# Beacon Manufacturers Workshop

Clearwater, Florida
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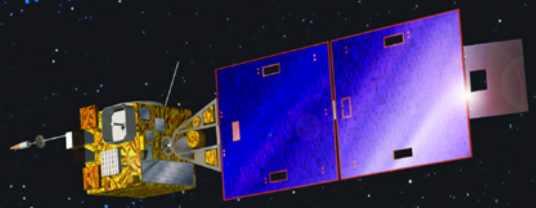

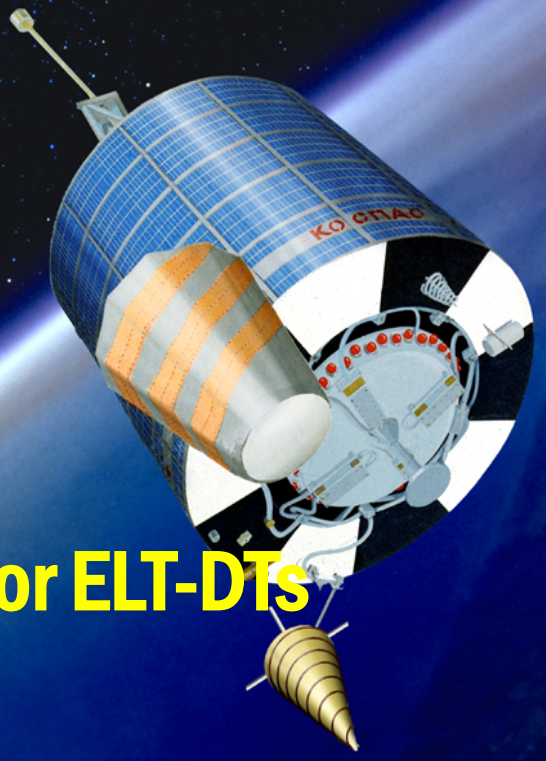

# Cospas-Sarsat documents updates for ELT-DTs

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•Source: CNES – D. Ducros

# ELT (DT) concept evolution

- Despite many Cospas-Sarsat-assisted saves resulting from 406 mHz ELT activation, the reliability of ELT transmissions after an impact with the ground has always been problematic, especially for large aircraft which are usually impacting the ground at high velocities.
- In 2010, Cospas-Sarsat Participants began investigating the development a new capability, namely the capability to detect and locate an ELTs signal activated prior to an impact using the upcoming MEOSAR system.
- In 2013, triggered in-flight beacon requirements were included as part of C/S G.008 “406 MHz Second Generation Beacons Operational requirements”.

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# ELT (DT) concept evolution

- In 2015 ICAO introduced GASS requirements for Distress Tracking along with expected implementation dates (January 2021) and accuracy requirements for locating an aircraft accident site (6 nm accuracy).
- In 2016 Cospas-Sarsat Participants reviewed how to best address GASS requirements. Two paths were developed, one based on the use of modified T.001 compliant beacons and one based on the use of Second-Generation beacons. Participants are developing both approaches with an aim to make ELT(DT)s available in early 2019.

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# ELT (DT)s concept demonstration

- Since 2013, several tests have been undertaken by Cospas-Sarsat Participants using fast moving beacons or ELTs triggered-in-flight (ELT-DT concept. These tests supported the technical feasibility of Cospas-Sarsat ELT(DT)s.

- Additional tests are planned to be undertaken in the upcoming years to better assess what performance levels could be achieved by the Cospas-SARSAT system when ELTs are activated in flight, especially with regards to MEOSAR independent location determination accuracies.

- The capability of the Cospas-Sarsat systems to detect and locate ELTs triggered-in-flight was further demonstrated in two recent distress aircraft incidents.

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# ELT(DT)s Characteristics

Compared with existing 406 MHz beacons, Cospas-Sarsat ELT-DTs:

- Will use the transmission of GNSS locations as a primary means for beacon location determination (as opposed to independent location determination for other beacons). Also Doppler shift location determination (primary LEOSAR location determination) would not be expected to provide a useful indication of the beacon location for fast-moving ELT-DTs.

- Will be moving at high speed when triggered in flight which implies that the latency of the GNSS data is an important factor in location accuracies. MEOLUT location algorithms will also very likely need to be adjusted to provide a reasonable independent location determination for fast-moving ELT-(DT)s.

- Will likely operate over a wider temperature range (lower minimum temperature in particular).

- Should ideally provide 3-D location data or information about the aircraft altitude.

