.
"X" - indicates default values are allowed.
Note 2: The underline "__" is an indication where the New Line (NL) code is to be inserted.

Table C.2

MESSAGE CONTENT
FOR
SYSTEM INFORMATION AND NARRATIVE MESSAGES

MESSAGE FORMAT	MF #	TITLE	SIT NUMBERS 415 417	416 515	425 525	435 535	445 545
MESSAGE HEADER	1	MESSAGE NUMBER	A	A	A	A	A
	2	REPORTING MCC	A	A	A	A	A
	3	MESSAGE TRANSMIT TIME	A	A	A	A	A
	4	SIT	A	A	A	A	A
SIT HEADER	5	DESTINATION MCC	A	A	A	A	A
	44	NUMBER OF SPACECRAFT	.	.	.	.	.
	6	SPACECRAFT ID	A	.	.	A	.
	7	ORBIT NUMBER	A	.	.	.	.
	22	BEACON ID	.	.	.	.	.
	32	NUMBER OF ORBIT VECTORS	.	.	.	.	.
	33	NUMBER OF PROCEDURE NAMES	.	.	.	A	.
	34	ORBIT TIME	.	.	.	.	.
	35	ORBIT POSITION	.	.	.	.	.
SIT BODY	36	ORBIT VELOCITY	.	.	.	.	.
	37	CALIBRATION TIME	A	.	.	.	.
	38	USO FREQUENCY	A	.	.	.	.
	39	COMMAND PROCEDURE NAME & PRIORITY	.	.	.	A	.
	40	EXECUTE TIME	.	.	.	A	.
	64	406 MHz SARR FREQ. CALIB. OFFSET	.	.	.	.	.
	65	406 MHz SARR FREQ. CALIB. DRIFT	.	.	.	.	.
	66	TIME OF 406 MHz SARR FREQ. CALIB.	.	.	.	.	.
		REPEAT MF #s 39 AND 40 FOR EACH PROCEDURE NAME (MF #33)	.	.	.	A	.
		REPEAT MF #s 6 TO 66 AS REQUIRED BY MF #44	.	.	.	.	.
	41	NARRATIVE TEXT	.	A	A	A	A
SIT TRAILER	42	ENDSIT	A	A	A	A	A
MSG TRAILER	43	ENDMSG	A	A	A	A	A

Notes: The narrative text is terminated as specified in MF #41.
See section 4.1 for size specification.
The underline "__" is an indication where the New Line (NL) code is to be inserted.

Table C.2 (Cont.)

MESSAGE CONTENT FOR SYSTEM INFORMATION AND NARRATIVE MESSAGES

MESSAGE FORMAT	MF #	TITLE	SIT NUMBERS 216 215	217	510	605	915	925
MESSAGE HEADER	1	MESSAGE NUMBER	A	A	A	A	A	A
	2	REPORTING MCC	A	A	A	A	A	A
	3	MESSAGE TRANSMIT TIME	A	A	A	A	A	A
SIT HEADER	4	SIT	A	A	A	A	A	A
	5	DESTINATION MCC	A	A	A	A	A	A
	44	NUMBER OF SPACECRAFT	A	A	A	.	.	.
SIT BODY	6	SPACECRAFT ID	A	.	A	.	.	.
	7	ORBIT NUMBER	A	.	.	.	.	.
	22	BEACON ID	.	.	.	.	.	A
	32	NUMBER OF ORBIT VECTORS	A	.	.	.	.	.
	33	NUMBER OF PROCEDURE NAMES	.	.	.	.	.	.
	34	ORBIT TIME	A	.	.	.	.	.
	35	ORBIT POSITION	A	.	.	.	.	.
	36	ORBIT VELOCITY	A	.	.	.	.	.
	37	CALIBRATION TIME	.	.	.	.	.	.
	38	USO FREQUENCY	.	.	.	.	.	.
	39	COMMAND PROCEDURE NAME & PRIORITY	.	.	.	.	.	.
	40	EXECUTE TIME	.	.	.	.	.	.
	64	406 MHz SARR FREQ. CALIB. OFFSET	.	.	A	.	.	.
	65	406 MHz SARR FREQ. CALIB. DRIFT	.	.	X	.	.	.
	66	TIME OF 406 MHz SARR FREQ. CALIB.	.	.	A	.	.	.
	85	TWO-LINE ELEMENT (TLE) SET – LINE 1	.	A	.	.	.	.
	86	TWO-LINE ELEMENT (TLE) SET – LINE 2	.	A	.	.	.	.
		REPEAT MF #s 39 AND 40 FOR EACH PROCEDURE NAME (MF #33)	.	.	.	.	.	.
		REPEAT MF #s 6 TO 86 AS REQUIRED BY MF #44	A	.	A	A	.	.
	41	NARRATIVE TEXT	.	.	.	A	A	A
SIT TRAILER	42	ENDSIT	A	A	A	A	A	A
MSG TRAILER	43	ENDMSG	A	A	A	A	A	A

Notes: The narrative text is terminated as specified in MF #41.
See section 4.1 for size specification.
The underline "__" is an indication where the New Line (NL) code is to be inserted.

MESSAGE CONTENT FOR MEOSAR DATA MESSAGES

The TOA/FOA data to be transferred between MEOLUTS is described by the Schema below in Figure C.1. This XML Schema document can be copied to an appropriate folder on a local MEOLUT data server for immediate use by any third-party XML parser. Note that each "element name" corresponds to the message field name as provided in Annex B.1 of C/S A.002 (SID) or the corresponding information above in this Annex, with the explicit replacement of all spaces and other punctuation characters by the underscore characters ("_").

[To include MF #87 – Orbit Reference Coordinate System]

```
<?xml version="1.0"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns="urn:packet-schema"
elementFormDefault="qualified"
targetNamespace="urn:packet-schema">
<xsd:complexType name="TOA_FOA_LIST">
<xsd:sequence>
<xsd:element name="TOA_FOA_DATA" minOccurs="0" maxOccurs="unbounded">
<xsd:complexType>
<xsd:all>
<xsd:element name="MF6" type="xsd:positiveInteger" />
<xsd:element name="MF11" type="xsd:positiveInteger" />
<xsd:element name="MF71" type="xsd:positiveInteger" />
<xsd:element name="MF22">
<xsd:simpleType>
<xsd:restriction base="xsd:string">
<xsd:pattern value="[0-9A-F]{15}" />
</xsd:restriction>
</xsd:simpleType>
</xsd:element>
<xsd:element name="MF77">
<xsd:simpleType>
<xsd:restriction base="xsd:string">
<xsd:pattern value="[0-9A-F]{36}" />
</xsd:restriction>
</xsd:simpleType>
</xsd:element>
<xsd:element name="MF67" type="xsd:string" />
<xsd:element name="MF68" type="xsd:decimal" />
<xsd:element name="MF69" type="xsd:decimal" />
<xsd:element name="MF70" type="xsd:decimal" />
<xsd:element name="MF72" type="xsd:decimal" />
<xsd:element name="MF73" type="xsd:decimal" />
<xsd:element name="MF74">
<xsd:simpleType>
<xsd:restriction base="xsd:string">
<xsd:pattern value="[0-9A-F]{4}" />
</xsd:restriction>
</xsd:simpleType>
</xsd:element>
<xsd:element name="MF75" type="xsd:string" />
<xsd:element name="MF76" type="xsd:string" />
<xsd:element name="MF87" type="xsd:string" />
</xsd:all>
</xsd:complexType>
</xsd:element>
</xsd:sequence>
</xsd:complexType>
</xsd:schema>
```


Figure C.1: XML Schema for the Transfer of TOA/FOA Data between MEOLUTs

Table C.3

MESSAGE CONTENT
FOR SIT 185 MESSAGES

PRINTED LINE #	MF #	TITLE	
1	45	MESSAGE TYPE	X
2	46	CURRENT MESSAGE NUMBER	X
	47	MCC REFERENCE	X
3	48	DETECTION TIME & SPACECRAFT ID	X
4	49	DETECTION FREQUENCY	X
5	50	COUNTRY OF BEACON REGISTRATION	X
6	51	USER CLASS OF BEACON	X
	52	IDENTIFICATION	X
7	53	EMERGENCY CODE	X
8	54	POSITIONS	X
9	54a	CONFIRMED POSITION	X
10	54b	A POSITION & PROBABILITY	X
11	54c	B POSITION & PROBABILITY	X
12	54d	DOA POSITION AND ALTITUDE	X
13	54e	ENCODED POSITION AND TIME OF UPDATE	X
14	55	SOURCE OF ENCODED POSITION DATA	X
15	56	NEXT PASS/EXPECTED DATA TIMES	X
16	56a	NEXT TIME OF VISIBILITY/ EXPECTED TIME OF CONFIRMED POSITION	X
17	56b	NEXT TIME OF VISIBILITY A POSITION	X
18	56c	NEXT TIME OF VISIBILITY B POSITION	X
19	56d	NEXT EXPECTED TIME OF DOA POSITION	X
20	56e	NEXT TIME OF VISIBILITY OF ENCODED POSITION	X
21	57	BEACON HEX ID & HOMING SIGNAL	X
22	58	ACTIVATION TYPE	X
23	59	BEACON NUMBER	X
24	60	OTHER ENCODED INFORMATION	X
25+a	61	OPERATIONAL INFORMATION	X
26+a+b	62	REMARKS	X
27+a+b+c	63	END OF MESSAGE	X

where:

a = number of lines required for MF #61
b = number of lines required for MF #62
c = number of lines required for MF #63
The underline "_" is an indication where the New Line (NL) code is to be inserted.

APPENDIX C.1 TO ANNEX C

SAMPLE MESSAGES

1. GENERAL

This Appendix contains examples of messages formatted for transmission. The examples are shown double spaced for ease of reading. Each example is composed of 3 sections:

a. FORMAT FRAMES

b. MF #

c. CONTENT

1.1 Format Frames

The FORMAT FRAME corresponds to the required format given in section 4 of the document. The INFO frame contains the text message and can therefore be formatted as required by Cospas-Sarsat. The HEADER and TRAILER frames are specified by the host network.

1.2 MF

This MF # provides the field number used within a particular message line and correspond to the MF # shown in Tables C.1, C.2 and C.3.

1.3 Content

This section contains the actual information transmitted. Only the content in the examples is transmitted and not the FORMAT FRAME column and the MF #s column.

1.4 SIT 185

Because of its nature, examples for SIT 185 are presented differently than examples for other SIT messages and shows only the content as it would be displayed or printed at the receiving agency.

2. SAMPLES

Sample messages for each SIT format are provided in the following pages.

