



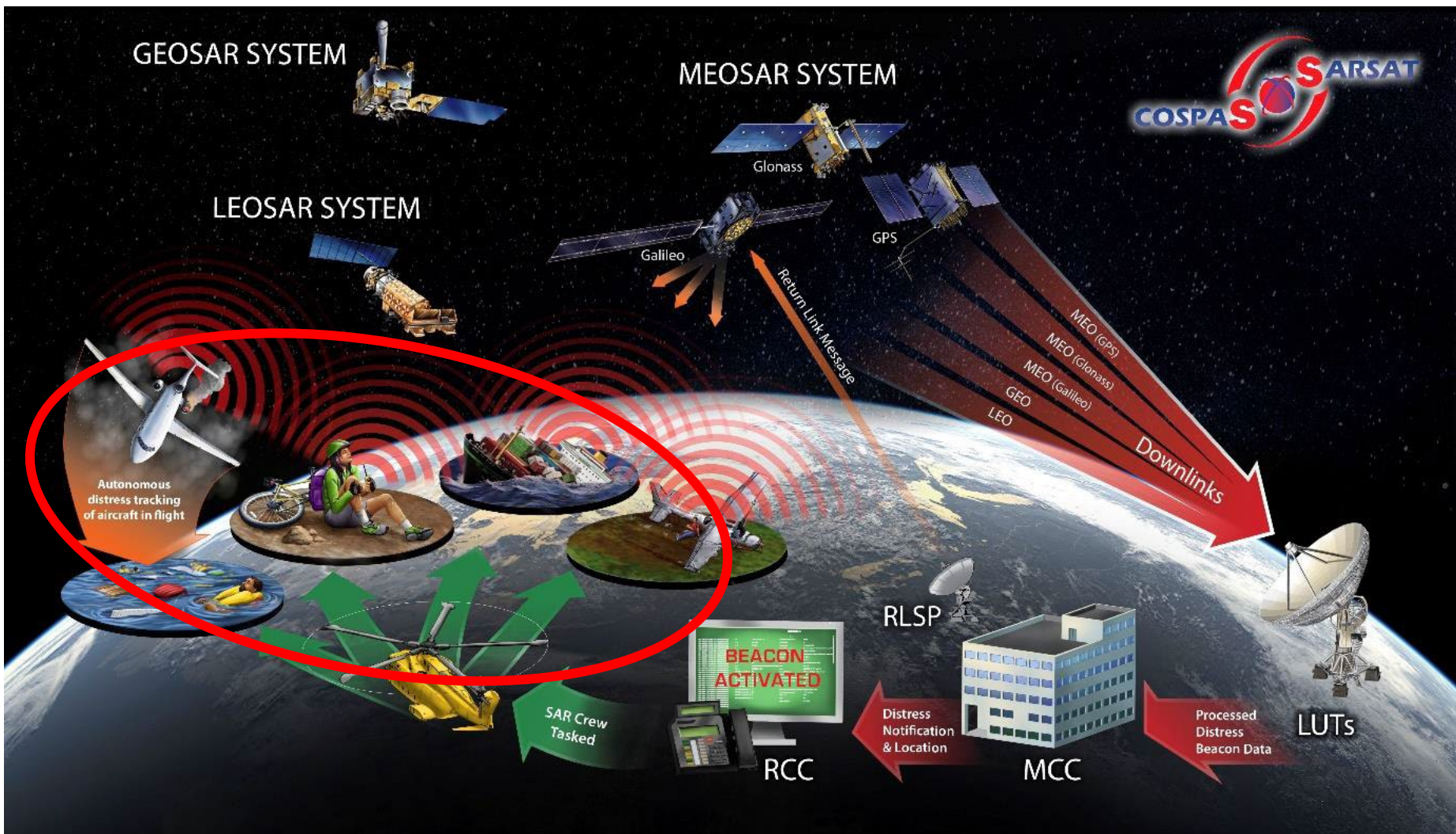
COSPAS-SARSAT System Overview

Third NAM/CAR Working Group Search and
Rescue Implementation Task Force Meeting
(NACC/WG/SAR/TF/3)

