ADT equipage in aircraft

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COMMERCIAL AIRCRAFT

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Agenda

- Basic overview
- Current Status Inadvertent ELT-DT activations
- Way forward / Lines To Take

Basic overview

Basic overview / Major system components

ELT-DT Antenna
- 406MHz & 121,5 MHz transmission
- GNSS reception

Remote Control Panel
- ON-ARMED-TEST/RESET
- Status Indication (LED)

ELT-DT Unit
- Crash survivable
- Acceleration Sensors
- Internal GNSS receiver

Aircraft Identification Module
- LADR compatible coding available

ADT Software
- Hosted on avionics computer
- Logic for detection of “in flight” status, distress detection & ADT triggering
- Interface between ELT-DT and aircraft display & maintenance systems

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Basic overview / Activation types

- **Autonomous**

  Initiated by the ADT software after detection of:

  - Unusual Aircraft Attitude: excessive pitch angle, excessive roll angle
  - Unusual Speed: excessive vertical speed, stall warning, Speed or Mach excessive
  - Collision with Terrain: radio altitude and inertial vertical speed in mode 1 warning envelope
  - Total loss of thrust/propulsion on all engines
  - Excessive Cabin Altitude

  Autonomous activation is also done by ELT-DT unit directly in case of total loss of communication with onboard avionic or loss of ELT power supply

- **Automatic**

  Initiated by the Acceleration Measurement Device within the ELT-DT

- **Manual**

  Initiated via switch on the RCP in the cockpit or on the ELT-DT unit itself (Remark: ELT-DT unit not accessible in flight)

Basic overview / Flight Crew alerting of ELT-DT activation

Primary:

Alert via the Electronic Centralized Aircraft Monitoring (ECAM)

The ECAM alert is categorized as a CAUTION:

- visual attention getters lighted (Master Caution lights - amber steady lights located in front of each pilot) and
- it has an AMBER text **COM ELT EMITTING** on the Engine/Warning Display (upper part of the central display) and
- is associated with aural attention getters (Single Chime)

Supplemented by:

LED on the RCP will flash periodically

Additionally:

If A/C is on ground a horn is activated

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Basic overview / Key figures

- **Standards**
  406 MHz ELT-DT (First Generation Beacon) in accordance with European Technical Standard Order (ETSO)-C126c, Eurocae ED-62B and COSPAS-SARSAT C/S T.001 & C/S T.007
- **Capabilities**
  C (crash survivability)
  H1 (121.5-MHz homing signal)
  G (internal/integral GNSS receiver) - Aircraft navigation system as backup
- **Transmission Duration**
  406 MHz signal at least 24 hours
  121.5 MHz signal at least 48 hours
- **Position accuracy of 406 MHz signal for location of point of end of flight**
  If the system survives the accident: within 200 meters radius
  In case of a non-survivable accident: within 6 nautical miles

Basic overview / Testing and Maintenance

- **Testing**

  Automatic: Power on self test
  Manual: Test via switch on RCP or on ELT-DT unit

  ELT-DT is connected to the onboard maintenance system. Detected failures will be displayed to flight crew and as part of the Post Flight Report.

- **Scheduled Maintenance Tasks**

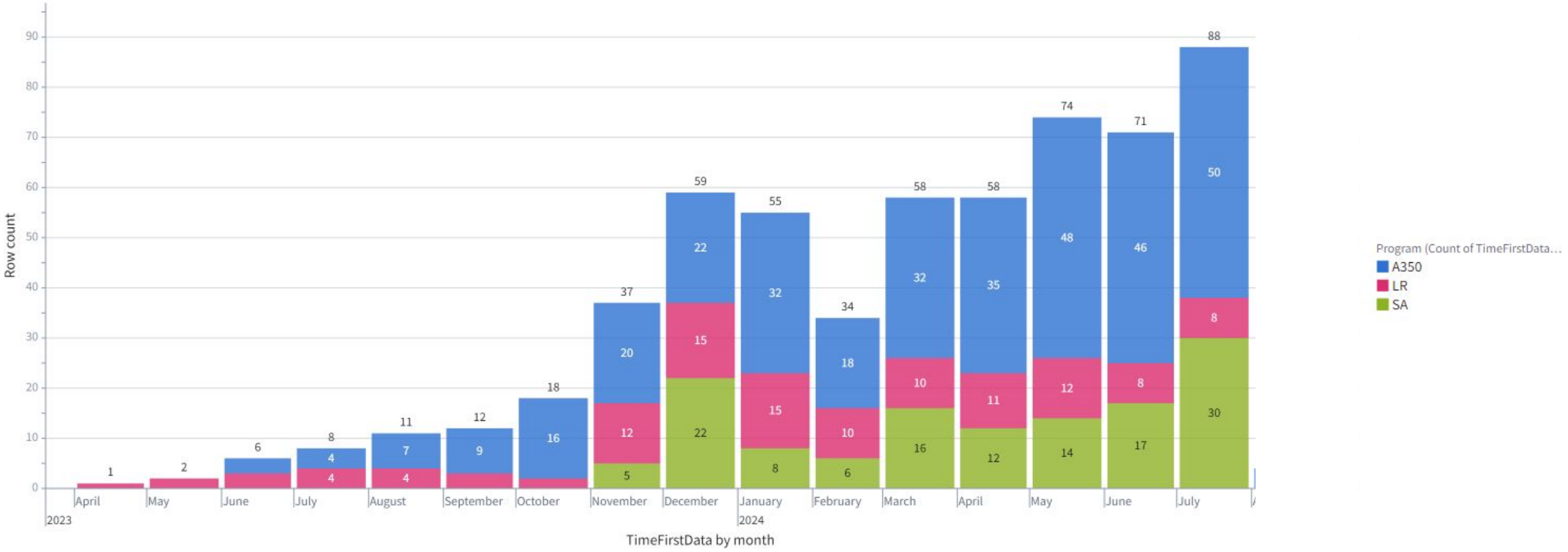
Replace ELT-DT unit (battery discard)	60 month
Operational check of discrete interfaces	180 month or 24000FH

