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A UN SPECIALIZED AGENCY
RECONNECTING THE WORLD

Global Aeronautical Distress and Safety System (GADSS), Autonomous Distress Tracking (ADT) and Location of an Aircraft in Distress Repository (LADR)

John Welton
17 June 2024

Global Aeronautical Distress and Safety System (GADSS)

1 A Brief History of GADSS

2 Aircraft Tracking

3 ADT and LADR

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1

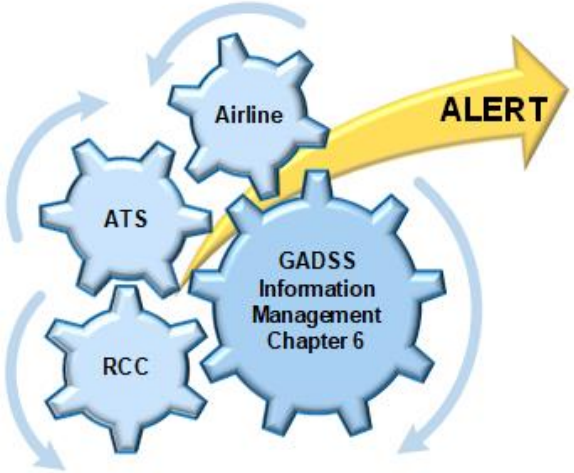
A Brief History of GADSS

Global Aeronautical Distress and Safety System

Aircraft Tracking

Location of Aircraft in Distress

Post Flight Localization



SAR

Flight Recorder Data Recovery

Accident Investigation

Why GADSS?