SAMPLE MESSAGE FOR

SIT 121

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
	1,2,3	/01612 01600/3660/91 280 1705
	4-6,8	/121/3160/002/01
	11-15	/3663/+4/-03446.0 006.0 +11.00/91 280 1630 23.50/0
	16-20	/3/12.057/0000/01/0000 99
	24-31	/-366/+48.981/-113.906/052 011.8 003.2/52/91 280 1715/2/010.0 004.0
	24-31	/+316/+53.225/-090.102/160 019.7 009.7/48/91 280 1750/2/010.0 004.0
	42	/LASSIT
	43	/ENDMSG
TRAILER		(as per communication network requirements if any)

SAMPLE MESSAGE FOR

SIT 122, 123, 124, 132, 134

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
INFO	1,2,3	/01614 00000/3660/80 005 1750
	4-6,10	/122/3160/102/02
	11,13,14,21	/3661/-03496.0 006.0 +11.00/80 005 1700 20.00/02
	23	/123456789ABCDEF012345600000000
	11,13,14,21	/3661/-03496.0 006.0 +11.00/80 005 1700 20.00/02
	23	/23456789ABCDEF0123456700000000
	42	/LASSIT
	43	/ENDMSG
TRAILER		(as per communication network requirements if any)

Note: MF #4 must reflect SIT which is being used.

SAMPLE MESSAGE FOR

SIT 125, 126, 127, 133, 135

FORMAT FRAMES	MF #	CONTENT
HEADER		(As per communication network requirements if any)
	1,2,3	/00127 00117/5120/91 280 1843
	4-6,8	/125/3660/004/02
	11-15	/5121/-4/-00405.0 001.0 -00.70/91 280 1516 16.00/1
	16-18,21	/0/15.859/0000/07
	23	/56E680AD19602009C7C7D000000000
	24-31	/+227/+22.811/-017.447/276 000.3 000.1/90/00 000 0000/3/010.0 000.0
INFO		
	24-31	/+366/+24.755/+017.906/074 003.5 001.6/10/00 000 0000/3/040.0 002.0
	11-15	/5121/-4/-00407.9 001.0 +00.40/91 280 1657 06.00/1
	16-18,21	/0/00.707/0000/18
	23	/56E680AD19602009C7C7D000000000
	24-31	/+227/+22.826/-017.686/077 001.5 000.1/51/00 000 0000/2/020.0 001.0
	24-31	/+366/+23.181/-016.104/077 001.5 000.1/49/00 000 0000/2/020.0 001.0
	42	/LASSIT
	43	/ENDMSG
TRAILER		(as per communication network requirements if any)

Note: MF #4 must reflect SIT which is being used.

SAMPLE MESSAGE FOR
SITs 141, 145, 146, 147, 137, 139

FORMAT FRAMES	MF #	CONTENT
HEADER		as per communication network requirements if any)
	1,2,3	/01614 00000/3660/09 280 1518
	4,5,8	/145/3160/02
	11,13,14a	/3668/-00405.0 001.0 +99.99/09 280 1516 36.21
	14b,21,77	/09 280 1518 16.19/03/FFFE2F789ABCDEF012345600000000123456
	24,25,26,78,89	/+316/+53.225/-130.102/007/010.42
	79,80,81,82,84,88,27	/35.12/09/04/06.379410/00/012/000 000.0 000.0
	83	/301 302 303 304 000 000 000 000 000 000 000 000 000 000 000 000
INFO		
	11,13,14a,	/3667/+01923.0 999.9 +99.99/09 280 1517 10.01
	14b,21,77	/09 280 1517 10.01/01/ FFFE2F789ABCDEF012345670000000123456
	24,25,26,78,89	/+316/+58.451/-140.810/002/103.57
	79,80,81,82,84,88,27	/34.39/05/05/99.999999/00/012/000 000.0 000.0
	83	/301 302 303 304 000 000 000 000 000 000 000 000 000 000 000 000
	42	/LASSIT
	43	/ENDMSG
TRAILER		(as per communication network requirements if any)

Note: MF #4 must reflect SIT which is being used.

SAMPLE MESSAGE FOR

SITs 142, 143, 144, 136, 138

FORMAT	MF #	CONTENT
FRAMES		
HEADER		(as per communication network requirements if any)
_____		
	1,2,3	/01614 00000/3660/09 280 1518
	4,5,8	/142/3160/02
	11,13,14a	/3668/-00405.0 001.0 +99.99/09 280 1516 36.21
	14b,21,77	/09 280 1518 16.19/03/ FFFE2F789ABCDEF012345600000000123456
	79,80,81,88	/35.12/09/04/001
	83	/301 302 303 304 000 000 000 000 000 000 000 000 000 000 000 000
INFO		
	11,13,14a	/3667/+01923.0 999.9 +99.99/09 280 1517 10.01
	14b,21,77	/09 280 1517 10.01/01/ FFFE2F789ABCDEF012345670000000123456
	79,80,81,88	/34.39/05/05/002
	83	/301 302 303 304 000 000 000 000 000 000 000 000 000 000 000 000
	42	/LASSIT
	43	/ENDMSG
_____		
TRAILER		(as per communication network requirements if any)

Note: MF #4 must reflect SIT which is being used.

SAMPLE MESSAGE FOR
TOA/FOA XML DATA TRANSFER

```
<?xml version="1.0" encoding="utf-8"?>
<TOA_FOA_DATA>
<MF6>312</MF6>
<MF11>7106</MF11>
<MF71>16</MF71>
<MF22>ADDFFFFFFFFFFC</MF22>
<MF77>42BB1F56EFFFFFFFFFFFE5CB630000000000</MF77>
<MF67>10 272 0003 50.623698</MF67>
<MF68>406036073.075</MF68>
<MF69>0.076403</MF69>
<MF70>2255.694</MF70>
<MF72>37.6</MF72>
<MF73>400.046</MF73>
<MF74>0000</MF74>
<MF87>ECEF</MF87>
<MF75>22797.7391 -13074.3953 -00794.0700</MF75>
<MF76>001.064675 002.052740 -003.157027</MF76>
</TOA_FOA_DATA>
```

SAMPLE MESSAGE FOR SIT 185

SAMPLE 406 MHz UNRESOLVED DOPPLER POSITION MATCH (STANDARD LOCATION - EPIRB)

1. DISTRESS COSPAS-SARSAT UNRESOLVED DOPPLER POSITION MATCH

2. MSG NO: 00741 AUMCC REF: 1C04273BC0FFBFF

3. DETECTED AT: 19 MAR 09 0514 UTC BY SARSAT S08

4. DETECTION FREQUENCY: 406.0250 MHz

5. COUNTRY OF BEACON REGISTRATION: 224/ SPAIN

6. USER CLASS: STANDARD LOCATION - EPIRB
   MMSI LAST 6 DIGIT: 080350

7. EMERGENCY CODE: NIL

8. POSITIONS:
   CONFIRMED - NIL
   DOPPLER A - 41 07.1 N 001 12.7 E PROB 69 PERCENT
   DOPPLER B - 36 48.4 N 022 20.2 E PROB 31 PERCENT
   DOA/ALTITUDE – NIL
   ENCODED - NIL
   UPDATE TIME WITHIN 4 HOURS OF DETECTION TIME

9. ENCODED POSITION PROVIDED BY: EXTERNAL DEVICE

10. NEXT PASS/EXPECTED DATA TIMES:
    CONFIRMED - NIL
    DOPPLER A - NIL
    DOPPLER B - NIL
    DOA - NIL
    ENCODED - NIL

11. HEX ID:1C04273BC0FFBFF HOMING SIGNAL: 121.5 MHZ

12. ACTIVATION TYPE: NIL

13. BEACON NUMBER ON AIRCRAFT OR VESSEL: NIL

14. OTHER ENCODED INFORMATION: NIL

15. OPERATIONAL INFORMATION:

    WARNING: AMBIGUITY IS NOT RESOLVED

16. REMARKS: NIL

END OF MESSAGE

SAMPLE MESSAGE FOR SIT 185
SAMPLE 406 MHz INITIAL ENCODED POSITION ALERT

(STANDARD LOCATION - EPIRB: SERIAL NUMBER)

1. DISTRESS COSPAS-SARSAT INITIAL ALERT

2. MSG NO: 00306 AUMCC REF: 12345

3. DETECTED AT: 17 APR 07 1627 UTC BY GOES 11

4. DETECTION FREQUENCY: 406.0250 MHz

5. COUNTRY OF BEACON REGISTRATION: 316/ CANADA

6. USER CLASS: STANDARD LOCATION - EPIRB
SERIAL NO: 05918

7. EMERGENCY CODE: NIL

8. POSITIONS:
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B - NIL
DOA/ALTITUDE - NIL
ENCODED - 05 00.00 S 178 00.00 E
UPDATE TIME WITHIN 4 HOURS OF DETECTION TIME

9. ENCODED POSITION PROVIDED BY: EXTERNAL DEVICE

10. NEXT PASS/EXPECTED DATA TIMES:
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B - NIL
DOA - NIL
ENCODED - NIL

11. HEX ID: 278C362E3CFFBFF HOMING SIGNAL: 121.5 MHZ

12. ACTIVATION TYPE: NIL

13. BEACON NUMBER ON AIRCRAFT OR VESSEL: NIL

14. OTHER ENCODED INFORMATION:
CSTA CERTIFICATE NO: 0108
BEACON MODEL - ACR, RLB-33
ENCODED POSITION UNCERTAINTY: PLUS-MINUS 30 MINUTES OF LATITUDE AND LONGITUDE

15. OPERATIONAL INFORMATION:
LUT ID: NZGEO1 WELLINGTON GEOLUT, NEW ZEALAND (GOES 11)
BEACON REGISTRATION AT [CMCC]

16. REMARKS: NIL

END OF MESSAGE

SAMPLE MESSAGE FOR SIT 185

SAMPLE 406 MHz INITIAL ALERT WITH NO LOCATION

(NATIONAL LOCATION - ELT)

1. DISTRESS COSPAS-SARSAT INITIAL ALERT

2. MSG NO: 00141 SPMCC REF: 12345

3. DETECTED AT: 21 FEB 07 0646 UTC BY MSG-2

4. DETECTION FREQUENCY: 406.0249 MHz

5. COUNTRY OF BEACON REGISTRATION: 408/ BAHRAIN

6. USER CLASS: NATIONAL LOCATION - ELT
SERIAL NO: 000006

7. EMERGENCY CODE: NIL

8. POSITIONS:
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B – NIL
DOA/ALTITUDE - NIL
ENCODED - NIL
UPDATE TIME WITHIN 4 HOURS OF DETECTION TIME

9. ENCODED POSITION PROVIDED BY: EXTERNAL DEVICE

10. NEXT PASS/EXPECTED DATA TIMES:
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B - NIL
DOA - NIL
ENCODED - NIL

11. HEX ID: 331000033F81FE0 HOMING SIGNAL: 121.5 MHZ

12. ACTIVATION TYPE: NIL

13. BEACON NUMBER ON AIRCRAFT OR VESSEL: NIL

14. OTHER ENCODED INFORMATION: NIL

15. OPERATIONAL INFORMATION:
BEACON REGISTRATION AT WWW.406REGISTRATION.COM

16. REMARKS: NIL

END OF MESSAGE

SAMPLE MESSAGE FOR SIT 185

SAMPLE 406 MHz POSITION CONFIRMATION ALERT

(NATIONAL LOCATION - PLB)