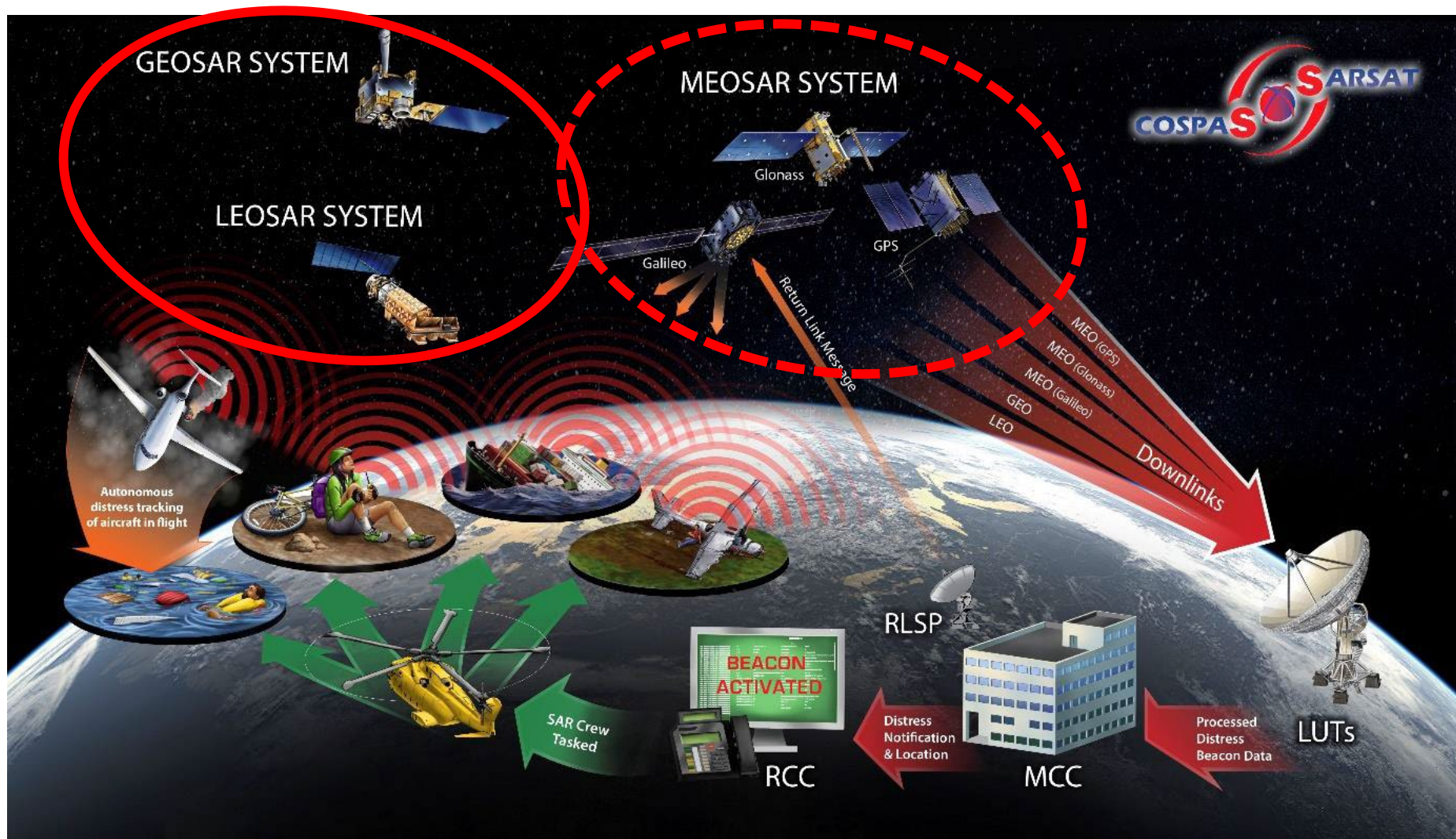
October 2022



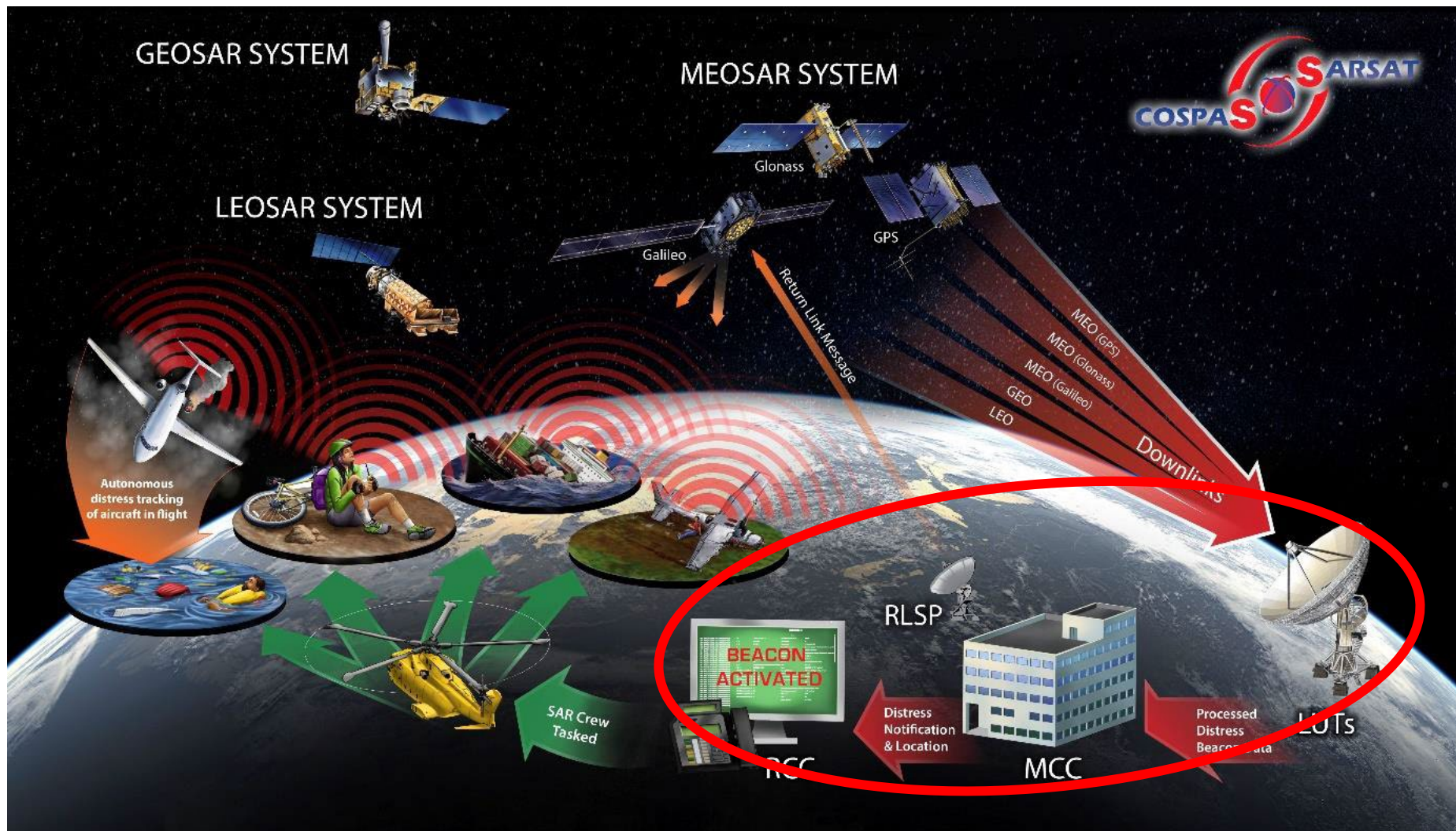
COSPAS-SARSAT System Overview - Beacons



COSPAS-SARSAT System Overview- Space Segment

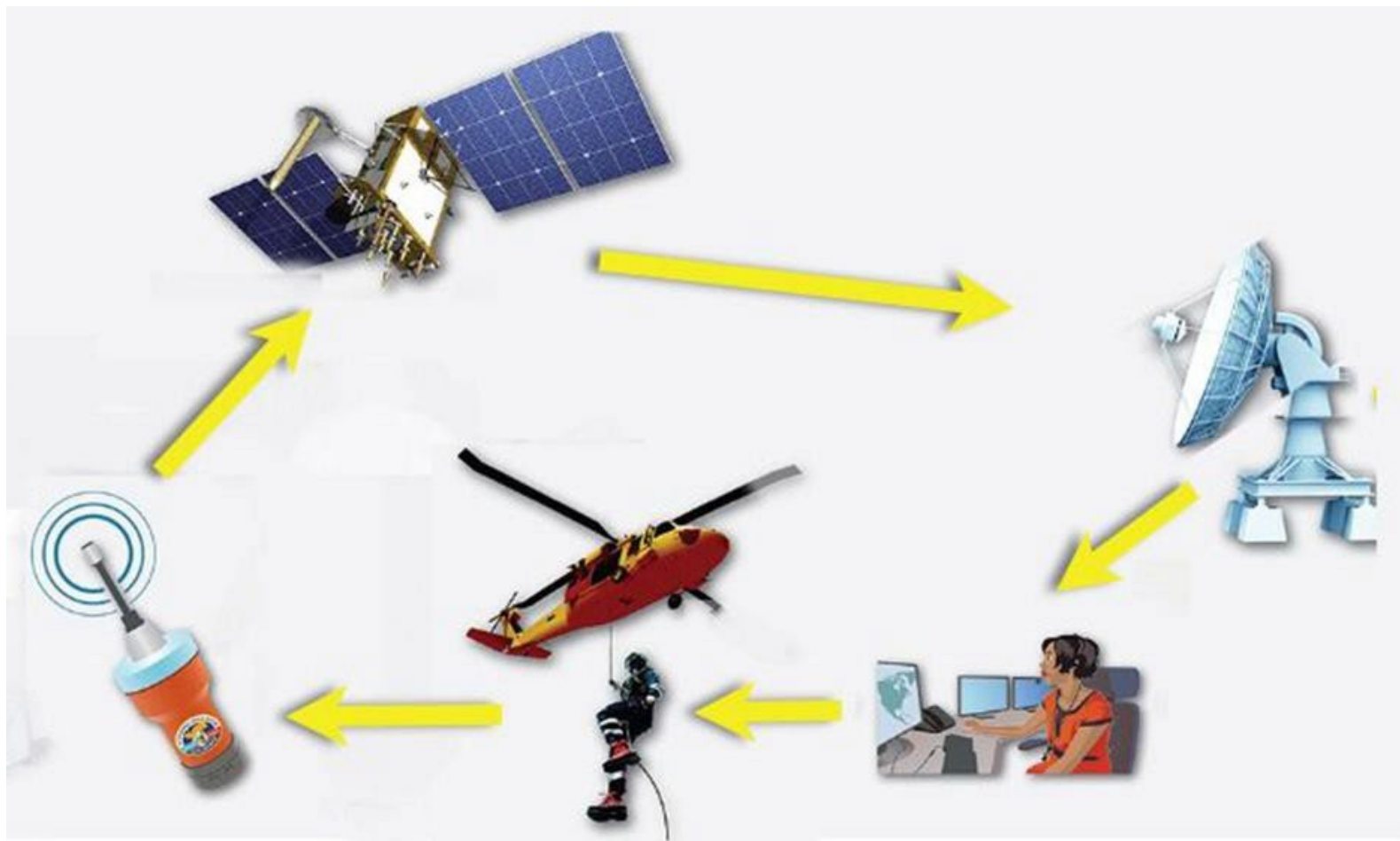


COSPAS-SARSAT System Overview - Ground Segment





COSPAS-SARSAT System Overview



COSPAS-SARSAT Beacons





ELT(DT) Activation Triggers

ICAO directed the development of this new beacon. It activates when the plane is still flying via 4 main automatic triggers (manual activation available).

Trigger profiles will be developed by aircraft manufacturers

- (1) Unusual attitude - The conditions may include, but are not limited to, excessive values of roll, pitch and yaw and their corresponding rates of change.
- (2) Unusual speed - The conditions may include, but are not limited to, excessive vertical speed, stall condition, low airspeed, overspeed or other speed conditions.
