



# RTCA/ EUROCAE UPDATE

ELT(DT) , LITHIUM BATTERIES, IAM, VFDR

2024 NOAA Beacon Manufacturers Workshop

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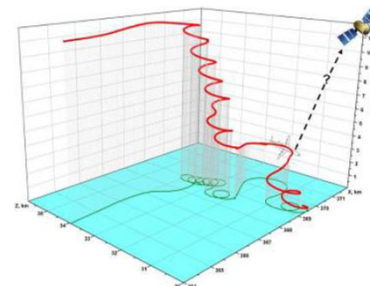
# AGENDA

1. Decade Recap
2. RTCA SC-229 Update
3. RTCA SC-235 Update - Lithium
4. FAA Rulemaking
5. Industry Challenges
6. Trends



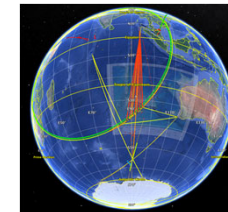
# A RECAP OF THE LAST DECADE

- 2009 June 1st : AF 447 Crash
- 2011 April 29th : AF 447 FDR Recovered
- 2013 July 12th : Ethiopian 787 ELT Fire
  - Started Lithium Special Conditions
- 2013 Nov 27th : EUROCAE WG-98
  - **We Need - Triggered in Flight ELT !**



# A RECAP OF THE LAST DECADE

- 2014 March 8th: MH370 Missing
- 2014 March 10th : RTCA SC-229
  - Joint Committee with WG-98
  - ED-237 MASPS
- ICAO GADSS
  - 2013 FLIRECP proposal
  - 2015 Conops
  - 2021 SARPS Mandate
  - 2023 SARPS Mandate
  - 2024/2025 SARPS Mandate
- EASA
  - Workshop Series
  - CAT.GEN.MPA.210
  - NPA 2020/2022 ....
- SAE ARINC
  - AEEC
  - 680 GADSS Report
  - 681 TRFD Report
- 2022 October
  - Orolia (Safran) ELT(DT) ETSO
- 2023 Airbus
  - ELT(DT) in Commercial Use !



# RTCA SC-229 ELT COMMITTEE

## EUROCAE WG-98



### •RTCA DO-204B / EUROCAE ED-62B

•MOPS FOR AIRCRAFT EMERGENCY LOCATOR TRANSMITTERS 406 MHz

•2019 December = Published

Triggered in Flight ELT  
Second Generation C/S  
Crash Robustness  
Harmonized with EUROCAE ED-62B

• 2020 June = DO-204B Change 1

•Committee back to Active Monitoring Status

### •EUROCAE ED-237

•MASPS: CRITERIA TO DETECT IN-FLIGHT AIRCRAFT DISTRESS EVENTS TO TRIGGER TRANSMISSION OF FLIGHT INFORMATION

•Scenario 1: Unusual attitude.

•Scenario 2: Unusual speed.

•Scenario 3: Collision with terrain. position.

•Scenario 4: Total loss of thrust/propulsion on all engines.

•2016 February = Published

•Some calls from industry to update based on real life implementation.



# RTCA SC-235 NRC LITHIUM BATTERY COMMITTEE



- ✓ Update RTCA/DO-227 for Lithium battery to incorporate the latest understanding of lithium battery technology, including battery testing and installation considerations.
- ✓ RTCA DO-227A – MOPS FOR NON-RECHARGEABLE LITHIUM BATTERIES
- ✓ 2017 Sept = Published
- ✓ 2017 March = TSO-C142b Effectivity
- ✓ 2021 March – Active Status
- ✓ 2022 Sept = FRAC #1
- ✓ 2023 May = Final Comment Review
- ✓ 2023 June FRAC #2
- ✓ 2023 Fall FRAC #3
- 2024 May FRAC #4



# EUROCAE WG-118 FLIGHT DATA RECORDERS



- ✓ Updated EUROCAE ED-112 for Crash Protected Flight Data Recorders
- ✓ Updated EUROCAE ED-155 for Light Weight FDR.
- MASPS - Flight Data Recording for AAM
  - AAM – Advanced Air Mobility,
  - IAM – Innovative Aviation Mobility
  - Air and Ground Recording
  - Multiple Comm Links
  - C2C, Satellite, Cellular
- MASPS - Virtual Flight Recording Data Recovery Services