1. DISTRESS COSPAS-SARSAT POSITION CONFIRMED ALERT

2. MSG NO: 00812 AUMCC REF: 2DD747073F81FE0

3. DETECTED AT: 28 APR 07 0920 UTC BY SARSAT S11

4. DETECTION FREQUENCY: 406.0278 MHz

5. COUNTRY OF BEACON REGISTRATION: 366/ USA

6. USER CLASS: NATIONAL LOCATION - PLB
SERIAL NO: 167438

7. EMERGENCY CODE: NIL

8. POSITIONS:
CONFIRMED - 33 27.1 N 038 56.2 E
DOPPLER A - 33 27.1 N 038 56.2 E
DOPPLER B - NIL
DOA/ALTITUDE - NIL
ENCODED - 33 25.93 N 038 55.67 E UPDATE TIME
WITHIN 4 HOURS OF DETECTION TIME

9. ENCODED POSITION PROVIDED BY: INTERNAL DEVICE

10. NEXT PASS/EXPECTED DATA TIMES:
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B – NIL
DOA - NIL
ENCODED - NIL

11. HEX ID: 2DD747073F81FE0 HOMING SIGNAL: 121.5 MHZ

12. ACTIVATION TYPE: NIL

13. BEACON NUMBER ON AIRCRAFT OR VESSEL: NIL

14. OTHER ENCODED INFORMATION: NIL

15. OPERATIONAL INFORMATION:
LUT ID: FRLUT2 TOULOUSE, FRANCE

16. REMARKS: NIL

END OF MESSAGE

SAMPLE MESSAGE FOR SIT 185

SAMPLE 406 MHz DOA POSITION CONFIRMATION ALERT

(STANDARD LOCATION – EPIRB: SERIAL NUMBER)

1. DISTRESS COSPAS-SARSAT POSITION CONFIRMED ALERT
2. MSG NO: 00306 BRMCC REF: 12345
3. DETECTED AT: 17 DEC 10 1630 UTC BY MEOSAR
4. DETECTION FREQUENCY: 406.0371 MHz
5. COUNTRY OF BEACON REGISTRATION: 316/ CANADA
6. USER CLASS: STANDARD LOCATION - EPIRB
   SERIAL NO: 05918
7. EMERGENCY CODE: NIL
8. POSITIONS:
   CONFIRMED - 05 10.1 S 178 01.3 E
   DOPPLER A - NIL
   DOPPLER B - NIL
   DOA - 05 10.2 S 178 01.2 E EXPECTED ACCURACY 03 NMS
   ALTITUDE 45 METRES
   ENCODED - NIL
   UPDATE TIME WITHIN 4 HOURS OF DETECTION TIME
9. ENCODED POSITION PROVIDED BY: EXTERNAL DEVICE
10. NEXT PASS / EXPECTED DATA TIMES:
    CONFIRMED – MEOSAR DATA USUALLY SENT WITHIN 15 MINUTES
    DOPPLER A - NIL
    DOPPLER B - NIL
    DOA - MEOSAR DATA USUALLY SENT WITHIN 15 MINUTES
    ENCODED - NIL
11. HEX ID: 278C362E3CFFBFF HOMING SIGNAL: 121.5 MHZ
12. ACTIVATION TYPE: NIL
13. BEACON NUMBER ON AIRCRAFT OR VESSEL: NIL
14. OTHER ENCODED INFORMATION:
    CSTA CERTIFICATE NO: 0108
    BEACON MODEL - ACR, RLB-33
15. OPERATIONAL INFORMATION:
    BEACON REGISTRATION AT CMCC
    MEOSAR ALERT LAST DETECTED AT 17 DEC 10 1646 UTC
16. REMARKS: NIL

END OF MESSAGE

SAMPLE MESSAGE FOR SIT 185

SAMPLE 406 MHz NOCR ENCODED POSITION ALERT

(NATIONAL LOCATION - PLB)

1. DISTRESS COSPAS-SARSAT NOTIFICATION OF COUNTRY OF BEACON REGISTRATION ALERT

2. MSG NO: 01737 AUMCC REF: 3EF6C34FBF81FE0

3. DETECTED AT: 20 MAR 07 0504 UTC BY SARSAT S08

4. DETECTION FREQUENCY: 406.0216 MHz

5. COUNTRY OF BEACON REGISTRATION: 503/ AUSTRALIA

6. USER CLASS: NATIONAL LOCATION - PLB
SERIAL NO: 099999

7. EMERGENCY CODE: NIL

8. POSITIONS:
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B – NIL
DOA/ALTITUDE - NIL
ENCODED - 28 06.00 S 153 40.00 E
UPDATE TIME WITHIN 4 HOURS OF DETECTION TIME

9. ENCODED POSITION PROVIDED BY: EXTERNAL DEVICE

10. NEXT PASS/EXPECTED DATA TIMES:
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B – NIL
DOA - NIL
ENCODED - 20 MAR 07 1417 UTC NZLUT WELLINGTON LUT NEW ZEALAND

11. HEX ID: 3EF6C34FBF81FE0
HOMING SIGNAL: OTHER (NOT 121.5 MHZ) OR NIL

12. ACTIVATION TYPE: NIL

13. BEACON NUMBER ON AIRCRAFT OR VESSEL: NIL

14. OTHER ENCODED INFORMATION:
ENCODED POSITION UNCERTAINTY:
PLUS-MINUS 4 SECONDS IN LATITUDE AND LONGITUDE

15. OPERATIONAL INFORMATION:
LUT ID: ASLUT CAPE TOWN, SOUTH AFRICA

16. REMARKS: NIL

END OF MESSAGE

SAMPLE MESSAGE FOR SIT 185

SAMPLE 406 MHz INITIAL DOPPLER POSITION ALERT

(STANDARD LOCATION – ELT: 24-BIT ADDRESS)

1. DISTRESS COSPAS-SARSAT INITIAL ALERT

2. MSG NO: 00741 AUMCC REF: 3266E2019CFFBFF

3. DETECTED AT: 22 APR 07 0912 UTC BY SARSAT S10

4. DETECTION FREQUENCY: 406.0247 MHz

5. COUNTRY OF BEACON REGISTRATION: 403/ SAUDI

6. USER CLASS: STANDARD LOCATION - ELT
AIRCRAFT 24 BIT ADDRESS: 7100CE

7. EMERGENCY CODE: NIL

8. POSITIONS:
CONFIRMED - NIL
DOPPLER A - 32 49.1 N 081 54.2 E PROB 69 PERCENT
DOPPLER B - 24 18.1 N 041 18.2 E PROB 31 PERCENT
DOA/ALTITUDE - NIL
ENCODED - NIL
UPDATE TIME WITHIN 4 HOURS OF DETECTION TIME

9. ENCODED POSITION PROVIDED BY: EXTERNAL DEVICE

10. NEXT PASS/EXPECTED DATA TIMES:
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B – NIL
DOA - NIL
ENCODED - NIL

11. HEX ID: 3266E2019CFFBFF HOMING SIGNAL: 121.5 MHZ

12. ACTIVATION TYPE: NIL

13. BEACON NUMBER ON AIRCRAFT OR VESSEL: NIL

14. OTHER ENCODED INFORMATION:
AIRCRAFT 24-BIT ADDRESS ASSIGNED TO: SAUDI ARABIA

15. OPERATIONAL INFORMATION:
LUT ID: INLUT1 BANGALORE, INDIA

16. REMARKS: NIL

END OF MESSAGE

SAMPLE MESSAGE FOR SIT 185

SAMPLE 406 MHz INITIAL DOA POSITION ALERT

(STANDARD LOCATION – EPIRB: SERIAL NUMBER)

1 DISTRESS COSPAS-SARSAT INITIAL ALERT

2. MSG NO: 00306 BRMCC REF: 12345

3. DETECTED AT: 17 DEC 10 1627 UTC BY MEOSAR

4. DETECTION FREQUENCY: 406.0371 MHz

5. COUNTRY OF BEACON REGISTRATION: 316/ CANADA

6. USER CLASS: STANDARD LOCATION - EPIRB

SERIAL NO: 05918

7. EMERGENCY CODE: NIL

8. POSITIONS:

CONFIRMED - NIL

DOPPLER A - NIL

DOPPLER B - NIL

DOA - 05 10.1 S 178 01.4 E EXPECTED ACCURACY 15 NMS

ALTITUDE 45 METRES

ENCODED - NIL

UPDATE TIME WITHIN 4 HOURS OF DETECTION TIME

9. ENCODED POSITION PROVIDED BY: EXTERNAL DEVICE

10. NEXT PASS / EXPECTED DATA TIMES:

CONFIRMED - NIL

DOPPLER A - NIL

DOPPLER B - NIL

DOA - NIL

ENCODED - NIL

11. HEX ID: 278C362E3CFFBFF HOMING SIGNAL: 121.5 MHZ

12. ACTIVATION TYPE: NIL

13. BEACON NUMBER ON AIRCRAFT OR VESSEL: NIL

14. OTHER ENCODED INFORMATION:

CSTA CERTIFICATE NO: 0108

BEACON MODEL - ACR, RLB-33

15. OPERATIONAL INFORMATION:

BEACON REGISTRATION AT CMCC

MEOSAR ALERT LAST DETECTED AT 17 DEC 10 1627 UTC

16. REMARKS: NIL

END OF MESSAGE

SAMPLE MESSAGE FOR SIT 185

SAMPLE 406 MHz INITIAL ALERT

(RETURN LINK LOCATION –PLB: SERIAL NUMBER)

1 DISTRESS COSPAS-SARSAT POSITION CONFLICT ALERT

2. MSG NO: 00308 USMCC REF: 12345

3. DETECTED AT: 18 DEC 10 1630 UTC BY SARSAT S09

4. DETECTION FREQUENCY: 406.0370 MHz

5. COUNTRY OF BEACON REGISTRATION: 227/ FRANCE

6. USER CLASS: NATIONAL LOCATION – PLB (RETURN LINK)
SERIAL NO: 00029

7. EMERGENCY CODE: NIL

8. POSITIONS:
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B - NIL
DOA/ALTITUDE - NIL
ENCODED - 17 44.1 N 087 26.3 E
UPDATE TIME WITHIN 4 HOURS OF DETECTION TIME

9. ENCODED POSITION PROVIDED BY: EXTERNAL DEVICE

10. NEXT PASS / EXPECTED DATA TIMES:
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B - NIL
DOA - NIL
ENCODED - 18 DEC 10 1655 UTC

11. HEX ID: 1C7B000EBF81FE0 HOMING SIGNAL: 121.5 MHZ

12. ACTIVATION TYPE: NIL

13. BEACON NUMBER ON AIRCRAFT OR VESSEL: NIL

14. OTHER ENCODED INFORMATION: NIL

15. OPERATIONAL INFORMATION:
BEACON REGISTRATION AT FMCC

16. REMARKS:
THIS BEACON HAS GALILEO RETURN LINK CAPABILITY
TYPE 1 CAPABILITY (AUTOMATIC ACKNOWLEDGEMENT)

END OF MESSAGE

SAMPLE MESSAGE FOR SIT 185

SAMPLE 406 MHz ALERT WITH UNRELIABLE BEACON MESSAGE

(AS PER C/S A.001, SECTION II/B.1.1.3)

