



SIT 185
Distress
Messages
for
FGB ELT(DT)s

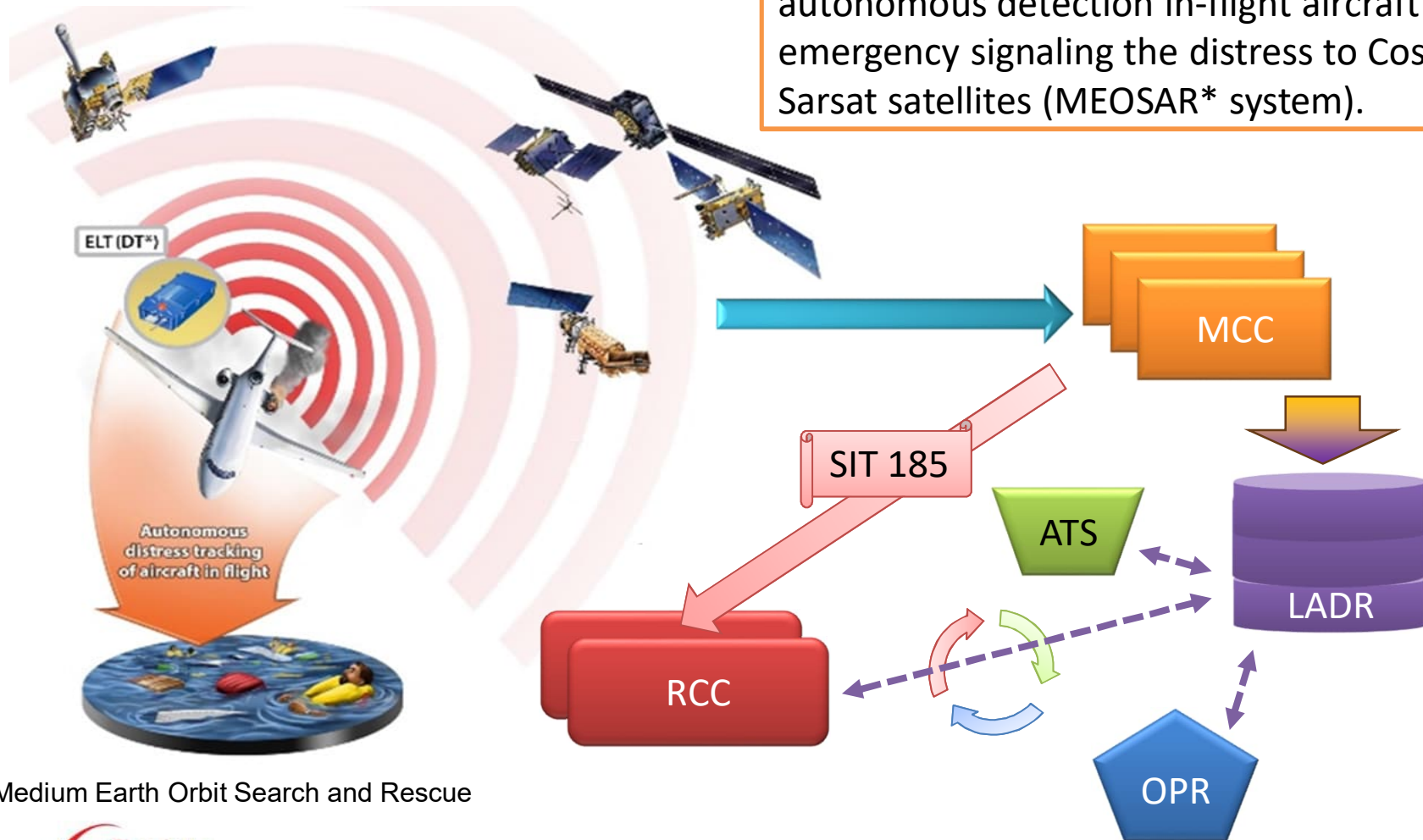
Cospas-Sarsat
Secretariat



SAR Workshop
(Cyprus 5-6 October 2023)

ELT(DT) for Distress Tracking

ELT(DT) activates independently upon autonomous detection in-flight aircraft emergency signaling the distress to Cospas-Sarsat satellites (MEOSAR* system).