MASPS Minimum Aviation System Performance Standards

# FAA AVIATION RULEMAKING COMMITTEE INNOVATIVE TECHNOLOGIES

- A group of aviation stakeholders who are selected to evaluate issues and provide advice and recommendations to the FAA.
- For the following National Transportation Safety Board (NTSB) Safety Recommendations, discuss issues and develop recommendations to the FAA.
- 4 (e) ii) Location End of Flight 6nm
  - equipped with a **tamper-resistant** method to broadcast to a ground station sufficient information to establish the location of an aircraft after the flight has terminated due to a **crash within six (6) Nautical Miles**.
- 4 (e) iv) Timely Recovery of Flight Data
  - ....equipped with a means to recover **mandatory flight data parameters**; the means of recovery **should not require underwater retrieval**.
  - **data should be captured from a triggering event** until the end of the flight and for as long a time period before the triggering event as possible



U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
Aviation Rulemaking Committee Charter

Effective Date: 6/7/2023  
Amended: 9/21/2023

**SUBJECT: Amended Investigative Technologies Aviation Rulemaking Committee**

1. **PURPOSE.** This charter establishes the Investigative Technologies Aviation Rulemaking Committee (ARC), according to the Administrator's authority under Title 49 of the United States Code (49 U.S.C) § 106(p)(5). The sponsor of the ARC is the Associate Administrator for Aviation Safety. This charter outlines the ARC's organization, responsibilities, and tasks.

2. **BACKGROUND.** The FAA is committed to the recovery of flight data, whether it is in-flight data or information collected after an incident or accident. The best way for the FAA to maintain this commitment is by reviewing domestic and international regulations, policies and guidance associated with investigative technology as it relates to the needs of search and rescue authorities, investigative safety boards, and new technological development. The request for more data, changes in international regulations, and technology development may necessitate new regulations, policies, and guidance.

Based on recent recommendations from the Commercial Aviation Safety Team Approach and Landing Misalignment Joint Safety Analysis and Implementation Team, the FAA has amended the charter to seek recommendations on cockpit alerting technologies designed to reduce runway safety events.

3. **OBJECTIVES OF THE ARC.** The ARC will provide a forum for the United States aviation community to discuss, prioritize, and provide recommendations to the FAA concerning requirements on the installation of existing, new, and upgraded investigative technologies that affect applicable airworthiness standards and operating rules. Those investigative technologies include the following:

- a. Cockpit Voice Recorders (CVRs)
- b. Flight Data Recorders (FDRs)
- c. Underwater Locator Device (ULD)
- d. Cockpit Image Recorders (CIRs)
- e. Data Link Recorders (DLRs)
- f. Automatic Deployable Flight Recorders (ADFRs)
- g. Automatic Distress Tracking System (ADT)
- h. Global Aeronautical Distress and Safety System (GADSS)

[https://www.faa.gov/regulations\\_policies/rulemaking/committees/documents/index.cfm/document/information/documentID/6023](https://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/document/information/documentID/6023)





# FAA RE-AUTHORIZATION ACT OF 2024

- **Updates Air Tour and Helicopter Safety**

Requirements: Responding to NTSB recommendations, the bill requires stronger safety requirements for **commercial air tours and helicopter operations** through increased FAA oversight, equipment upgrades and flight data monitoring.

- **Facilitates Commercial Use of Drones and Unmanned Aircraft:** The bill directs the FAA to establish a pathway for beyond visual line-of-sight operations and create two additional test sites for companies to start using unmanned aircraft (UAS) **for package delivery** or other operations. The bill also gives the FAA enforcement authority to prohibit unauthorized or unsafe use of UAS.

- **Supports Avenues to Safety Certification of Air Taxis:** The bill supports pathways and additional certainty needed for the safety certification of advanced air mobility powered-lift aircraft, or “air taxis,” capable of vertical take-off and landing.



<https://www.commerce.senate.gov/2024/4/bipartisan-bicameral-faa-reauthorization-act-heads-to-senate-floor#:~:text=Mandates%2025%2DHour%20Cockpit%20Voice,reforms%20consistent%20with%20NTSB%20recommendations>

**Almost through the Senate (for the last few months).**



# INDUSTRY CHALLENGES - DISTRESS TRACKING

- EASA NPA 2022 :

  - Class 1 Operation

  - DAL C: Nuisance Alert considered a Major 10E-5 Location of Crash Site

- ICAO Annex 6 Part 1

  - Does not define ELT(DT) as a Type of ELT.

- MOPS DO-204b

  - Does not define ELT(DT) as Automatic
  - TSO-C126c mentions DT **automatic** activation
  - Various Environmental inconsistencies with DO-160

  - Compliance challenges

- ELT(DT) Does not comply with CFR 91.207

  - “...There is attached to the airplane an approved **automatic** type emergency locator transmitter ...”