1. DISTRESS COSPAS-SARSAT INITIAL ALERT

2. MSG NO: 00506 AUMCC REF: 12345

3. DETECTED AT: 01 APR 07 0610 UTC BY SARSAT S08

4. DETECTION FREQUENCY: 406.0315 MHz

5. COUNTRY OF BEACON REGISTRATION: NIL

6. USER CLASS: NIL

7. EMERGENCY CODE: NIL

8. POSITIONS:
   CONFIRMED - NIL
   DOPPLER A - 07 23.1 S 136 46.2 E PROB 92 PERCENT
   DOPPLER B - 03 00.1 S 155 08.2 E PROB 08 PERCENT
   DOA/ALTITUDE - NIL
   ENCODED - NIL
   UPDATE TIME WITHIN 4 HOURS OF DETECTION TIME

9. ENCODED POSITION PROVIDED BY: NIL

10. NEXT PASS/EXPECTED DATA TIMES:
    CONFIRMED - NIL
    DOPPLER A - NIL
    DOPPLER B – NIL
    DOA - NIL
    ENCODED - NIL

11. HEX ID: 4C4B4E007688888

12. ACTIVATION TYPE: NIL

13. BEACON NUMBER ON AIRCRAFT OR VESSEL: NIL

14. OTHER ENCODED INFORMATION:

15. OPERATIONAL INFORMATION:
    DATA DECODED FROM THE BEACON MESSAGE IS NOT RELIABLE

16. REMARKS: NIL

END OF MESSAGE

SAMPLE MESSAGE FOR SIT 185

SAMPLE 406 MHz CONFIRMED UPDATE POSITION ALERT

(STANDARD LOCATION – SHIP SECURITY)

1. SHIP SECURITY COSPAS-SARSAT POSITION CONFIRMED UPDATE ALERT

2. MSG NO: 00192 AUMCC REF: 2AB82AF800FFBFF

3. DETECTED AT: 03 MAY 07 0853 UTC BY SARSAT S09

4. DETECTION FREQUENCY: 406.0276 MHz

5. COUNTRY OF BEACON REGISTRATION: 341/ ST KITTS

6. USER CLASS: STANDARD LOCATION – SHIP SECURITY
MMSI LAST 6 DIGITS: 088000

7. EMERGENCY CODE: NIL

8. POSITIONS:
CONFIRMED - 02 15.1 N 046 00.2 E
DOPPLER A - 02 25.1 N 046 06.2 E
DOPPLER B – NIL
DOA/ALTITUDE - NIL
ENCODED - 01 54.40 N - 045 37.53 E
UPDATE TIME WITHIN 4 HOURS OF DETECTION TIME

9. ENCODED POSITION PROVIDED BY: EXTERNAL DEVICE

10. NEXT PASS/EXPECTED DATA TIMES:
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B – NIL
DOA - NIL
ENCODED - NIL

11. HEX ID: 2AB82AF800FFBFF
HOMING SIGNAL: OTHER (NOT 121.5 MHZ) OR NIL

12. ACTIVATION TYPE: NIL

13. BEACON NUMBER ON AIRCRAFT OR VESSEL: 00

14. OTHER ENCODED INFORMATION: NIL

15. OPERATIONAL INFORMATION:
LUT ID: NZLUT WELLINGTON, NEW ZEALAND

16. REMARKS:
THIS IS A SHIP SECURITY ALERT.
PROCESS THIS ALERT ACCORDING TO RELEVANT SECURITY REQUIREMENTS

END OF MESSAGE

SAMPLE MESSAGE FOR SIT 185

SAMPLE 406 MHz DOPPLER POSITION CONFLICT ALERT

(SERIAL USER-LOCATION - ELT: 24-BIT ADDRESS)

1. DISTRESS COSPAS-SARSAT POSITION CONFLICT ALERT

2. MSG NO: 02698 AUMCC REF: C1ADE28809C0185

3. DETECTED AT: 06 APR 07 1440 UTC BY SARSAT S11

4. DETECTION FREQUENCY: 406.0246 MHz

5. COUNTRY OF BEACON REGISTRATION: 525/ INDONESIA

6. USER CLASS: SERIAL USER-LOCATION - ELT
AIRCRAFT 24-BIT ADDRESS: 8A2027

7. EMERGENCY CODE: NIL

8. POSITIONS:
CONFIRMED - NIL
DOPPLER A - 07 00.1 S 098 42.2 E PROB 50 PERCENT
DOPPLER B - 05 42.1 S 107 20.2 E PROB 50 PERCENT
DOA/ALTITUDE - NIL
ENCODED - NIL
UPDATE TIME WITHIN 4 HOURS OF DETECTION TIME

9. ENCODED POSITION PROVIDED BY: INTERNAL DEVICE

10. NEXT PASS/EXPECTED DATA TIMES:
CONFIRMED - NIL
DOPPLER A - 06 APR 07 1805 UTC AULUTW ALBANY LUT AUSTRALIA
DOPPLER B - 06 APR 07 1956 UTC AULUTW ALBANY LUT AUSTRALIA
DOA - NIL
ENCODED - NIL

11. HEX ID: C1ADE28809C0185 HOMING SIGNAL: 121.5 MHZ

12. ACTIVATION TYPE: NIL

13. BEACON NUMBER ON AIRCRAFT OR VESSEL: 00

14. OTHER ENCODED INFORMATION:
CSTA CERTIFICATE NO: 0097
BEACON MODEL - TECHTEST, UK: 503-1
AIRCRAFT 24-BIT ADDRESS ASSIGNED TO: INDONESIA

15. OPERATIONAL INFORMATION:
RELIABILITY OF DOPPLER POSITION DATA - SUSPECT
LUT ID: INLUT1 BANGALORE, INDIA

16. REMARKS:
THIS POSITION 51 KILOMETRES FROM PREVIOUS ALERT

END OF MESSAGE

SAMPLE MESSAGE FOR SIT 185

SAMPLE 406 MHz DOPPLER INITIAL ALERT

(SERIAL USER – EPIRB: NON-FLOAT FREE)

1. DISTRESS COSPAS-SARSAT INITIAL ALERT

2. MSG NO: 01087 AUMCC REF: ADCE402FA80028D

3. DETECTED AT: 20 MAY 07 1613 UTC BY SARSAT S08

4. DETECTION FREQUENCY: 406.0266 MHz

5. COUNTRY OF BEACON REGISTRATION: 366/ USA

6. USER CLASS: SERIAL USER – EPIRB (NON-FLOAT FREE)
SERIAL NO: 0003050

7. EMERGENCY CODE: NIL

8. POSITIONS:
CONFIRMED - NIL
DOPPLER A - 36 38.1 S 168 58.2 E PROB 50 PERCENT
DOPPLER B - 36 39.1 S 169 01.2 E PROB 50 PERCENT
DOA/ALTITUDE - NIL
ENCODED - NIL

9. ENCODED POSITION PROVIDED BY: NIL

10. NEXT PASS/EXPECTED DATA TIMES:
CONFIRMED - NIL
DOPPLER A - 21 MAY 07 0812 UTC
DOPPLER B - 21 MAY 07 0812 UTC
DOA - NIL
ENCODED - NIL

11. HEX ID: ADCE402FA80028D HOMING SIGNAL: 121.5 MHZ

12. ACTIVATION TYPE: MANUAL

13. BEACON NUMBER ON AIRCRAFT OR VESSEL: NIL

14. OTHER ENCODED INFORMATION:
CSTA CERTIFICATE NO: 0163
BEACON MODEL - MCMURDO LTD: G5 OR E5 SMARTFIND

15. OPERATIONAL INFORMATION:
RELIABILITY OF DOPPLER POSITION DATA - SUSPECT
LUT ID: AULUTW ALBANY, AUSTRALIA

16. REMARKS: NIL

END OF MESSAGE

SAMPLE MESSAGE FOR SIT 185

SAMPLE 406 MHz DOPPLER CONFIRMED ALERT

(AVIATION USER - AIRCRAFT REGISTRATION)

1. DISTRESS COSPAS-SARSAT POSITION CONFIRMED ALERT

2. MSG NO: 00932 AUMCC REF: 9D064BED62EAFE1

3. DETECTED AT: 10 MAY 07 0654 UTC BY SARSAT S11

4. DETECTION FREQUENCY: 406.0246 MHz

5. COUNTRY OF BEACON REGISTRATION: 232/ G. BRITAIN

6. USER CLASS: ELT USER
AIRCRAFT REGISTRATION: VP-CGK

7. EMERGENCY CODE: NIL

8. POSITIONS:
CONFIRMED - 25 13.1 N 055 22.2 E
DOPPLER A - 25 17.1 N 055 23.2 E
DOPPLER B – NIL
DOA/ALTITUDE - NIL
ENCODED - NIL

9. ENCODED POSITION PROVIDED BY: NIL

10. NEXT PASS/EXPECTED DATA TIMES:
CONFIRMED - NIL
DOPPLER A - NIL
DOPPLER B – NIL
DOA - NIL
ENCODED - NIL

11. HEX ID: 9D064BED62EAFE1 HOMING SIGNAL: 121.5 MHZ

12. ACTIVATION TYPE: MANUAL

13. BEACON NUMBER ON AIRCRAFT OR VESSEL: 0

14. OTHER ENCODED INFORMATION: NIL

15. OPERATIONAL INFORMATION: NIL

16. REMARKS: NIL

END OF MESSAGE

SAMPLE MESSAGE FOR

SIT 215, 216

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
INFO	1,2,3	/00011 00005/3660/91 280 1844
	4,5,44	/215/3160/02
	6,7,32	/002/35144/01
	34	/91 281 0000 00.000
	35,36	/+1624.4912 -8839.7195 -1719.9279/-001.28323 -002.07614 +007.11246
	6,7,32	/106/02872/01
	34	/91 281 0000 00.000
	35,36	/-5287.2876 +4838.8309 +1711.7118/-001.55450 +000.87006 -007.08719
	42	/LASSIT
	43	/ENDMSG
TRAILER		(as per communication network requirements if any)

SAMPLE MESSAGE FOR

SIT 217

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
	1,2,3	/00011 00005/3660/15 280 1844
	4,5, 44	/217/3160/02
	85	1 28874U 05038A 15207.37312269 -.00000033 00000-0 00000+0 0 9999
	86	2 28912 0.8892 59.3238 0001404 192.0935 85.5157 1.00281209 35179
INFO		
	85	1 27663U 03005A 15321.27963824 -.00000054 00000-0 00000+0 0 9994
	86	2 27663 56.7665 7.3715 0081081 16.3518 103.0593 2.00565996 93786
	42	/LASSIT
	43	/ENDMSG
TRAILER		(as per communication network requirements if any)

SAMPLE MESSAGE FOR

SIT 415

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
INFO	1,2,3	/00022 00015/3660/80 100 1630
	4-7,37,38	/415/3160/101/01135/80 161 1856 24.239/1234567.123
	42	/LASSIT
	43	/ENDMSG
TRAILER		(as per communication network requirements if any)

SAMPLE MESSAGE FOR

SIT 416, 425, 445, 515, 525, 545, 605, 915

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
	1,2,3	/00030 00015/3660/80 160 1550
	4,5	/416/3160
	41	/THE NARRATIVE TEXT IN PRINTABLE CHARACTERS IS PLACED HERE, WITH NO MORE THAN 69 CHARACTERS PER LINE.
INFO		QQQQ
	42	/LASSIT
	43	/ENDMSG
TRAILER		(as per communication network requirements if any)

Note: MF #4 must reflect SIT which is being used.