- (3) Collision with terrain - The conditions may include, but are not limited to, high rate of closure to terrain or inappropriate altitude for the current position.
- (4) Total loss of thrust/propulsion on all engines - The parametric data used to define this condition may be engine performance parameters or other parameters that result from loss of thrust.

Expected to be very rapidly unfolding events – original crash studies showed average event timeline – 6 minutes from activation to crash.



ELT(DT) Alert Transmission Schedule

- ELT(DT) transmissions primarily provide encoded (GNSS) locations – position data provided from onboard aircraft navigation system directly to beacon
 - *Time of Encoded position update for Second Generation Beacons (SGB) provided with 1 second resolution*
 - *Time of Encoded position update provided for First Generation Beacons (FGB)s as either “0 - 2 SECONDS”, “2 - 60 SECONDS”, or “1 MINUTE TO 4 HOURS”*
 - *Locations computed by a Mid Earth Orbiting (MEO) Ground Stations will be used only if the MEO Ground Station is commissioned to provide locations for fast moving beacons*
- **Beacon Burst Transmission Schedule**
 - For the first 2 minutes the beacon transmits every 5 seconds (24 messages to LADR)
 - Then after 2 minutes the beacon transmits every 10 seconds for 3 minutes (18 Messages to LADR)
 - 42 messages will be sent to the LADR in first 5 minutes
 - After 5 minutes the beacon activates every 30 seconds
- **Distribution to SAR Points of Contacts (SPOC)/Rescue Coordination Centers (RCC)**
 - *For the first 30 seconds the SPOCs/RCCs will receive a message every 5 seconds (6 messages)*
 - *After 30 seconds the SPOCs/RCCs will receive a message every 10 minutes thereafter. The **best** new alert will be distributed rather than the **last** alert.*
- **Message distribution to the Location of an Aircraft in Distress Repository (LADR)**
 - *At least one message for each received burst will be uploaded to the LADR*



Nodal MCC Populating the LADR

- All C/S MCCs shall send all ELT(DT) data to nodal MCCs
- Nodal MCCs will populate the Location of an Aircraft in Distress Repository (LADR)
- The connection to the LADR is defined and developed by ICAO
- Rules for data distribution to the LADR is defined and managed by ICAO for the Nodal MCCs
- ICAO continues to refine and develop the LADR specifications



SIT 185 ELT(DT) example 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



Questions & References

- Questions?
- References
 - C/S - www.cospas-sarsat.int
 - RCC and SPOC Handbook - <https://www.sarsat.noaa.gov/RCC%20Messages%20Manual%20v3.11.pdf>
 - ICAO - <https://www.icao.int/>
 - ICAO LADR <https://www.icao.int/safety/globaltracking/Documents/LADR%20Functional%20Spec%20v3.1.pdf>
 - ICAO GADSS - <https://www.icao.int/safety/globaltracking/Documents/GADSS%20Concept%20of%20Operations%20-%20Version%206.0%20-%202007%20June%202017.pdf>