* Medium Earth Orbit Search and Rescue

Sample ELT(DT) SIT185 message

1. **DISTRESS TRACKING** COSPAS-SARSAT DOA POSITION CONFLICT ALERT

2. MSG NO 21013 CMCC REF 1D1200F03BBFDFF

3. BEACON MESSAGE INFORMATION

BEACON TYPE **ELT DISTRESS TRACKING**

AIRCRAFT 24 BIT ADDRESS 01E077 ASSIGNED TO G BRITAIN

AIRCRAFT OPERATOR DESIGNATOR MMB

HEX ID 1D1200F03BBFDFF

COUNTRY OF BEACON REGISTRATION 232/G BRITAIN

ACTIVATION TYPE MANUAL

GNSS POSITION PROVIDED BY EXTERNAL DEVICE

4. ALERT POSITION INFORMATION

DETECTED AT 04 AUG 20 101501 UTC BY MEOSAR

ALERT LAST DETECTED AT 04 AUG 20 101501 UTC

GNSS - 01 54.40 N 045 37.53 E

UPDATE TIME WITHIN 2 - 60 SECONDS OF DETECTION TIME

ALTITUDE OF GNSS LOCATION BETWEEN 1600 AND 2200 METRES (BETWEEN 5200 AND 7200 FEET)

DOA - 02 00.1 N 046 06.2 E

5. OTHER INFORMATION

GNSS POSITION UNCERTAINTY PLUS-MINUS 2 SECONDS OF LATITUDE AND LONGITUDE

DETECTION FREQUENCY 406.0400 MHZ

POSITION CONFLICT BASED ON DISTANCE SEPARATION OF AT LEAST 20 KM

ELT(DT) POSITION DOES NOT REFERENCE ANY PREVIOUS POSITION

6. REMARKS

THIS DISTRESS TRACKING MESSAGE IS BEING SENT TO APPROPRIATE SAR AUTHORITIES

PROCESS THIS ALERT ACCORDING TO RELEVANT REQUIREMENTS

END OF MESSAGE

6 Paragraphs

Para. 1: Message Type

1. **DISTRESS TRACKING** COSPAS-SARSAT DOA POSITION CONFLICT ALERT

Para. 2: Msg # and MCC ref

2. MSG NO 21013 CMCC REF 1D1200F03BBFDFF

Para. 3: Beacon Msg Information

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Para. 4: Alert Position Information

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Para. 5: Other information

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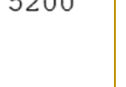
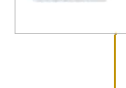
Para. 6: Remarks

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PROCESS THIS ALERT ACCORDING TO RELEVANT REQUIREMENTS

END OF MESSAGE



1. Message Type

1. DISTRESS TRACKING COSPAS-SARSAT DOA POSITION CONFLICT ALERT

- **Distress Tracking Cospas-Sarsat** => for an ELT(DT)
- **DOA¹ Position Conflict Alert** => Detection is provided by MEOSAR system, but the DOA position does not match the GNSS² position provided by the beacon.

This is not abnormal because the target is moving at high speed, and the MEOSAR system is not commissioned for determining accurate position in such case.

For an FGB ELT(DT), the DOA position is optional information.

The GNSS position should be the one to rely on. The GNSS position will also be the one sent to the LADR³.

1- Difference of Arrival (MEOSAR system processing is based on time and frequency difference)

2- Global Navigation Satellite System (e.g., GPS, Galileo, Glonass, BDS)

3- Location of an Aircraft in Distress Repository

1. Message Type

1. DISTRESS TRACKING COSPAS-SARSAT DOA POSITION CONFLICT ALERT

- Possible values:

- **INITIAL ALERT (UNLOCATED)** => no position provided => sent to Country of Rg,
- **INITIAL LOCATED ALERT** => message for 1st detection when positions match
- **POSITION CONFLICT ALERT** => DOA¹ position does not match GNSS² position
- **DOA POSITION MATCH ALERT** => to remedy a previous position conflict alert
- **POSITION UPDATE ALERT** => new position
- **NOTIFICATION OF COUNTRY OF BEACON REGISTRATION ALERT**
=> when located, 2nd info is sent to the SPOC³ CoR
- **USER CANCELLATION ALERT** => alert has been cancelled by the user (same means)
- **UNRESOLVED DOPPLER POSITION MATCH ALERT**
=> 2nd LEOSAR pass is not able to resolve the ambiguity (2 similar sat. passes)
- **ROTATING FIELD UPDATE ALERT** => Similar position but new embedded information (Second Gen. Bcn only)
- **UPDATED ALERT UNLOCATED** => New information but still unlocated

1- Difference of Arrival

2- Global Navigation Satellite System (e.g., GPS, Galileo, Glonass, BDS)

3- SAR Point of Contact



2. Msg Number and MCC reference

2. MSG NO 21013 CMCC REF 1D1200F03BBFDFF

- **MSG NO 21013**

=> Sequential Msg Number assigned by MCC, per SPOC

- **CMCC REF 1D1200F03BBFDFF**

=> Here, detection is provided by Canadian MCC.