SAMPLE MESSAGE FOR

SIT 417

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
INFO	1,2,3	/00022 00015/3660/80 100 1630
	4-7,37,38a	/417/3160/011/01135/80 161 1856 24.239/12345678.123
	42	/LASSIT
	43	/ENDMSG
TRAILER		(as per communication network requirements if any)

SAMPLE MESSAGE FOR

SIT 435, 535

FORMAT FRAMES	MF #	CONTENT
HEADER	(as per communication network requirements if any)	
INFO	1,2,3	/79566 00000/3160/08 191 1348
	4,5,6,33	/535/3660/008/02
	39,40	/DISC121A R/08 211 0000 00.00
	39,40	/DISC243A R/08 211 0000 00.00
	41	/TO: USMCC FM: CTEC SATELLITE S8 NOAA 16 COMMANDS TO BE SENT AT THE SOCC CONVENIENCE ON 29 JULY 2008 QQQQ
	42	/LASSIT
	43	/ENDMSG
TRAILER	(as per communication network requirements if any)	

Note: MF #4 must reflect the SIT being used.

SAMPLE MESSAGE FOR

SIT 510

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
INFO	1,2,3	/66289 00000/3160/01 147 2249
	4,5,44	/510/3160/04
	6,64,65,66	/008/-0039.238/+57.201/01 147 1936
	6,64,65,66	/007/-0038.325/+99.999/01 147 1520
	6,64,65,66	/004/-0007.357/-52.301/01 147 1641
	6,64,65,66	/006/-0001.000/+99.999/01 147 2056
	42	/LASSIT
	43	/ENDMSG
TRAILER		(as per communication network requirements if any)

SAMPLE MESSAGE FOR REPORTING

SATELLITE PAYLOAD STATUS

USING SIT 605

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
_____		
	1,2,3	/12345 00000/3660/97 123 1234
	4,5	/605/5030
	41	/ TO: ALL MCCS FROM: USMCC SUBJECT: INITIAL OPERATIONAL CAPABILITY FOR SARSAT-6 SAR PAYLOAD DATA CONSIDERED OPERATIONAL IN COSPAS-SARSAT (WWW.COSPAS-SARSAT.INT) --- 406 SARR: OPERATIONAL 406 SARP (LOCAL): NOT OPERATIONAL 406 SARP (GLOBAL): NOT OPERATIONAL PSEUDO MODE: NOT APPLICABLE
INFO		STATUS OF SAR PAYLOAD (WWW.COSPAS-SARSAT.INT) --- L-BAND DOWNLINK: NORMAL 406 SARR: NORMAL 406 SARR GAIN CONTROL: AUTOMATIC 406 SARP (LOCAL): UNUSABLE 406 SARP (GLOBAL): UNUSABLE PSEUDO MODE: NOT APPLICABLE BANDWIDTH: NOT APPLICABLE COMMENTS --- SARP FAILED AFTER LAUNCH QQQQ
	42	/LASSIT
	43	/ENDMSG

_____

TRAILER (as per communication network requirements if any)

[Ensure consistency of MEOSAR satellite status messages with document C/S A.001]

SAMPLE MESSAGE FOR REPORTING

SATELLITE PAYLOAD STATUS

USING SIT 605

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
_____	1,2,3	/12345 00000/2730/97 123 1234
	4,5	/605/5030
	41	/ TO: ALL MCCS FROM: CMC SUBJECT: DECLARATION OF OPERATION FOR COSPAS-6 SAR PAYLOAD DATA CONSIDERED OPERATIONAL IN COSPAS-SARSAT (WWW.COSPAS-SARSAT.INT) ---------- 406 SARR: NOT APPLICABLE 406 SARP (LOCAL): OPERATIONAL 406 SARP (GLOBAL): OPERATIONAL PSEUDO MODE: NOT APPLICABLE
INFO		STATUS OF SAR PAYLOAD (WWW.COSPAS-SARSAT.INT) ---------- L-BAND DOWNLINK: NORMAL 406 SARR: NOT APPLICABLE 406 SARR GAIN CONTROL: NOT APPLICABLE 406 SARP (LOCAL): DEGRADED 406 SARP (GLOBAL): DEGRADED PSEUDO MODE: NOT APPLICABLE BANDWIDTH: NOT APPLICABLE COMMENTS ---------- FAILURE IN ONE OF THE ON-BOARD DRUS QQQQ
	42	/LASSIT
	43	/ENDMSG
_____		
TRAILER		(as per communication network requirements if any)

SAMPLE MESSAGE FOR REPORTING
SATELLITE PAYLOAD STATUS
USING SIT 605

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
	1,2,3	/12345 00000/3160/97 123 1234
	4,5	/605/3660
	41	/ TO: ALL MCCS FROM: CMCC SUBJECT: CHANGE IN STATUS FOR SARSAT-4 SAR PAYLOAD DATA CONSIDERED OPERATIONAL IN COSPAS-SARSAT (WWW.COSPAS-SARSAT.INT) ---------- 406 SARR: NOT OPERATIONAL 406 SARP (LOCAL): OPERATIONAL 406 SARP (GLOBAL): OPERATIONAL PSEUDO MODE: NOT APPLICABLE STATUS OF SAR PAYLOAD (WWW.COSPAS-SARSAT.INT) ----------
INFO		L-BAND DOWNLINK: NORMAL 406 SARR: UNUSABLE 406 SARR GAIN CONTROL: NOT APPLICABLE 406 SARP (LOCAL): NORMAL 406 SARP (GLOBAL): NORMAL PSEUDO MODE: NOT APPLICABLE BANDWIDTH: NOT APPLICABLE COMMENTS ---------- THE 406 SARR IS NO LONGER USABLE, IT SHOULD NOW BE CONSIDERED NOT OPERATIONAL QQQQ
	42	/LASSIT
	43	/ENDMSG
TRAILER		(as per communication network requirements if any)

SAMPLE MESSAGE FOR REPORTING

SATELLITE PAYLOAD STATUS

USING SIT 605

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
_____	1,2,3	/12345 00000/2730/97 123 1234
	4,5	/605/5030
	41	/ TO: ALL MCCS FROM: CMC SUBJECT: DECOMMISSIONING OF COSPAS-5 SAR PAYLOAD DATA CONSIDERED OPERATIONAL IN COSPAS-SARSAT (WWW.COSPAS-SARSAT.INT) ---------- 406 SARR: NOT APPLICABLE 406 SARP (LOCAL): NOT OPERATIONAL 406 SARP (GLOBAL): NOT OPERATIONAL PSEUDO MODE: NOT APPLICABLE STATUS OF SAR PAYLOAD (WWW.COSPAS-SARSAT.INT) ---------- L-BAND DOWNLINK: UNUSABLE 406 SARR: NOT APPLICABLE 406 SARR GAIN CONTROL: NOT APPLICABLE 406 SARP (LOCAL): UNUSABLE 406 SARP (GLOBAL): UNUSABLE PSEUDO MODE: NOT APPLICABLE BANDWIDTH: NOT APPLICABLE COMMENTS ---------- COSPAS-5 DECOMMISSIONED ON FEBRUARY 5 1996 QQQQ
INFO	42	/LASSIT
	43	/ENDMSG
_____		
TRAILER		(as per communication network requirements if any)

SAMPLE MESSAGE FOR REPORTING

SATELLITE PAYLOAD STATUS

USING SIT 605

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
_____	1,2,3	/12345 00000/3660/97 123 1234
	4,5	/605/5030
	41	/ TO: ALL MCCS FROM: USMCC SUBJECT: DECLARATION OF OPERATION FOR GOES-9 SAR PAYLOAD DATA CONSIDERED OPERATIONAL IN COSPAS-SARSAT (WWW.COSPAS-SARSAT.INT) ---------- 406 SARR: OPERATIONAL
INFO		STATUS OF SAR PAYLOAD (WWW.COSPAS-SARSAT.INT) ---------- 406 SARR: NORMAL 406 SARR GAIN CONTROL: AUTOMATIC BANDWIDTH: 406.005 - 406.045 POSITION: 135 W DOWNLINK FREQUENCY/TYPE: 1544.5 MHZ / BROAD COMMENTS ---------- GOES-9 SHOULD BE CONSIDERED OPERATIONAL AS OF 5 MAY 1995 QQQQ
	42	/LASSIT
	43	/ENDMSG
_____		
TRAILER		(as per communication network requirements if any)

SAMPLE MESSAGE FOR

SIT 925

FORMAT FRAMES	MF #	CONTENT
HEADER		(as per communication network requirements if any)
	1,2,3	/12345 00000/3160/94 194 2200
	4,5	/925/3660
	22	/A78D00597040401
INFO	41	/ FROM: CMCC TO: USMCC SUBJECT: BEACON REGISTRATION INFORMATION BEACON INFO: FF 0/PF 1/CC 316/UC SER/ID 0005724/MODEL MAR/HS121/EC/AUT/00 HEX A78D0 05970 40401/LAT :::::/LNG :::::/:::/::::/:::/::/:: OWNER INFO: LAST NAME: COAST GUARD-M FIRST NAME: N/A COMPANY NAME: CCG DARTMOUTH BASE ADDRESS: P.O. BOX 1000 CITY: DARTMOUTH PROVINCE: NS COUNTRY: CANADA POSTAL CODE: B2Y SZ8 HOME PHONE: 123 45678 OFFICE PHONE: 987 654321 EXTENSION: PREFERRED LANGUAGE: ENGLISH COMMENTS: HOME NO: OPERATIONS NOTSHIP DESK (123 45678) BUSS NO: FLEET SUPERINTENDENT (987 654321) SEW WORKSHOP NO: (426 7017)
INFO		VESSEL INFO: NAME: CCGS SIR WILLIAM ALE REGISTRATION/LICENCE NUMBER: 807685 HOME PORT: DARTMOUTH CALL SIGN: CGUM VESSEL LENGTH: 83 METERS CLASS: COLOUR: VESSEL TYPE: GOVERNMENT HULL: RED HULL: SINGLE HULL SAIL: N/A PROPULSION: POWER INBOARD SUPER STRUCTURE: WHITE DISTINCTIVE FEATURE: HELO DECK AND HANGAR; LIGHT ICEBREAKER/BUOY TENDER COMMENTS: 1-28FT F.G. BOAT 1-28FT SELF-PROPELLED STEEL BARGE 1-15FT ZODIAC; 1-6 MAN LIFERAFT CELLULAR: 123 456789 QQQQ
	42	/LASSIT
	43	/ENDMSG
TRAILER		(as per communication network requirements if any)

Note: MF #41 THE NARRATIVE TEXT IN PRINTABLE CHARACTERS IS PLACED HERE, WITH NO MORE THAN 69 CHARACTERS PER LINE.