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# ELT(DT)s Characteristics

Compared with existing 406 MHz beacons, Cospas-Sarsat ELT-DTs:

- Would be expected to operate for the duration of an aircraft flight (up to 20 hours) instead of the typical minimum 24 hours.
- Would not be required to provide a homing capability while transmitting distress signals in flight.
- Would be triggered by a new automatic activation means (based on aircraft avionic status or its equivalent).
- Would need to be capable of ceasing transmission of distress signals following deactivation commands provided by the same means as the one used for activation (manual or automatic).
- Would require that a cancellation message be sent in case of voluntary deactivation.
- Would be expected to operate shortly after beacon activation.

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# ELT(DT)s Characteristics

From an operational perspective, compared with existing 406 MHz, Cospas-Sarsat ELT-DTs would:

- likely required a different data distribution scheme. In addition to the data being forwarded to RCCs (as per the current data distribution), data would also likely need to be provided to Aircraft Operators and/or ATSU's and/or a central data repository facility as required by ICAO.
- require a more frequent position (and additional information) update to be provided to RCC's.

# Documentation amendments for implementing ELT-(DT)s

- Implementing ELT(DT)s as part of the Cospas-Sarsat System requires changes in beacon specifications (first and second generations) , type approval procedures, LUT specifications and MCC specifications.

- ELT-DT related changes to beacon specifications documents C/S T.001 and C/S T.018 were mostly reviewed at JC-30 in September 2016, approved at CSC-57 in December 2016. Minor amendments to T.001 and T.018 were proposed at TG-1 (March 2017) and were submitted for approval at CSC-58 (May 2017).

- ELT-DT related changes to type approval standards document C/S T.007 and C/S T.008 were reviewed at TG-1 2017 and amendments to T.007 were submitted to approval at CSC-58. Development of the type approval requirements of SGBs (document C/S T.021) are planned to be introduced and reviewed at JC-31 (October 2017) for approval by CSC-59 (February 2018).

# Documentation amendments for implementing ELT-(DT)s

- ELT(DT) related changes to A documents will be discussed at TG-2 2017 (June 2017) and possibly JC-31 for an expected approval at CSC-59.
- ELT(DT) related changes MEOLUT specifications, document C/S T.019 and commissioning standards, document C/S T.020 were discussed at TG-1 2017 and changes to C/S T.019 were submitted for approval to CSC-58. Additional changes to C/S T.019 (SGB related) along with changes to possible additional amendments to C/S T.020 will be discussed at JC-31 for approval CSC-59.
- ELT (DT) related changes to LEOLUT and GEOLUT specifications, documents C/S T.002 and C/S T.009 were discussed at TG-1 2017 and will be revisited at JC-31 for a planned approval at CSC-59.
- ELT(DT) related changes to LEOLUT and GEOLUT commissioning standards, documents C/S T.005 and C/S T.010 (as required) will be discussed at JC-31 for approval at CSC-59.

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# LEOSAR implementation principles for ELT(DT)s

When TG-1 reviewed changes to document C/S T.002 (LEOLUT) the group agreed that:

- Ground Segment Providers should ensure that the activation of an ELT(DT) should not degrade the operation of the Cospas-Sarsat LEOSAR and GEOSAR systems (the “do no harm” principle).
- As the LEOSAR system was not expected to remain the primary operational Cospas-Sarsat system throughout the operating life of ELT(DT) beacons, processing of an ELT(DT) message by a LEOLUT should be optional and that a LEOLUT could provide no data at all to an MCC from an ELT(DT) alert if an Administration decided not to implement an option to process ELT(DT) messages.
- Document C/S T.002 should be amended assuming the considerations above.
- Participants should further study and/or propose amendments to document C/S T.002 related to LEOLUT processing of ELT(DT) messages to address any cases where an Administration chose to implement the capability.
- Future amendments to document C/S T.002, to implement the processing of an ELT(DT) message, should consider various levels of functionality.

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# GEOSAR implementation principles for ELT(DT)s

When TG-1 reviewed changes to document C/S T.009 (GEOLUT specification) the group agreed that:

- since GEOLUTs were expected to be maintained for many years to come, it would be inadvisable to not have them process and distribute all C/S T.001-compliant beacon protocols, including ELT(DT)s and document C/S T.009 should be amended assuming this consideration.
- ground Segment Providers should further review the impact of the amendments proposed in C/S T.009 to accommodate receipt of ELT(DT) messages, and comment on implementation considerations prior to their submission to Council for approval.

# MEOSAR implementation principles for ELT(DT)s

TG-1 changes related with C/S T.019 (MEOLUT specification) were agreed on the following principles:

- MEOLUTs should process both ELT(DT) T.001-compliant and ELT(DT) SGB protocols.
- for a beacon identified as an ELT(DT), the MEOLUT shall send an alert with the encoded location to the associated MCC as soon as the message is valid (i.e., no need for message confirmation).

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# For More Information


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