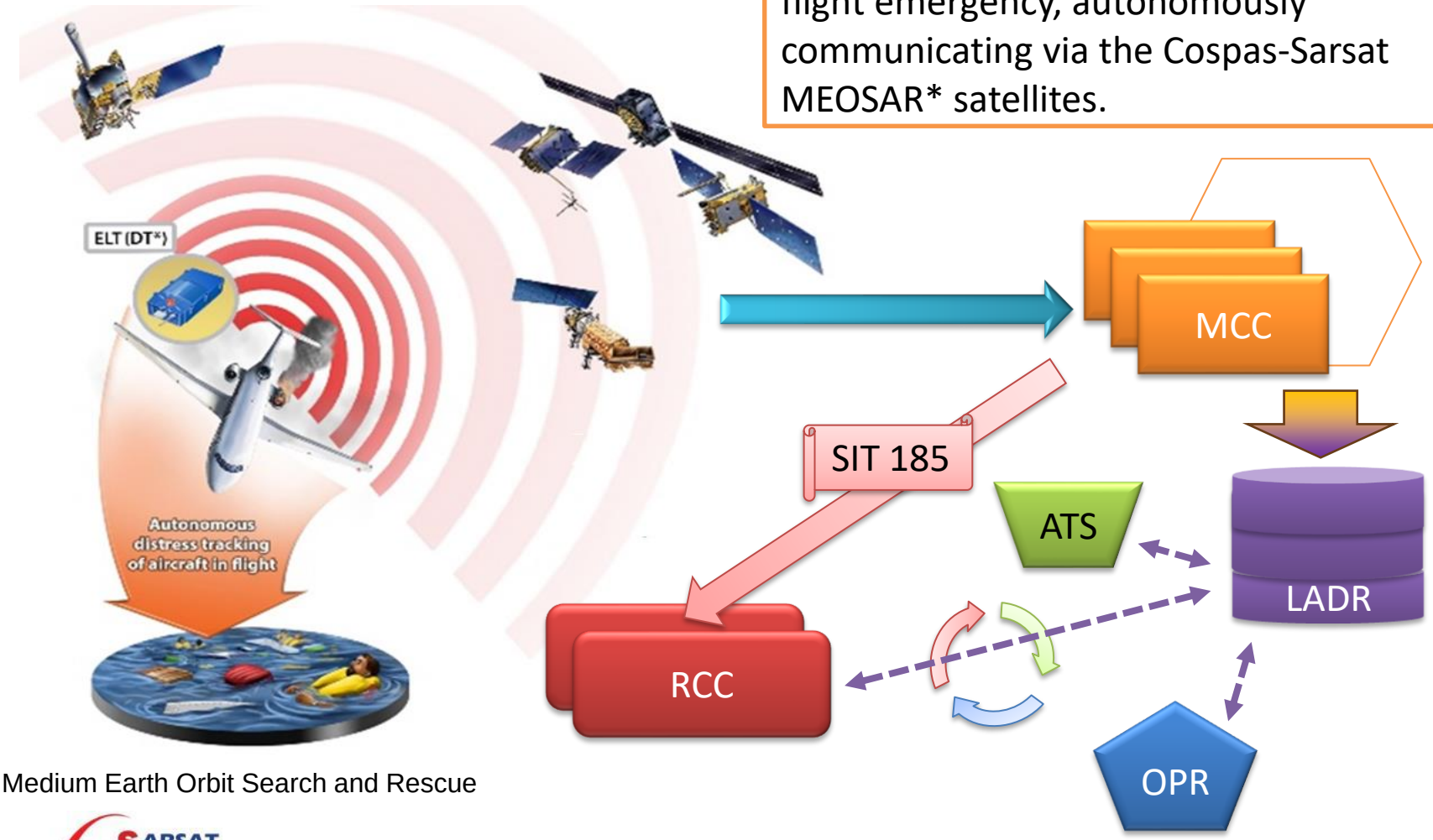
SIT 185 Distress Messages for FGB ELT(DT)s

Cospas-Sarsat Secretariat

APSARWG - 9
(Bangkok 07-10 May 2024)

ELT(DT) for Distress Tracking

ELT(DT)S activate after detection of an in-flight emergency, autonomously communicating via the Cospas-Sarsat MEOSAR* satellites.