- END OF ANNEX C -

ANNEX D

USEFUL INFORMATION

(Standard Message Formats between MCC and RCC)

1. Acknowledgment of distress alert message:

FM: RCC
TO: MCC

DISTRESS ALERT REPORT (NUMBER)

A. MESSAGE RECEIVED

2. Request to repeat message:

FM: RCC
TO: MCC

DISTRESS ALERT REPORT (NUMBER)

A. REPEAT REQUESTED

3. SAR operation completed:

FM: RCC
TO: MCC

DISTRESS ALERT REPORT (NUMBER)

A. CASE CLOSED (SUSPENDED)
B. BEACON TURNED OFF

4. Request to "listen to" particular geographic area:

FM: RCC
TO: MCC

REQUEST FOR ALERT DATA

A. GEOGRAPHIC LOCATION
B. FREQUENCY
C. CANCELLATION DATE/TIME

5. Request for SAR data associated with satellite beacon:

FM: RCC
TO: MCC

REQUEST FOR ADDITIONAL INFORMATION FROM BEACON REGISTER

A. BEACON IDENTIFICATION CODE

- END OF ANNEX D -

ANNEX E

COSPAS-SARSAT STANDARD FOR THE TRANSMISSION OF MESSAGES VIA FTP

E.1 FILE TRANSFER PROTOCOL (FTP) COMMUNICATIONS

Each ground segment facility (e.g., MCC or LUT) communicating via FTP shall comply with the applicable standards described in the Internet Engineering Task Group document RFC 959 - File Transfer Protocol, which can be found at the following web address: www.ietf.org.

E.1.1 FILE NAMING CONVENTION

A ground segment facilityshall send a message by writing a file on the FTP server of the receiving facility. Each file shall contain exactly one message.

The FTP file name format shall be "?SRCE_?DEST_?CUR#.TXT", where:

- "?SRCE" is the name of the facility that originated this message (www.cospas-sarsat.int),
- "?DEST" is the name of the facility to which this message is being sent (www.cospas-sarsat.int), and

- "?CUR#" is the Current Message Number (Message Field 1).

The FTP file name shall contain only upper case characters. For example, a file with the name "USMCC_CMCC_02345.TXT" contains Current Message Number 02345 sent by the USMCC to the CMCC.

Any facility that wants to receive data via FTP shall provide the Host Name and/or Internet Protocol (IP) Address, User Name, Password, and Message Directory Name in Table F.1, to enable other ground segment facilities to place data on the FTP server of the receiving facility. On a bilateral basis, the receiving and sending facility should agree on passwords and other security measures. It is the responsibility of the receiving facility to provide adequate security for its FTP server.

The sending facility shall write a file with a file name extension of ".TMP" on the FTP server of the receiving facility. A file is given a temporary name to prevent the receiving facility from processing a file before it is complete. Once the file transfer is complete, the sending facility shall rename the file with an extension ".TXT". Once the file has been renamed, the sending facility shall not manipulate the file. The receiving facility shall not process files with an extension of

".TMP". The receiving facility shall be responsible for disposing of files placed on its FTP server.

If the receiving MCC detects an anomalous condition in the FTP file transfer, it shall notify the transmitting MCC. If an FTP file transfer fails for any reason the transmitting MCC shall try to resend the message, and notify the receiving MCC if the failure persists.

If the receiving MEOLUT detects an anomalous condition in the FTP file transfer, it shall notify its associated MCC. If an FTP file transfer fails for any reason the transmitting MEOLUT shall maintain a 10 minutes buffer of messages. Upon re-establishment of a connection the transmitting MEOLUT shall send the buffered messages. If MEOLUT FTP file transfer failures persist, the transmitting MEOLUT shall notify its associated MCC.

Each facility communicating via FTP shall operate in binary transfer mode.

E.2 FILE TRANSFER PROTOCOL (FTP) INFORMATION LIST

A list of information used to send messages to a facility via FTP is provided in this section. This list is composed of 6 items:

1. Receiving Ground Segment Facility.
2. Host Name.
3. IP Address.
4. User Name.
5. Password.
6. Message Directory Path.

E.2.1 Receiving Ground Segment Facility

The name of the ground segment facility to receive data via FTP. For an MCC, this name matches the MCC Identification Code in the Cospas-Sarsat website, www.cospas-sarsat.int. For a MEOLUT, this name matches the MEOLUT name in the Cospas-Sarsat website, (www.cospas-sarsat.int), noting that spaces are always replaced with an underscore ("_") character.

E.2.2 Host Name

This is the FTP Host Name of the receiving ground segment facility. ***

E.2.3 Internet Protocol (IP) Address

This is the Internet Protocol Address referenced to reach the receiving ground segment facility. ***

E.2.4 User Name

The User Name required to login to the FTP server of the receiving facility. If the value is "Sending Ground Segment facility Name", then the user name is the name of the sending ground segment facility, per the Cospas-Sarsat website (www.cospas-sarsat.int). ***

E.2.5 Password

The password required to access the FTP server of the receiving facility. ***

"*** indicates that the information is provided on a need to know basis."

E.2.6 Message Directory Path

The path of the directory into which message files shall be written. <facilityname> indicates that each facility will put messages in a sub-directory per facility, where the sub-directory name is the name of the sending facility, per the Cospas-Sarsat website, (www.cospas-sarsat.int).

E.3 SECURITY

All ground segment facilities with an Internet connection must be protected by firewall technology.

E.3.1 Passwords

Ground segment facilities shall formulate passwords using security best practices. The passwords shall have the following characteristics:

- contain at least 8 characters,
- not have any characters that are "blank",
- six of the characters shall occur once in the password,
- at least one of the characters must be a number (0-9) or a special character (~,!,$,#,%,*) – see Table E.1,
- at least one of the characters must be from the alphabet (upper or lower case),
- passwords shall not include:
  - words found in any dictionary (English or other language), spelled forward or backward,
  - system User Ids,

- addresses or birthdays,
- common character sequences (e.g., 123, ghijk, 2468),
- vendor-supplied default passwords (e.g., SYSTEM, Password, Default, USER, Demo),
- words that others might guess.

Ground segment facilities shall change passwords at least semi-annually.

To protect passwords from unauthorized disclosure facilities shall exchange passwords by telephone or facsimile if allowed by security authorities at each facility. Facilities shall coordinate the exchange of new passwords during the last full work week of April and October of each year. Facilities exchanging passwords shall agree on an implementation date that is not later than the end of the week during which new passwords are exchanged.

Table E.1: FTP Password Special Characters

SYMBOL	NAME
~	TILDE
!	EXCLAMATION POINT
@	AT SYMBOL
#	OCTOTHORPE
$	DOLLAR SIGN
%	PERCENT
^	CHAPEAU / HAT
&	AMPERSAND
*	ASTERIX
)	CLOSE PARENTHESES
(	OPEN PARENTHESES
`	APOSTROPHE
-	HYPHEN
“	QUOTATION
/	SLASH

E.3.2 Access

Access permissions on all directories and files on the FTP server shall follow the principle of “least permissions” to ensure that no unauthorized access is allowed. “Least permissions” means that each user is granted the minimum access required to perform their assigned tasks.
Facilities shall check IP addresses to limit server access only to authorized users.

Facilities shall allow access to their FTP servers only through ports 20 and 21. All other ports that are not being used shall be closed.

E.3.3 Anonymous FTP

Facilities shall not use anonymous FTP.

E.3.4 Encryption of Critical Information

Facilities shall implement methodologies to encrypt FTP login names (userids) and passwords during file transmission to prevent unauthorized disclosure. These methodologies include FTP over Internet Virtual Private Network (VPN). Standards for the use of hardware VPN are contained in Annex F.

E.3.5 Monitoring for a Potential Security Breach

Facilities shall monitor the FTP servers for abnormal activity. If a breach of security is found, ground segment facilities shall notify all FTP correspondents as soon as possible to minimize exposure.

Examples of items that should be monitored on a FTP server include:

Event logs:
should be set and checked for failed login attempts,
gaps in time and date stamps,
attempts to elevate privileges;

Disk Space:
unexplained loss of disk space,
unexplained disk access;

Unexplained events:
large number of failures (system or programs crash),
unexplained process or programs running,
new users added,
virus protection has been disabled.

E.3.6 Security Patches

Facilities shall apply the latest software and security patches to their FTP servers as soon as possible.

- END OF ANNEX E -

ANNEX F

COSPAS-SARSAT STANDARD FOR THE TRANSMISSION OF SIT MESSAGES VIA HARDWARE VPN

F.1 INTRODUCTION

A Virtual Private Network (VPN) provides a secure method to transmit information over the Internet. A tunnelling technology such as Internet Protocol IPSec is used to set up private connections between separate sites. A tunnel provides a means for forwarding data across a network from one site to another, as if they were directly connected.

Prior to an MCC setup/installation an MCC installer should ensure that the IP address range selected for the MCC's network does not conflict with the IP range of all other MCCs with which it may potentially connect.

IP conflicts will not stop the creation of the VPN tunnel but will prevent the transfer of data using FTP between the hosts.

This aspect is especially relevant when a new ground segment is being installed.

F.2 STANDARDS

F.2.1 Tunnelling

MCCs that use VPN to transmit data via the Internet shall use IPSec. IPSec is a framework of open standards developed by the Internet Engineering Task Force (IETF). IPSec provides security for transmission of sensitive information over the Internet. IPSec acts at the network layer, protecting and authenticating IP packets between participating IPSec devices ("peers"), such as Cisco routers.

IPSec provides the following network security services:

- Data Confidentiality - The IPSec sender can encrypt packets before transmitting them across a network.
- Data Integrity - The IPSec receiver can authenticate packets sent by the IPSec sender to ensure that the data has not been altered during transmission.
- Data Origin Authentication - The IPSec receiver can authenticate the source of the IPSec packets sent. This service is dependent upon the data integrity service.
- Anti-Replay - The IPSec receiver can detect and reject replayed packets.

F.2.2 Mutual Confirmation Method

This step performs the function of a negotiator. It will allow two IPSec nodes to decide which algorithms they will use for authentication and encryption, as well as how long this session will last. The Cospas-Sarsat standard is the PreShared Key Internet Key Exchange (IKE) method.

F.2.3 Code Algorithm (Crypto Algorithm)

This step applies a mathematical formula to the information to be encrypted. MCCs should implement the highest level of encryption that is available on a bilateral basis. Possible choices include:

- DES.
- 3DES.
- CAST128.
- Blowfish.

F.2.4 Confirmation Algorithm

This step applies an algorithm that is used to validate that both ends of a session (MCCs) are in fact who they claim to be. The Cospas-Sarsat standard is the MD5 confirmation algorithm.

F.2.5 Perfect Forward Security

Perfect Forward Security (PFS) should be set to group 1, 2, or 3.

F.2.6 Lifetime

Specify lifetime at an agreed standard time (e.g., 120 minutes).

F.3 HARDWARE CONFIGURATION

Hardware VPN is defined as any piece of commercial or industrial-grade hardware that supports international and non-proprietary VPN standards, for example IPSec. Some possible hardware VPN devices include, but are not limited to Routers, Concentrators, VPN appliances and Firewalls, in any combination.

These devices provide the security called for in section E.3.4 of the FTP standard (Annex E).

F.4 CONFIGURING FTPV BETWEEN MCCs

The following two templates can be used when configuring FTPVbetween two MCCs. The two MCCs are shown as XXMCC and YYMCC.

The first template,Table G.1, is used for configuring the VPN concentrators at each end of the VPN.

The second column lists all parameters configured on the XXMCC VPN concentrator. The third column lists all parameters configured on the YYMCC VPN concentrator. The IKE Peer Address on the XXMCC VPN concentrator is provided by YYMCC.The IKE Peer Address on the YYMCC VPN concentrators is provided by XXMCC. All other IKE and IPSEC parameters are the same on both VPN concentrators and must be negotiated by the two MCCs.