=> Here, the reference is the beacon Hex ID (UIN).

The MCC beacon reference is a unique designator to identify all messages sent for that beacon event. It could be a sequenced number instead.

1- SAR Point of Contact,

2- 15-hexadecimal-digit identifier of the beacon also named UIN,

3- Unique Identification Number



3. Beacon Message Information 1/2

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3. BEACON MESSAGE INFORMATION
   BEACON TYPE ELT DISTRESS TRACKING
   AIRCRAFT 24 BIT ADDRESS 01E77 ASSIGNED TO G.BRITAIN
   AIRCRAFT OPERATOR DESIGNATOR MMB
   [...]
```

- **ELT DISTRESS TRACKING** => types are ELT DISTRESS TRACKING, ELT, EPIRB, PLB.
- **AIRCRAFT 24-BIT ADDRESS 01E77**
=> the “Mode S” in hexadecimal format.
=> TAC¹ & S/N - A/C OPR Designator & S/N - A/C 24-bit Address³- (Radio Call Sign) - (MMSI²)
- **AIRCRAFT OPERATOR DESIGNATOR MMB**
=> 3-Letter Designator (3LD) OPR code provided in the rotating field of the FGB.
=> See ICAO Doc 8585.

1- Type-Approval Certificate

2- Maritime Mobile Service Identity (9-digits number starting with the Maritime Identification Digits (MID))

3- Only FGB ELT(DT) protocol compatible with the LADR

3. Beacon Message Information 2/2

3. BEACON MESSAGE INFORMATION [...]
HEX ID 1D1200F03BBFDFF
COUNTRY OF BEACON REGISTRATION 232/G.BRITAIN
[HOMING SIGNAL NIL]
ACTIVATION TYPE MANUAL
GNSS POSITION PROVIDED BY EXTERNAL DEVICE

- **HEX ID 1D1200F03BBFDFF**
=> UIN (0-9 and A-F char.) (see [new decoder \(2021\)](#) on the Cospas-Sarsat website)
- **COUNTRY OF BEACON REGISTRATION 232/G.BRITAIN**
=> from the beacon coding (= Maritime Identification Digits (MID) allocated by ITU)
- **[HOMING SIGNAL NIL]** => 121.5 MHz not mandatory for ADT. Lines with “NIL” can be omitted
- **ACTIVATION TYPE MANUAL** => MANUAL by the crew.
=> AUTOMATIC BY G SWITCH – POSSIBLE CRASH*
=> AUTOMATIC BY EXTERNAL MEANS (AVIONICS)*
- **GNSS POSITION PROVIDED BY EXTERNAL DEVICE**
=> EXTERNAL by the avionics
=> INTERNAL by the beacon itself if disconnected from the avionics

1- 15-hexadecimal-digit identifier of the beacon also named UIN
2- Unique Identification Number



4. Alert Position Information 1/2

4. ALERT POSITION INFORMATION

DETECTED AT 04 AUG 20 101501 UTC BY MEOSAR

ALERT LAST DETECTED AT 04 AUG 20 101501 UTC

GNSS - 01 54.40 N 045 37.53 E

- **DETECTED AT 04 AUG 20 101501 UTC BY MEOSAR**
=> First detection DD-MM-YY HH-MM-SS (could also be GEOSAR – very rarely)
- **ALERT LAST DETECTED AT 04 AUG 20 101501 UTC**
=> Here, first and latest detections are the same
- **GNSS – 01 54.40 N 045 37.53 E**
=> Latest position (Degrees & Minutes); here provided by the external device*

4. Alert Position Information 2/2

4. ALERT POSITION INFORMATION

[...]

UPDATE TIME WITHIN 2 – 60 SECONDS OF DETECTION TIME

ALTITUDE OF GNSS LOCATION BETWEEN 1600 AND 2200 METRES

(BETWEEN 5200 and 7200 FEET)

DOA – 02 00.1 N 046 06.2 E

- **UPDATE TIME WITHIN 2 – 60 SECONDS**

=> Update of the GNSS position is done at least one every minute (see GADSS/ADT).

=> Could be 0 – 2 SECONDS / 2 – 60 SECONDS / 1 MINUTE TO 4 HOURS

- **ALTITUDE OF GNSS LOCATION BETWEEN [...]**

=> Optional / Within one of the 15 ranges for FGB ELT(DT)s (4 bits: 109-112).

=> [BLW – 04 – 08 – 12 – 16 – 22 – 28 – 34 – 40 – 48 – 56 – 66 – 76 – 88 – 100 – ABV]