Inadvertent activations

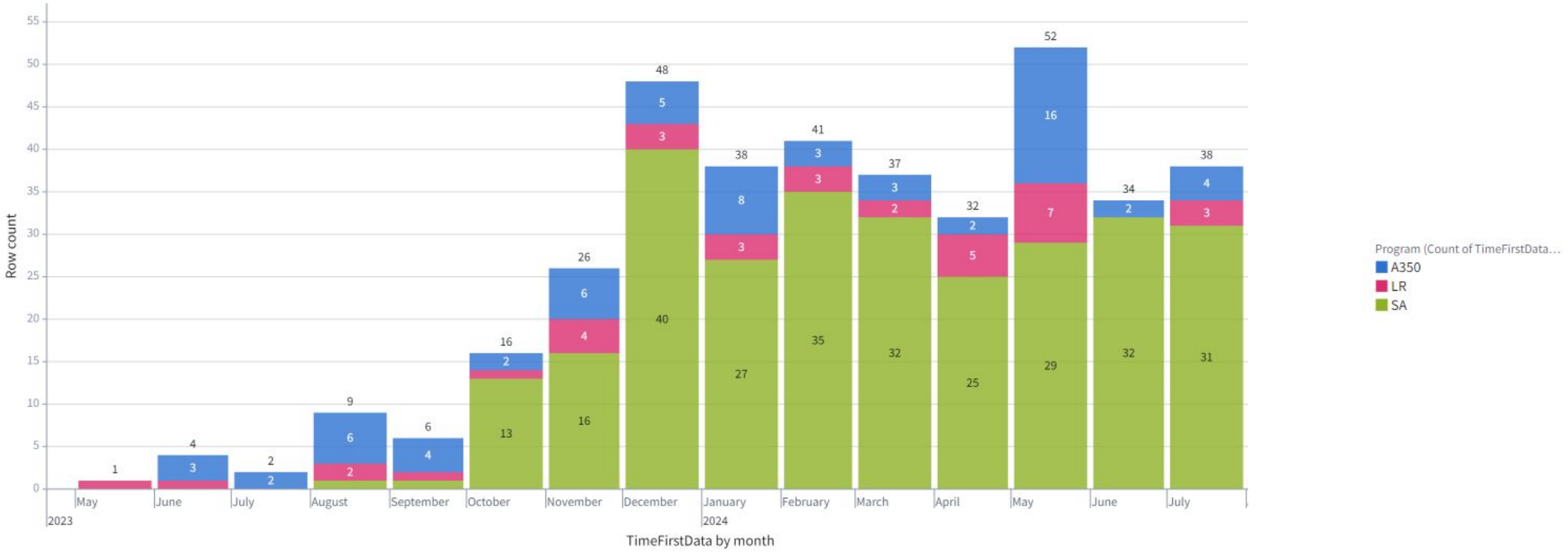
Inadvertent ELT-DT activations
Status End of July 2024 / Observations

- **Based on COSPAS / SARSAT data as per 02.Aug.2024:**
  - **1161 transmission events from Airbus ELT-DTs were detected since 1st a/c delivery in April 23**
    Remark: Until end of July 2024 Airbus delivered a total number of 437 aircraft equipped with ELT-DT -> 588 new events since last status provide in April 2024
- All inadvertent transmissions (Manual / Automatic / Autonomous) started on ground
- One activation in flight linked to temporary loss of 28V emergency power during flight / considered as 1st autonomous activation started in flight as loss of ELT-DT emergency power supply is a defined trigger reason, hence it is considered as justified alert
- Some operators have several issues, while others less or even none

Inadvertent ELT-DT activations per month (**autonomous activations** only) (until 02.08.)