FTP-VPN Configuration		
	As Configured on the XXMCC VPN Concentrator	**As Configured on the YYMCC VPN Concentrator**
Peer Site ID	YYMCC	XXMCC
IKE Details		
IKE Peer Address		
IKE Encryption		
IKE Authentication		
IKE Key Exchange		
IKE Pre-Shared Key		
IKE Time Lifetime		
IKE Data Lifetime		
IPSEC Details		
IPSEC Encryption		
IPSEC Authentication		
IPSEC PFS		
IPSEC Data Lifetime		
IPSEC NAT-T		
IPSEC Encapsulation Mode		
IPSEC Connection Type		

Table F.1: Template for VPN Concentrator Parameters

The second template, Table G.2, lists the information required by each MCC to establish a FTP connection and to transmit SIT messages. The information in the second column lists all information required by XXMCC to transmit SIT messages to YYMCC. The information in the second column is provided by YYMCC for use by XXMCC. The third column lists all information required by YYMCC to transmit SIT messages to XXMCC. The information in the third column is provided by XXMCC for use by YYMCC.

FTP Server Logon Information		
	Used by XXMCC to Log onto YYMCC FTP Server	**Used by YYMCC to Log onto XXMCC FTP Server**
Remote Primary FTP Address		
Remote Secondary FTP Address		
FTP Username		
FTP Password		
Incoming Directory		
Data Transfer		

Table F.2: Template for FTP Server Logon Information

Examples of the templates are shown in the Tables F.3 and F.4 that list parameters and information that could be used by AUMCC and INMCC.

FTP-VPN Configuration		
	As Configured on the AUMCC VPN Concentrator	**As Configured on the INMCC VPN Concentrator**
Peer Site ID	INMCC	AUMCC
IKE Details		
IKE Peer Address	220.228.67.145	203.20.107.66
IKE Encryption	3DES-168	3DES-168
IKE Authentication	MD5/HMAC-128	MD5/HMAC-128
IKE Key Exchange	DH Group 2	DH Group 2
IKE Pre-Shared Key	***	***
IKE Time Lifetime	28800	28800
IKE Data Lifetime	10000	10000
IPSEC Details		
IPSEC Encryption	3DES-168	3DES-168
IPSEC Authentication	ESP/MD5/HMAC-128	ESP/MD5/HMAC-128
IPSEC PFS	Group 2	Group 2
IPSEC Data Lifetime	86400	86400
IPSEC NAT-T	Not Enabled	Not Enabled
IPSEC Encapsulation Mode	Tunnel	Tunnel
IPSEC Connection Type	Bi-directional	Bi-directional

Table F.3: Example of Template of VPN Concentrator Parameters

FTP Server Logon Information		
	Used by AUMCC to Log onto INMCC FTP Server	**Used by INMCC to Log onto AUMCC FTP Server**
Remote Primary FTP Address	106.104.13.110	203.119.16.99
Remote Secondary FTP Address	106.104.13.115	
FTP Username	***	***
FTP Password	***	***
Incoming Directory	.	.
Data Transfer	Binary	Binary

Table F.4: Example of Template of FTP Server Logon Information

Note that the IKE Pre-Shared Key, FTP Username and FTP Password are shown as "***" in the above tables as the information must be kept secure. Exchange of these details must be undertaken via fax or telephone only. Other details may be transmitted by email.

- END OF ANNEX F -

ANNEX G

COSPAS-SARSAT STANDARD FOR THE TRANSMISSION OF SIT MESSAGES VIA AFTN

1. INTRODUCTION

The Aeronautical Fixed Telecommunications Network (AFTN) is a worldwide system of aeronautical fixed circuits provided, as part of the aeronautical fixed service, for the exchange of messages, and/or digital data between aeronautical fixed stations having the same or compatible communications characteristics. Communication procedures for the AFTN are detailed in Annex 10 to the Convention on International Civil Aviation, Volume II, Communication Procedures, which can be downloaded from the ICAO web site.

AFTN provides a store-and-forward messaging service for the conveyance of text messages, which supports the entire character set authorised for use in Cospas-Sarsat SIT messages.

All AFTN messages include a Transmission Identification (TI) of the form “MSO003” where the TI is comprised of the Channel Identifier (CI) = “MSO” and the Channel Sequence Number (CSN)=”003”.

Channel checks (heartbeat) are undertaken between an AFTN station and its AFTN communication centre to ensure the link is available and for synchronising of message numbers. These checks are usually undertaken every twenty minutes on the hour and will contain a unique Channel Sequence Number (CSN).

Although the AFTN communications centre ensures that messages are received correctly in terms of the “heading, address, origin and ending syntax” the system does not perform checks to validate the message text. Some MCCs have reported corruption in AFTN messages. The corruption can be quite severe and obvious to the recipient, however at other times they may be extremely difficult to detect.

The ICAO AFTN standard requires long term retention of AFTN traffic records to be maintained for 30 days. The AFTN standard for retaining messages does not obviate the MCC archiving requirement specified in document C/S A.005 (MCC specification).

2. CATEGORIES AND PRIORITIES OF MESSAGES

The AFTN supports the following categories of messages:

a) distress messages;
b) urgency messages;
c) flight safety messages;
d) meteorological messages;
e) flight regularity messages;
f) aeronautical information services (AIS) messages;
g) aeronautical administrative messages; and
h) service messages.

Each AFTN message type has an associated message priority. Section 5 provides recommendations in respect of message priorities for the various SIT message types. The highest priority used in the AFTN is SS, followed by DD.

Distress messages (priority indicator SS)

This message category comprises those messages sent by mobile stations reporting that they are threatened by grave and imminent danger and all other messages relative to the immediate assistance required by the mobile station in distress.

AFTN requires that messages transmitted with an SS priority be acknowledged using the format defined by ICAO. MCCs should ensure that SS priority messages are acknowledged by the MCC itself.

Urgency messages (priority indicator DD)

This category comprises messages concerning the safety of a ship, aircraft or other vehicles, or of some person on board or within sight.

3. AFTN MESSAGE FORMAT

The AFTN message formats for the International Telegraph Alphabet No.2 (ITA2) and International Alphabet No.5 (IA5) formats are provided in Figures 1 and 2. AFTN messages are comprised of a header, message body (SIT MESSAGE), and trailer. The SIT message is to be inserted into the fields identified as “Message Text” indicated in Figures 1 and 2.

AFTN messages cannot exceed 2100 characters in total, and the content of the SIT message inserted into an AFTN message cannot exceed 1800 characters.

3.1 AFTN Address Indicator

An AFTN address comprises 8 characters of the form:

a) four-letter location indicator listed in ICAO document, Doc 7910, e.g., YSAR for the Australian RCC/AUMCC, Canberra;

b) three-letter designator as listed in ICAO document, Doc 8585, e.g., ZSZ (which has been allocated for Sarsat Centre) for the French MCC and YCY for the Norwegian MCC; and

c) an additional letter which can represent a department, division or process within the organization/function of the originator. The letter X shall be used to complete the eight-letter address when explicit identification is not required.

3.2 Multiple Address Distribution

AFTN includes a facility for distributing messages to multiple addresses. The use of this capability is not recommended for MCC to MCC communications since it reduces the effectiveness of message number sequence checking.

4. EXAMPLES OF AFTN MESSAGES

The following are examples of AFTN messages using the IA5 format:

a) Example of an SS Priority AFTN Message transmitted by the UKMCC to the FMCC:

```
UKZ003                          < Transmission Identification >
SS LFIAZSZX
050021 EGQPZSZX
/55325 00000/2320/04 065 0021
/126/2270/008/01
/2321/-4/+00108.0 001.0 -12.20/04 064 2156 11.05/0
/5/18.756/0000/18
/5116209D1E00104FF6F59000000000
/+273/+56.342/+119.438/000 002.7 001.2/77/00 000 0000/4/001.0 001.0
/+273/+70.036/+037.655/000 007.3 003.1/23/00 000 0000/3/004.0 003.0
/LASSIT
/ENDMSG
```

b) Example of an SS Priority Acknowledgement Message from FMCC to UKMCC:

```
FRZ457
SS EGQPZSZX
050022 LFIAZSZX
R 050021 EGQPZSZX
```

c) Example of a DD Priority AFTN Message transmitted by the SPMCC to the NMCC:

```
SPZ101
```

```
DD ENBOYCYX
260934 GCMPZSZX
/66934 00000/2240/04 054 0934
/115/2570/004/01
/2241/+2/+02400.0 018.2 -25.21/04 054 0919 07.00/0
/3/02.856/0000/01/0247 99
/+257/+55.394/+012.072/088 008.1 004.5/50/04 054 0956/3/005.4 030.8
/+232/+52.975/-013.808/118 008.2 004.6/50/04 054 0956/3/005.2 029.8
/LASSIT
/ENDMSG
```

5. RECOMMENDED SIT MESSAGE AFTN PRIORITIES

Table 1 provides the suggested AFTN priorities for the various SIT message types. MCCs may, on a bilateral basis, use different priorities from those suggested.

Table G.1: Suggested AFTN Priority for SIT Messages

SIT Number	Type	Suggested Priority	Comments
121, 141	406 INTERFERER NOTIFICATION	DD	
122, 142	406 INCIDENT (NO DOPPLER)	SS	
123, 143	406 POSITION CONFLICT (ENCODED ONLY)	SS	
124, 144	406 AMBIGUITY RESOLUTION (ENCODED ONLY)	SS	
125, 145	406 INCIDENT	SS	
126, 146	406 POSITION CONFLICT	SS	
127, 147	406 AMBIGUITY RESOLUTION	SS	
132, 136	406 NOTIFICATION OF COUNTRY OF REGISTRATION (ENCODED ONLY)	DD / SS	
133 & 137	406 NOTIFICATION OF COUNTRY OF REGISTRATION	DD / SS	
134, 138	406 RLSP (encoded only)	SS	
135, 139	406 RLSP	SS	
185	COSPAS-SARSAT DISTRESS ALERTS TO RCCs/SPOCs	DD / SS	
215	ORBIT VECTORS	DD	
415	SARP CALIBRATION	DD	
510	406 MHz SARR FREQUENCY CALIBRATION OFFSET	DD	
605	SYSTEM STATUS TO ALL MCCs	SS / DD	Operator to decide dependent upon content
915	NARRATIVE MESSAGES FOR MCCs	SS / DD	Operator to decide dependent upon content
925	406 BEACON REGISTRATION INFORMATION	DD / SS	