**Implication: ELT(DT) with Crash Survivability does not necessarily meet carriage requirements despite Equivalent Level of Safety.**

- MASPS ED-237

  - Scenarios:

    - We only had the BEA database
    - OEMs would like to update with more realistic “Manufacturers may include additional scenarios or combine scenarios”

- Interface Complexity

  - What industry envisioned:

    - ON / OFF
    - ARINC 680 : Labels 201, 202

  - What OEM customers needed:

    - ARINC Labels for : Data xfer, Status, Maintenance
    - Digital IO for: Air/Ground; ADT Health Status
    - CBIT / IBIT
    - Bypass Switch
    - Complex Logic

- Too much decision making inside of ELT(DT)!

- Aviation Requirements are the **Gold** Standard of Safety

  - Design Assurance ARP4754**

  - SW DO-178c**

  - Environmental DO-160g

  - MOPS / MASPS



# TRENDS, CHALLENGES AND OPPORTUNITIES

- **IAM – Innovative Air Mobility**
  - Highly Controlled Infrastructure
  - Continuous Tracking
  - Data Streaming
  - Restricted Airspace Corridors.
  - Vehicle to Vehicle Communication
  - BVLOS Communication: Satcom
  - Local communication : 5G, VHF, ADS-B
  - Rechargeable Batteries
  - Avionics are highly integrated into vehicle
- **What is the role of the ELT in IAM**
  - Time from Event to Crash : seconds and minutes.
  - What technology is needed?
  - Multiple Communication Paths for Distress
  - What role does Cospas-Sarsat play? If any?
  - Would Accidents constitute a SAR event... or just Rescue?

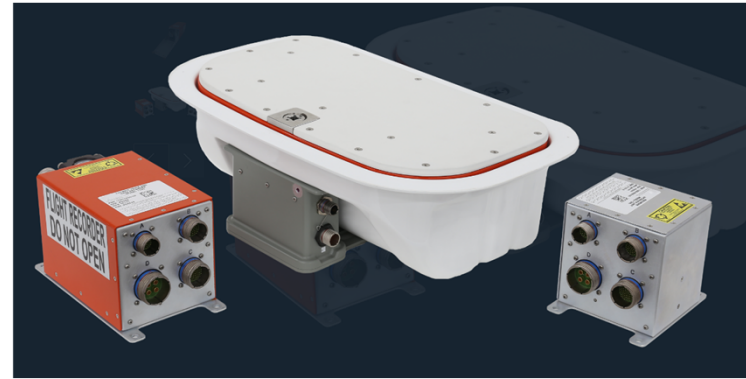


Little Search, Mostly Rescue

<https://www.easa.europa.eu/en/domains/drones-air-mobility/drones-air-mobility-landscape/innovative-air-mobility-hub>

# TRENDS, CHALLENGES AND OPPORTUNITIES

- **Virtual Flight Data Streaming**
  - ICAO SARPS
  - ARINC 681 Report TRFD
  - EUROCAE – WG-118 Flight Data Recorder Group
  - FAA Rulemaking
- **VFDR Drivers**
  - Flight operational quality assurance (FOQA)
  - Flight data monitoring (FDM)
  - Accident Investigation
  - Deployable FDRs are complex and high risk
  - 14 CFR 91.15 – No Dropping Objects
- **Threats and Opportunities.**
  - The Distress Triggers will be in place and well proven.
  - Flight Data Streaming, including position and distress status.
  - Alert goes directly to ATSU (Annex 11 – chapt 5 Alerting) and then RCC.
  - ELT Required as per SARPS, EASA. (Location of Aircraft in Distress)
  - Existing Squawk Codes (7700, 7500)



Always know where and what the aircraft is doing.

# SUMMARY

## Background

### •History

It has been **15** years since the Air France 447 crash.

It has been **10** years since the MH370 disappearance/crash

It took over **10** years to go from “triggered in flight ELT” to ELT(DT) flying today.

### •As Peter Broadhurst Presented on **Satellite Services of the Future**

In 5 Years.....10000 Satellite Launches a year  
Multiple Constellations  
Multiple bands

### • As Ed Thiedeman Presented **Delivering Distress Alerts to the RCC**

New Communication Alerting means  
Iridium, iPhone, Starlink,....?

## Trends to Watch

### •Cell to Sat

10 Years Ago - Pervasive Cellular was the Threat

5 Years Ago – New Satellite Constellations

Today, those have combined to a new threat – Cell to Sat

### •Innovative Air Mobility

Not your father’s Oldsmobile

New air space control

Less Search, Mostly Rescue

### •Virtual Flight Data Recording

Streaming data “real time”

Position and status always known

### • Ultimately, the Value is in

**Multi-Modal Alert Management**



THANK YOU!