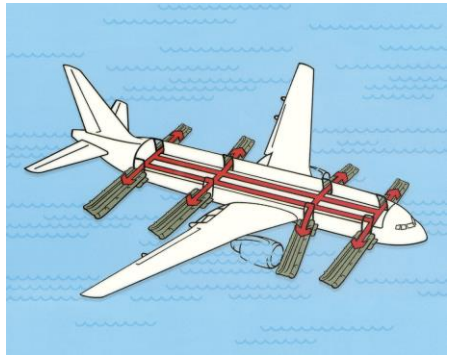
Air France flight AF447, 1 June 2009

Malaysian Airlines flight MH370, 8 March 2014

GADSS main functions

Aircraft Tracking

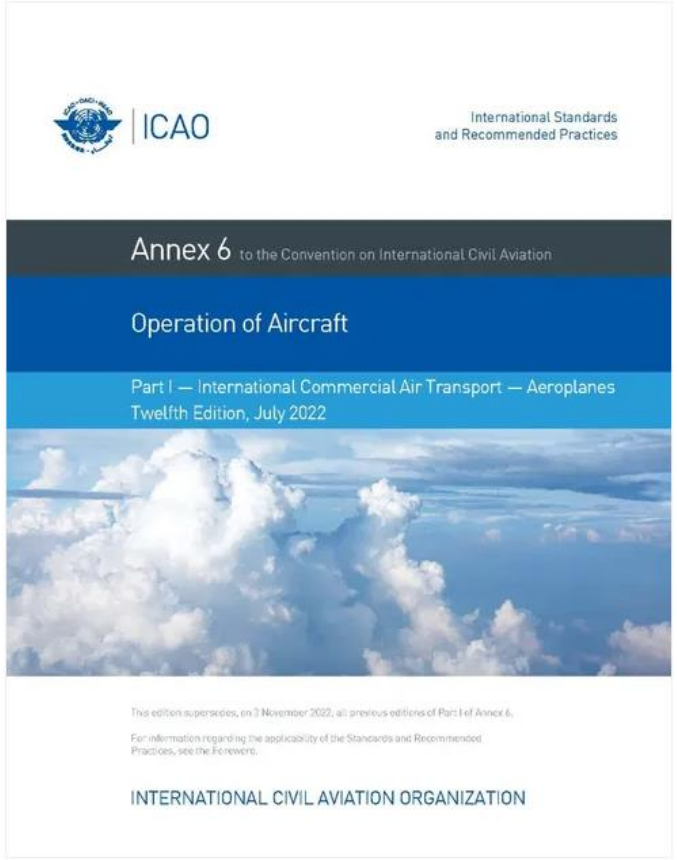
Location of Aircraft in Distress

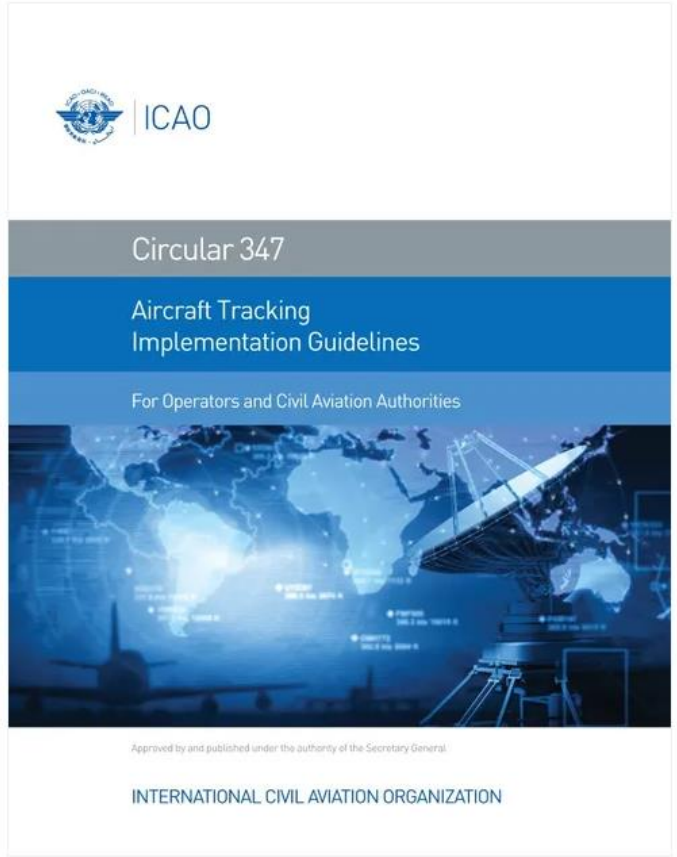


Post Flight Localization

2

Aircraft Tracking





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Annex 6 — *Operation of Aircraft*, Part I — *International Commercial Air Transport — Aeroplanes*

3.5 AIRCRAFT TRACKING

3.5.1 The operator shall establish an aircraft tracking capability to track aeroplanes throughout its area of operations.

Note.— Guidance on aircraft tracking capabilities is contained in the Aircraft Tracking Implementation Guidelines (Cir 347).

3.5.2 **Recommendation**.— *The operator should track the position of an aeroplane through automated reporting at least every 15 minutes for the portion(s) of the in-flight operation(s) under the following conditions:*

a) the aeroplane has a maximum certificated take-off mass of over 27 000 kg and a seating capacity greater than 19; and

b) where an ATS unit obtains aeroplane position information at greater than 15 minute intervals.

Note.— See Annex 11, Chapter 2, for coordination between the operator and air traffic services providers regarding position report messages.

3.5.3 The operator shall track the position of an aeroplane through automated reporting at least every 15 minutes for the portion(s) of the in-flight operation(s) that is planned in an oceanic area(s) under the following conditions:

a) the aeroplane has a maximum certificated take-off mass of over 45 500 kg and a seating capacity greater than 19; and

b) where an ATS unit obtains aeroplane position information at greater than 15 minute intervals.

Note 1.— Oceanic area, for the purpose of aircraft tracking, is the airspace which overlies waters outside the territory of a State.

Annex 6 — *Operation of Aircraft*, Part I — *International Commercial Air Transport — Aeroplanes*

3.5 AIRCRAFT TRACKING

When the ATS reporting interval is greater than 15 min

Requirement to track

Recommendation
Operators to track at 15 minute intervals

Requirement
Operators to track at 15 minute intervals

Became Applicable 8 Nov 2018

Seating capacity greater than 19 Seats

27,000 Kg (Should)

45,500 Kg (Shall)