Message part		*Component of the message part*	*Element of the component*	*Teletypewriter signal*
HEADING (*see* 4.4.2.1)		Start-of-Message Signal	—	ZCZC
		Transmission Identification	a) One SPACE b) Transmitting-terminal letter c) Receiving-terminal letter d) Channel-Identification letter e) One FIGURE SHIFT f) Channel-sequence number (3 digits) (*Example:* NRA062)	→...↑...
		(If necessary) Additional Service Indication	a) One SPACE b) No more than 10 characters (*Example:* 270930)	
		Spacing Signal	Five SPACES One LETTER SHIFT	→→→→→↓
ADDRESS (*see* 4.4.3)	THE PERMANENT PART OF A MESSAGE	Alignment Function	One CARRIAGE RETURN, one LINE FEED	<≡
		Priority Indicator	The relevant 2-letter group	..
		Addressee Indicator(s)	One SPACE An 8-letter group given in sequence for each addressee (*Example:* → **EGLLZRZX→EDLLYKYX→EGLLACAM**)	
		Alignment Function(s)	One CARRIAGE RETURN, one LINE FEED	<≡
ORIGIN (*see* 4.4.4)		Filing Time	One FIGURE SHIFT The 6-digit date-time group specifying when the message was filed for transmission One LETTER SHIFT	↑ ..... ↓
		Originator Indicator	One SPACE The 8-letter group identifying the message originator	→ .....
		Priority Alarm *(used only in tele-typewriter operation for Distress Messages)*	One FIGURE SHIFT Five Signal No. 10 of Telegraph Alphabet No. 2 One LETTER SHIFT	↑ Attention ↓ Signal(s)
		Alignment Function	One CARRIAGE RETURN, one LINE FEED	<≡
TEXT (*see* 4.4.5)		Beginning of the Text	Specific identification of Addressee(s) *(if necessary) with* each followed by one CARRIAGE RETURN, one LINE FEED *(if necessary)* The English word FROM *(if necessary)* (*see* 4.4.5.2.3) Specific identification of Originator *(if necessary)* The English word STOP followed by one CARRIAGE RETURN, one LINE FEED *(if necessary)* (*see* 4.4.5.2.3); *and/or* Originator's reference *(if used)*	
		Message Text	Message Text with one CARRIAGE RETURN, one LINE FEED at the end of each printed line of the Text except for the last one (*see* 4.4.5.3)	
		Confirmation *(if necessary)*	a) One CARRIAGE RETURN, one LINE FEED b) The abbreviation CFM followed by the portion of the Text being confirmed	
		Correction *(if necessary)*	a) One CARRIAGE RETURN, one LINE FEED b) The abbreviation COR followed by the correction of an error made in the preceding Text	
		End-of-Text Signal	a) One LETTER SHIFT b) One CARRIAGE RETURN, one LINE FEED	↓<≡
ENDING (*see* 4.4.6)		Page-Feed Sequence	Seven LINE FEEDS	≡≡≡≡≡≡≡
		End-of-Message Signal	Four of the letter case of N (Signal No. 14)	NNNN
		Message-Separation Signal *(used only on message traffic transmitted to a "torn-tape" station)*	Twelve LETTER SHIFTS	↓↓↓↓↓↓↓↓↓↓↓↓
		Tape Feed (*see* 4.4.7)	Additional LETTER SHIFTS will appear at this point in instances where prior arrangements have been made for tape-feed transmissions to be employed on an incoming circuit (*see* 4.4.7).	

Legend: ↑ FIGURE SHIFT *(Signal No. 30)* ≡ LINE FEED *(Signal No. 28)* ↓ LETTER SHIFT *(Signal No. 29)*
→ SPACE *(Signal No. 31)* < CARRIAGE RETURN *(Signal No. 27)*

Figure G.1: Message Format International Telegraph Alphabet No.2 (ITA2)

Message part		*Component of the message part*	*Elements of the component*	*Teletypewriter character*
THE HEADING	HEADING LINE (*see* 4.4.15.1.1)	Start-of-Heading Character	One Character (0/1)	SOH
		Transmission Identification	a) Transmitting-terminal letter b) Receiving-terminal letter c) Channel-identification letter d) Channel-sequence number (*Example:* NRA062)	.....
		(If necessary) Additional Service Indication	a) One SPACE b) No more than the remainder of the line (*Example:* 270930)	→
	ADDRESS (*see* 4.4.15.2.1)	Alignment Function	One CARRIAGE RETURN, one LINE FEED	<≡
		Priority Indicator	The relevant 2-letter group	..
		Addressee Indicator(s)	One SPACE An 8-letter group given in sequence for each addressee (*Example:*→**EGLLZRZX→EGLLYKYX→EGLLACAD**)	
		Alignment Function(s)	One CARRIAGE RETURN, one LINE FEED	<≡
	ORIGIN (*see* 4.4.15.2.2)	Filing Time	6-digit date-time group specifying when the message was filed for transmission	.....
		Originator Indicator	a) One SPACE b) 8-letter group identifying the message originator	→.....
		Priority Alarm (used only in teletypewriter operation for Distress Messages)	Five characters (0/7)(BEL)	
		Optional Heading Information	Additional data not to exceed the remainder of the line. *See* 4.4.15.2.2.6.	
		Alignment Function	One CARRIAGE RETURN, one LINE FEED	<≡
		Start-of-Text Character	One character (0/2)	STX
TEXT (*see* 4.4.15.3)		Beginning of the Text	Specific identification of Addressee(s) *(if necessary)* *with* each followed by one CARRIAGE RETURN, one LINE FEED *(if necessary)* The English word FROM *(if necessary)* (*see* 4.4.15.3.5) Specific identification of Originator *(if necessary)* The English word STOP followed by one CARRIAGE RETURN, one LINE FEED *(if necessary)* (*see* 4.4.15.3.5) *and/or* Originator's reference *(if used)*	
		Message Text	Message Text with one CARRIAGE RETURN, one LINE FEED at the end of each printed line of the Text except for the last one (*see* 4.4.15.3.6)	
		Confirmation *(if necessary)*	a) One CARRIAGE RETURN, one LINE FEED b) The abbreviation CFM followed by the portion of the Text being confirmed	
		Correction *(if necessary)*	a) One CARRIAGE RETURN, one LINE FEED b) The abbreviation CDR followed by the correction of an error made in the preceding Text	
ENDING (*see* 4.4.15.3.12.1)		Alignment Function	One CARRIAGE RETURN, one LINE FEED	<≡
		Page-feed Sequence	One character (0/11)	VT
		End-of-Text character	One character (0/3)	ETX

Figure G.2: Message Format International Alphabet No.5 (IA5)

- END OF ANNEX G -

ANNEX H

IMPLEMENTATION PLAN FOR NEW COMMUNICATION LINKS

H.1 IMPLEMENTATION PHASES

H.1.1 Phase I - Internal Development and Testing

In order to implement a new communication link, each MCC must begin with a phase of internal development and testing. This may require the procurement of communication equipment, specialized hardware, physical connections and/or other communication provider services.

The key purpose of this phase is to ensure that the new communication link is properly installed, configured and coded. Ideally, a capability should be available within the MCC environment to facilitate near "real world" testing. Completion of comprehensive development and testing is essential before proceeding to subsequent phases.

H.1.2 Phase II - Nodal Level Testing and Activation

Nodal MCCs operate as central entities or "hubs" in the Cospas-Sarsat Network and should be capable of handling any new communication link or protocol. There is limited benefit for an MCC within a DDR to implement a protocol that the nodal MCC does not yet support.

Nodal MCCs can in effect validate the new communication link while also establishing it at the core level of the Cospas-Sarsat System network. Lessons learned and resulting adjustments made can be passed along to other MCCs to minimize costs resulting from redundant efforts. During this phase each nodal MCC coordinates bilaterally, first testing and then activating each link.

H.1.3 Phase III - DDR Level Testing and Activation

This phase provides for establishing a new communication protocol between the nodal MCC and each of the MCCs within its DDR. When this phase starts, the nodal MCC will have operational links with most other nodal MCCs, and the experience gained should facilitate efforts under Phase III.

H.1.4 Phase IV - System Wide Testing and Activation

This phase provides for establishing links between MCCs as well as between MCCs and SPOCs (or RCCs) as appropriate. The intent is to test and activate all links outside the standard nodal configuration, most importantly the connections between additional MCC pairings to support the transmission of Cospas-Sarsat narrative traffic. Communication agreements between neighbouring MCCs shall be addressed during this phase.

- END OF ANNEX H -

ANNEX I

PROTOCOL FOR THE TRANSMISSION OF SIT MESSAGES VIA ELECTRONIC MAIL (EMAIL)

I.1 EMAIL COMMUNICATIONS

I.1.1 Electronic mail is a store-and-forward method of composing, sending, receiving and storing messages over Internet or other networks.

I.1.2 Email is an optional means of communication that shall be adopted on a bilateral contingency basis. Email should be used during the period it takes to implement MCC backup procedures (less than 30 minutes) when AFTN and FTP-VPN have failed or are unavailable.

I.1.3 Email communication shall be organized via mail Servers announced by MCCs. In the main, these mail Servers are the ones used for general purpose unformatted communications between MCCs.

I.1.4 Mail Boxes shall be created at Mail Servers exclusively for exchange by SIT information.

I.1.5 An MCC shall create and send messages with SIT data which would be transmitted via Internet to Mail Box of the receiving MCC. The receiving MCC shall be responsible for disposing the messages received in its Mail Box to the SIT processing programs of MCC.

I.I.6 Where a front-end communications server is used for Email transmissions it shall adhere to the national Administration's Email security provisions. The following Cospas-Sarsat Email security provisions outlined in section I.3 may be used as a guide by national Administrations in addition to any government security measures.

I.2 MESSAGE FORMING CONVENTION

I.2.1 Each message shall contain exactly one SIT message. The message is formed of the following parts:

1. Receiving MCC Address (To),
2. Subject field,
3. Message Body.

I.2.2 Receiving MCC Address (To) is formed as Recipient-Name@Domain-Name and is received from corresponding MCC on need-to-know basis. Example: sit-reception-?777@marsat.ru

I.2.3 Subject field format shall include "?SRCE_?DEST_?CUR#.", where:
- "?SRCE" is the Source MCC Name (per www.cospas-sarsat.int),
- "?DEST" is the Destination MCC Name (per www.cospas-sarsat.int), and
- "?CUR#" is the Current Message Number (Message Field 1).

The Subject field shall contain only upper case characters. For example, a file with the name "USMCC_CMCC_02345" contains Current Message Number 02345 sent by the USMCC to the CMCC.

I.2.4 Message Body shall be created using SIT conventions so only text mode will be used. No attachments should be included in the message.

I.3 SECURITY

I.3.1 To ensure security of the Cospas-Sarsat System MCCs using Email for SIT messages transmission must be protected by firewall. The computer used for email communications should be protected inside a demilitarized zone (DMZ).

I.3.2 The Software Firewall used shall be limited to highest level of security.

I.3.3 Message shall be encrypted to prevent corruption.

I.3.4 Adequate filters shall be implemented (on Email address, electronic signature, IP address, etc.). These controls shall be made before the messages are processed by MCC system.

I.3.5 The identity of the sender shall be determined via a system check or via operational coordination.

I.3.6 Initial check of message formats (SIT format, filename, etc.) shall be undertaken prior to processing of the message by the MCC. Any non-conforming message shall be rejected and an alarm raised to allow operator intervention.

I.3.7 Receipt of multiple redundant messages shall result in a alarm being raised to allow for operator intervention.

I.3.8 Routine Cospas-Sarsat message number checks shall be adopted to identify any message loss including operational checks during periods of low message traffic exchange.

I.3.9 All transmitted messages shall be archived.

- END OF ANNEX I -

- END OF DOCUMENT -

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