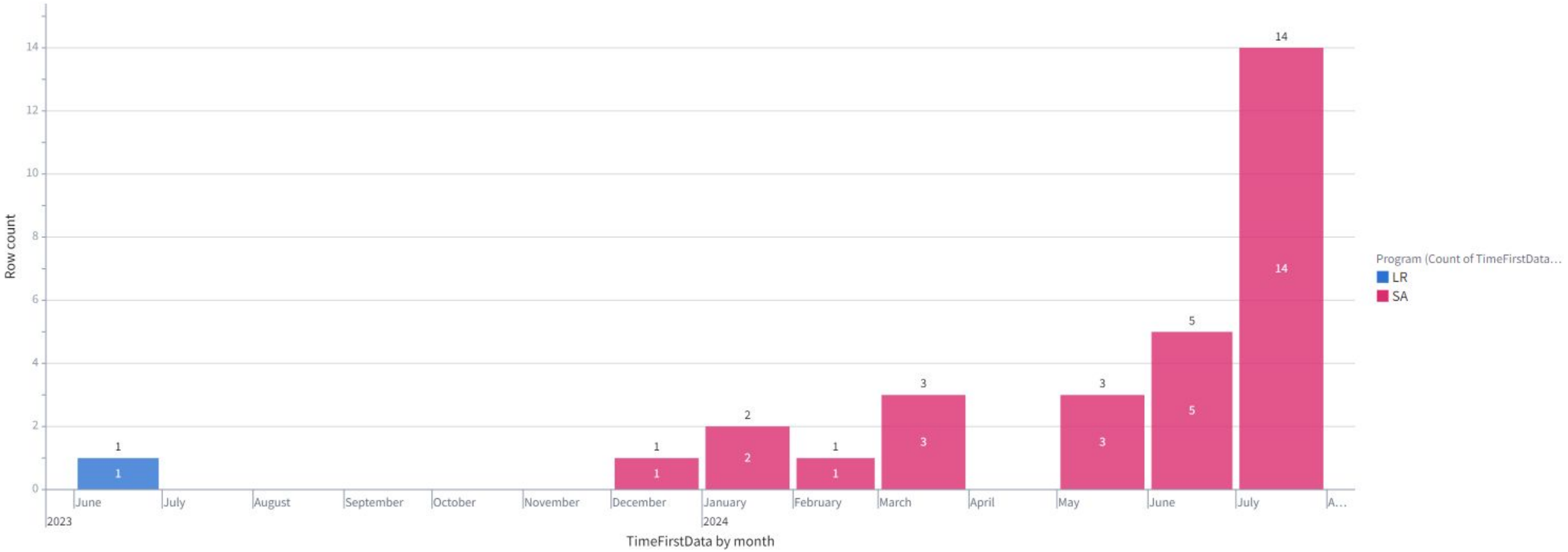


Inadvertent ELT-DT activations per month (**manual activations** only) (until 02.08.)



Inadvertent ELT-DT activations per month (**automatic activations** only) (until 02.08.)

(Note: In total 14 activations (May (1), June (2) and July (11)) could be traced down to a single unit installed on A320 MSN 11859. This ELT has been replaced and sent to Safran to be analyzed)



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Inadvertent ELT-DT activations
Status Root Cause Analysis

- Root cause analysis based on Airbus, SAFRAN and C/S data is still ongoing but some contributors already identified:
  - Operators and maintenance personnel were not aware of the difference between ELT(DT) and ELT(AF), including the consequences of triggering
  - Autonomous activations on ground due to incorrect detection of “in flight” status
  - Autonomous activations on ground as ELT-DT was not deactivated prior maintenance activities as defined in the maintenance documentation
  - Erroneous manual activation by installers and maintenance crews
  - Automatic activation due ELT-DT beacon internal issues (voltage tolerance/power cycle)

Inadvertent ELT-DT activations
Mitigation actions launched

- Dedicated electronic informations (ISI), Airline visits and webinars were performed to bring awareness and introduce improvements in airline operations / to be continued
- Maintenance manuals and trainings are updated / in update to promote the awareness of cautious ELT(DT) handling
- Technical improvements on aircraft level to robustify the “In Flight” detection logic are launched
- Technical improvements of the ELT(DT) beacon are defined and shall be part of the next equipment standard

Way forward / Lines To Take

Way forward / Lines To Take

- All unintended transmissions started on ground
  → Core distress detection logic is robust and working as per intention

- Some airline operators have several issues, while others less or even none
  → Issue is not solely related to the new ELT-DT system

- Reduction of inadvertent autonomous & automatic activations
  → For all three programs Airbus is working on ADT software update to improve the ground / airborne detection and to robustify the ELT(DT) beacon

- Mitigations of inadvertent activations via training & awareness
  → Several Awareness sessions performed (with customers but also Airbus internal)

- Update of maintenance procedures
  → Improvements ongoing on AMM & TSM