x 100 , then Default.

- **DOA – 02 00.1 N 046 06.2 E**

=> Latest position (Degrees & Minutes) provided by the MEOSAR system independently



5. Other Information

5. ALERT POSITION INFORMATION

GNSS POSITION UNCERTAINTY PLUS-MINUS 2 SECONDS OF LATITUDE AND LONGITUDE

DETECTION FREQUENCY 406.0400 MHZ

POSITION CONFLICT BASED ON DISTANCE SEPARATION OF AT LEAST 20 KM

ELT(DT) POSITION DOES NOT REFERENCE ANY PREVIOUS POSITION

- **GNSS POSITION UNCERTAINTY PLUS-MINUS 2 SECONDS OF LATITUDE AND LONGITUDE**

- => According to bits available for coding info, 2 seconds of angle is the best accuracy.

- => Other value is '15 minutes' of angle if the message does not provide the 'refined' position in the rotating field of the beacon (PDF-2), but provides the OPR 3LD identifier i/o.

- **DETECTION FREQUENCY 406.0400 MHZ**

- => Could be useful for SAR units equipped with 406-MHz homers if the beacon resists the crash.

- **POSITION CONFLICT BASED ON DISTANCE SEPARATION OF AT LEAST 20 KM**

- => Here, distance between MEOSAR DOA position and GNSS position = 55 km

- **ELT(DT) POSITION DOES NOT REFERENCE ANY PREVIOUS POSITION**

- => This is the first detection for this beacon. Other messages should come.



6. Remarks

6. REMARKS

THIS DISTRESS TRACKING MESSAGE IS BEING SENT TO APPROPRIATE SAR
AUTHORITIES

PROCESS THIS ALERT ACCORDING TO RELEVANT REQUIREMENTS

Administrations should follow defined national SAR procedures for responding to the activation of an ELT(DT).

Because the alert is likely emanating from an aircraft still in flight, DISTRESS TRACKING alert messages should be sent to an Aeronautical RCC (ARCC) which should rapidly liaise with relevant ATSU(s) and airline operator(s) as specified in dedicated annexes to the ICAO Convention, IAMSAR Manual (ICAO document DOC 9731), and GADSS documentation.



Training Materials

- RCC Handbook G.007
- Videos

moodle

You
Tube



<https://www.cospas-sarsat.int/en/search-and-rescue/programme-videos-en>
<https://moodle.406.org/>

Questions ?

<https://www.cospas-sarsat.int/en/pro>

The screenshot displays the COSPAS-SARSAT website interface. At the top, the header includes the logo 'COSPAS-SARSAT INTERNATIONAL SATELLITE SYSTEM FOR SEARCH AND RESCUE 406TH DISTRESS ALERTING SERVICE' and navigation options for 'Français' and 'Русский'. A red navigation bar contains the following menu items: SYSTEM, BEACONS, DOCUMENTS (highlighted with a green box), MEETINGS, and CONTACT LISTS. Below the navigation bar, a grid of service icons is visible: Beacon Message Decode (orange), QMS (yellow), Beacon Coding Guide (blue), and IBRD (red). A dropdown menu for 'DOCUMENTS' is open, listing 'System Documents' (including System Documents, Glossary, Handbook of Beacon Regulations, and RCC Handbook) and 'System Data' (including System Data). A green arrow points from the 'DOCUMENTS' menu item to the 'Handbook of Beacon Regulations' link. On the right side, there is a 'Documents' section with a list of links: Beacon Manufacturer Survey 2023, History and Experience of the Programme, Information Bulletin, Reference Material of Other Intergovernmental Organizations, and Templates and Forms. Below this, a 'Latest NEWS' section is partially visible. The footer features the COSPAS-SARSAT logo and the text 'What is a Cospas-Sarsat'.