* Medium Earth Orbit Search and Rescue

Sample ELT(DT) SIT185 message

6 Paragraphs

1. **DISTRESS TRACKING** COSPAS-SARSAT POSITION UPDATE ALERT
2. MSG NO 21013 NMCC REF 901456
3. BEACON MESSAGE INFORMATION

   BEACON TYPE **ELT DISTRESS TRACKING**

   AIRCRAFT 24 BIT ADDRESS 41E077 ASSIGNED TO G BRITAIN

   AIRCRAFT OPERATOR DESIGNATOR MMB

   HEX ID 1D1220F03BBFDFF

   COUNTRY OF BEACON REGISTRATION 232/G BRITAIN

   ACTIVATION TYPE AUTOMATIC BY EXTERNAL MEANS (AVIONICS)

   GNSS POSITION PROVIDED **BY EXTERNAL DEVICE**
4. ALERT POSITION INFORMATION

   GNSS - 61 54.40 N 045 37.53 W

   UPDATE TIME WITHIN 2 – 60 SECONDS OF DETECTION TIME

   ALTITUDE OF GNSS LOCATION BETWEEN 1600 AND 2200 METRES

   (BETWEEN 5200 AND 7200 FEET)
5. OTHER INFORMATION

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

   DETECTION FREQUENCY 406.0400 MHZ
6. REMARKS

   THIS DISTRESS TRACKING MESSAGE IS BEING SENT TO APPROPRIATE SAR AUTHORITIES

   PROCESS THIS ALERT ACCORDING TO RELEVANT REQUIREMENTS

END OF MESSAGE

Para. 1: Message Type

Para. 2: Msg # and MCC ref

Para. 3:
Beacon Msg Information

Para. 4:
Alert Position Information

Para. 5:
Other information

Para. 6:
Remarks

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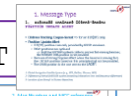





1. Message Type

1. DISTRESS TRACKING COSPAS-SARSAT
POSITION UPDATE ALERT

- **Distress Tracking Cospas-Sarsat** => for an ELT(DT) only
- **Position Update Alert**
  - ELT(DT) positions are only provided by GNSS[1] receivers.
  - DOA[2] positions are optional
    => Until the MEOSAR system is able to process fast-moving beacons, the MEOSAR DOA position is not provided.
  - Because of strong Doppler effect when the beacon is moving fast, the LEOSAR position based on this principle shall not be provided.
  - The GNSS position is the one sent to the LADR[3].

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

2- Difference of Arrival (MEOSAR system processing is based on time and frequency differences)

3- Location of an Aircraft in Distress Repository

1. Message Type

1. DISTRESS TRACKING COSPAS-SARSAT POSITION UPDATE ALERT

- Possible values:
  - **INITIAL ALERT (UNLOCATED)** => no position provided => sent to Country of Rg,
  - **INITIAL LOCATED ALERT** => message for 1st detection when DOA positions match
  - **POSITION CONFLICT ALERT** => DOA[1] position does not match GNSS[2] 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 SPOC[3] C.of.Reg.
  - **USER CANCELLATION ALERT** => alert has been cancelled by the user (same means)
  - **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 NMCC REF 901456

- MSG NO 21013

  => Sequential Msg Number assigned by MCC, per SPOC[1]

- NMCC REF 901456

  => Here, detection is provided by Norwegian MCC.

  => Here, the reference is the folder number;
  sometimes it is the beacon Hex ID[2] (UIN[3]).

The MCC beacon reference is a unique designator to identify all messages sent for that beacon event.

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.
  => TAC[1] & S/N - A/C OPR Designator & S/N - A/C 24-bit Address[3] - (Radio Call Sign) - (MMSI[2])

- 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 for FGB ELT(DT) protocol compatible with the LADR

3. Beacon Message Information 2/2

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3.  BEACON MESSAGE INFORMATION […]
    HEX ID 1D1200F03BBFDFF
    COUNTRY OF BEACON REGISTRATION 232/G.BRITAIN
    [HOMING SIGNAL NIL]
    ACTIVATION TYPE AUTOMATIC BY EXTERNAL MEANS (AVIONICS)
    GNSS POSITION PROVIDED BY EXTERNAL DEVICE
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- HEX ID[1] 1D1200F03BBFDFF

  => UIN[2] (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 avionics or INTERNAL by the beacon (disconnected from avionics)

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

4. Alert Position Information

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4.  ALERT POSITION INFORMATION
        GNSS - 61 54.40 N 045 37.53 W
        UPDATE TIME WITHIN 2 - 60 SECONDS OF DETECTION TIME
        ALTITUDE OF GNSS LOCATION BETWEEN 1600 AND 2200 METRES
        (BETWEEN 5200 and 7200 FEET)
```

- GNSS – 61 54.40 N 045 37.53 W
  => Latest position (Deg. & Min.); here provided by the external device*
- UPDATE TIME WITHIN 2 – 60 SECONDS
  => GNSS position is updated at least once every minute (see GADSS).
  => Could be 0 – 2 SECONDS / 2 – 60 SECONDS / 1 MINUTE TO 4 HOURS
- ALTITUDE OF GNSS LOCATION BETWEEN 1600 AND 2200 METRES
  => Optional / Within one of the 15 ranges for FGB (4 bits: #109-#112).
  => [BLW – 04 – 08 – 12 – **16 – 22** – 28 – 34 – 40 – 48 – 56 – 66 – 76 – 88 – 100 – ABV]
  x 100 , then Default.

5. Other Information

5. ALERT POSITION INFORMATION
GNSS POSITION UNCERTAINTY PLUS-MINUS 2 SECONDS OF LATITUDE AND LONGITUDE
DETECTION FREQUENCY 406.0400 MHZ

- 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 survives the crash.

  ⇒ If the beacon is designed as Crash-Survivable, it should also include a 121.5 MHz transmitter.

6. Remarks

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   PROCESS THIS ALERT ACCORDING TO RELEVANT REQUIREMENTS
```

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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.

PROCESS THIS ALERT ACCORDING TO RELEVANT REQUIREMENTS

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

Training Materials

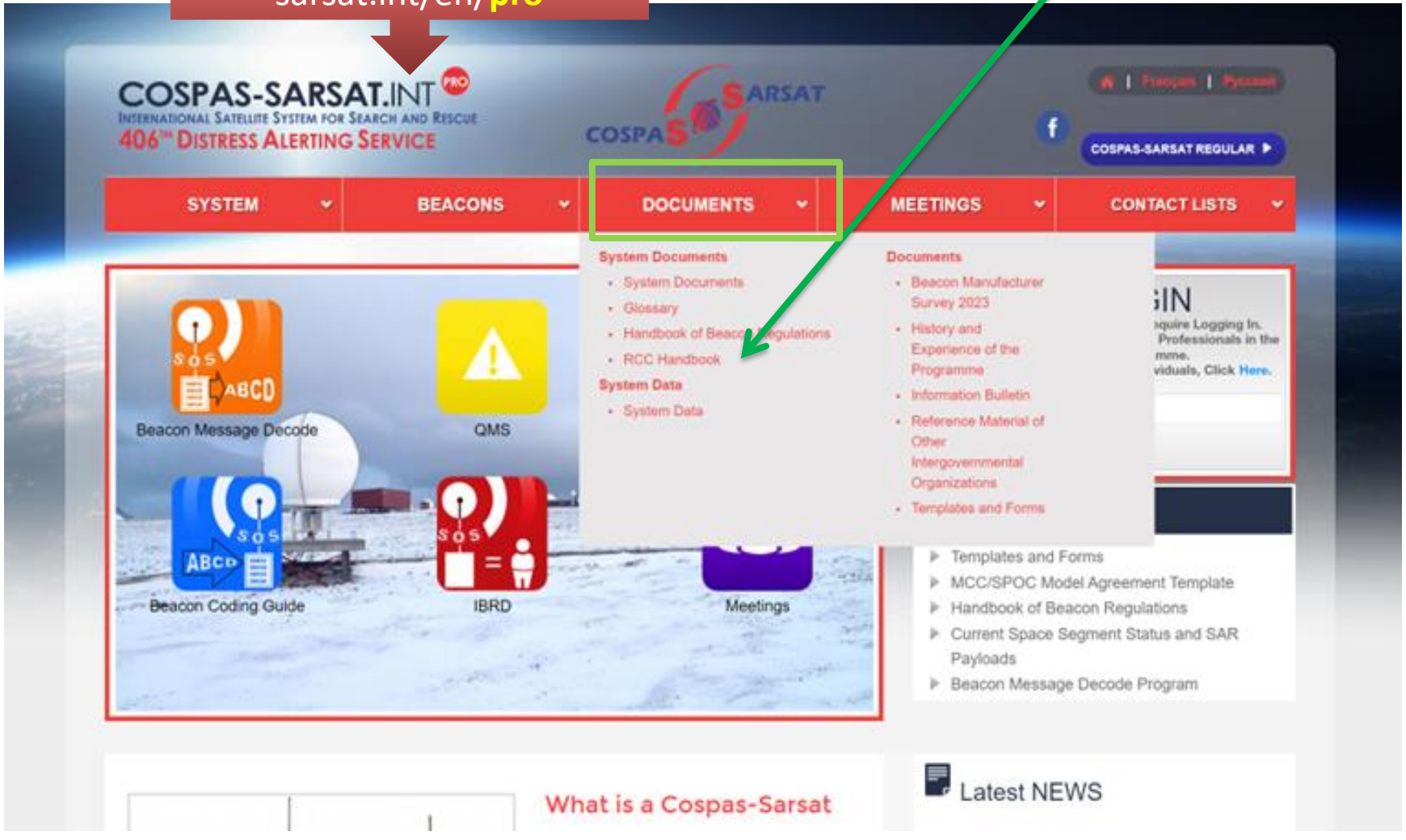
- RCC Handbook G.007
- Videos

https://www.cospas-sarsat.int/en/search-and-rescue/programme-videos-en

https://moodle.406.org/

Questions ?

https://www.cospas-sarsat.int/en/**pro**



THANKS FOR YOUR ATTENTION