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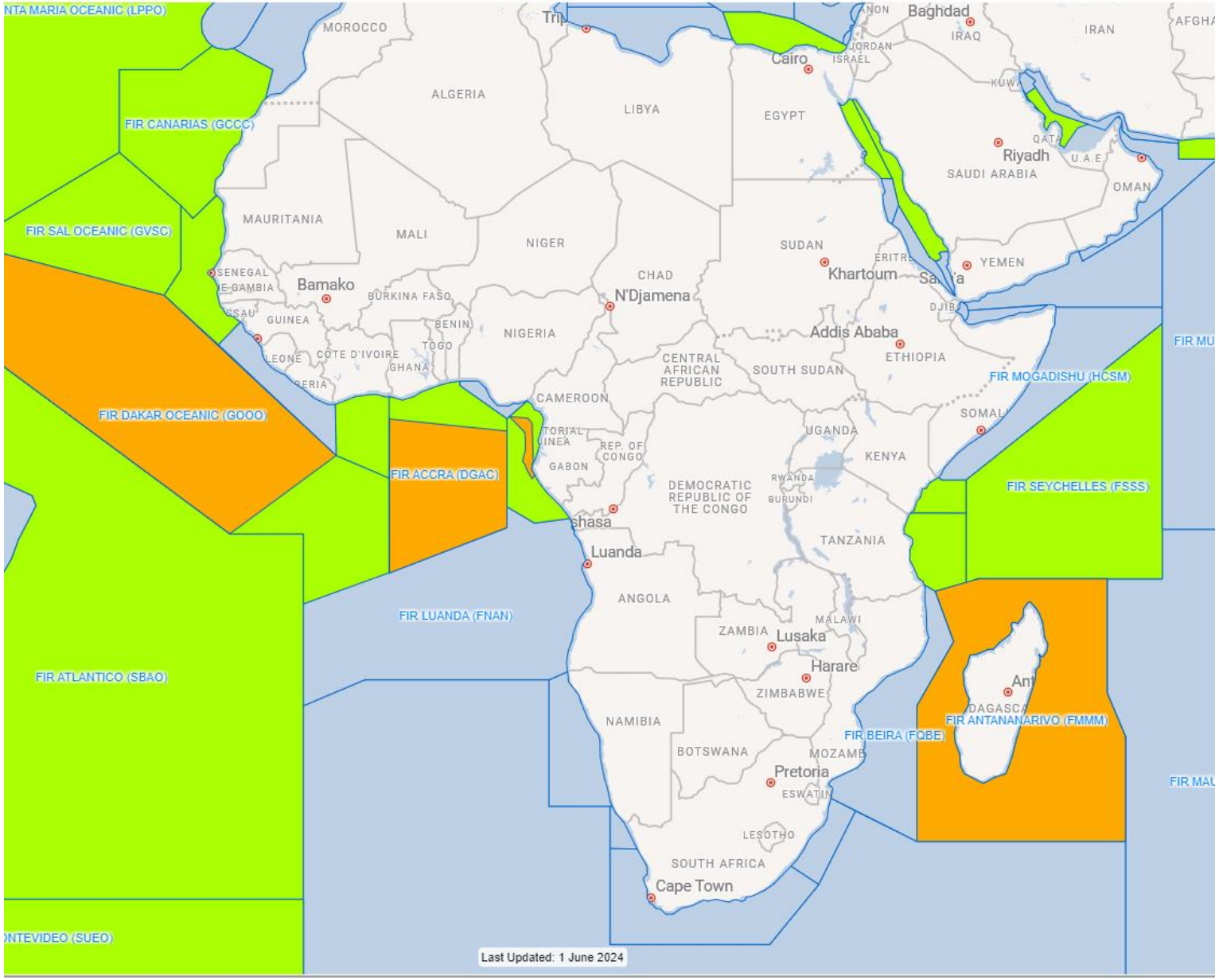

Search by FIR Name or Location Indicator

Search

ATSU no service provided:Air Operator tracking required
ATSU service provided:Air Operator tracking not required
ATSU no data recieved:Air Operator tracking required

https://www4.icao.int/opsctrl/

aircrafttracking@icao.int

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Aircraft Tracking

How?

Automated position reporting.

Position reports are four-dimensional (latitude, longitude, altitude and time).

Reduced time interval in resolving the status of, or locating, an aircraft.

- Assists in timely identification and location of aircraft
- Reduces the reliance on procedural methods used to determine aircraft position
- Helps to ensure the availability and sharing of aircraft position data
- Helps to improve the effectiveness, efficiency and performance of ATS unit alerting

And from a SAR perspective, this matters because…

- Aircraft Tracking means operators know the location of their aircraft.
- This helps with Uncertainty Phase.

3

Location of an Aircraft in Distress

Annex 6 — *Operation of Aircraft*, Part I — *International Commercial Air Transport — Aeroplanes*

6.18 LOCATION OF AN AEROPLANE IN DISTRESS

6.18.1 As of 1 January 2025, all aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2024, shall autonomously transmit information from which a position can be determined by the operator, at least once every minute, when in distress, in accordance with Appendix 9.

6.18.2 **Recommendation.—** *All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2023, should autonomously transmit information from which a position can be determined at least once every minute, when in distress, in accordance with Appendix 9.*

6.18.3 The operator shall make position information of a flight in distress available to the appropriate organizations, as established by the State of the Operator.

6.18.1 As of 1 January 2025, all aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2024, shall autonomously transmit information from which a position can be determined by the operator, at least once every minute, when in distress, in accordance with Appendix 9.

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Big planes

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That are new this year

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Will do something
from 1 January 2025.

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Information, not positions

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Reality is more often

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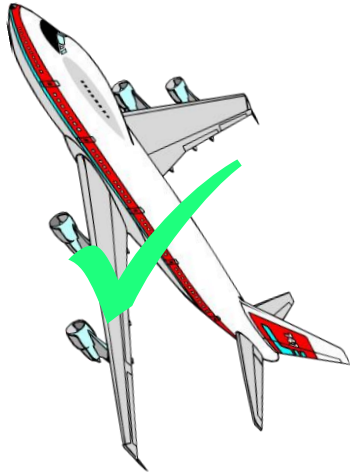

Unusual

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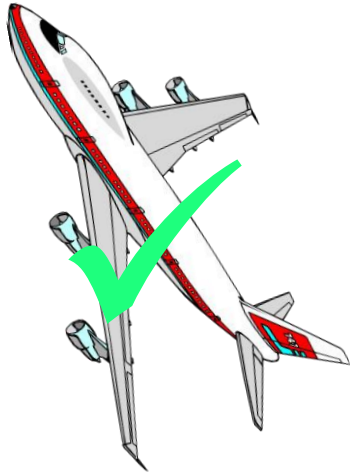


Unusual

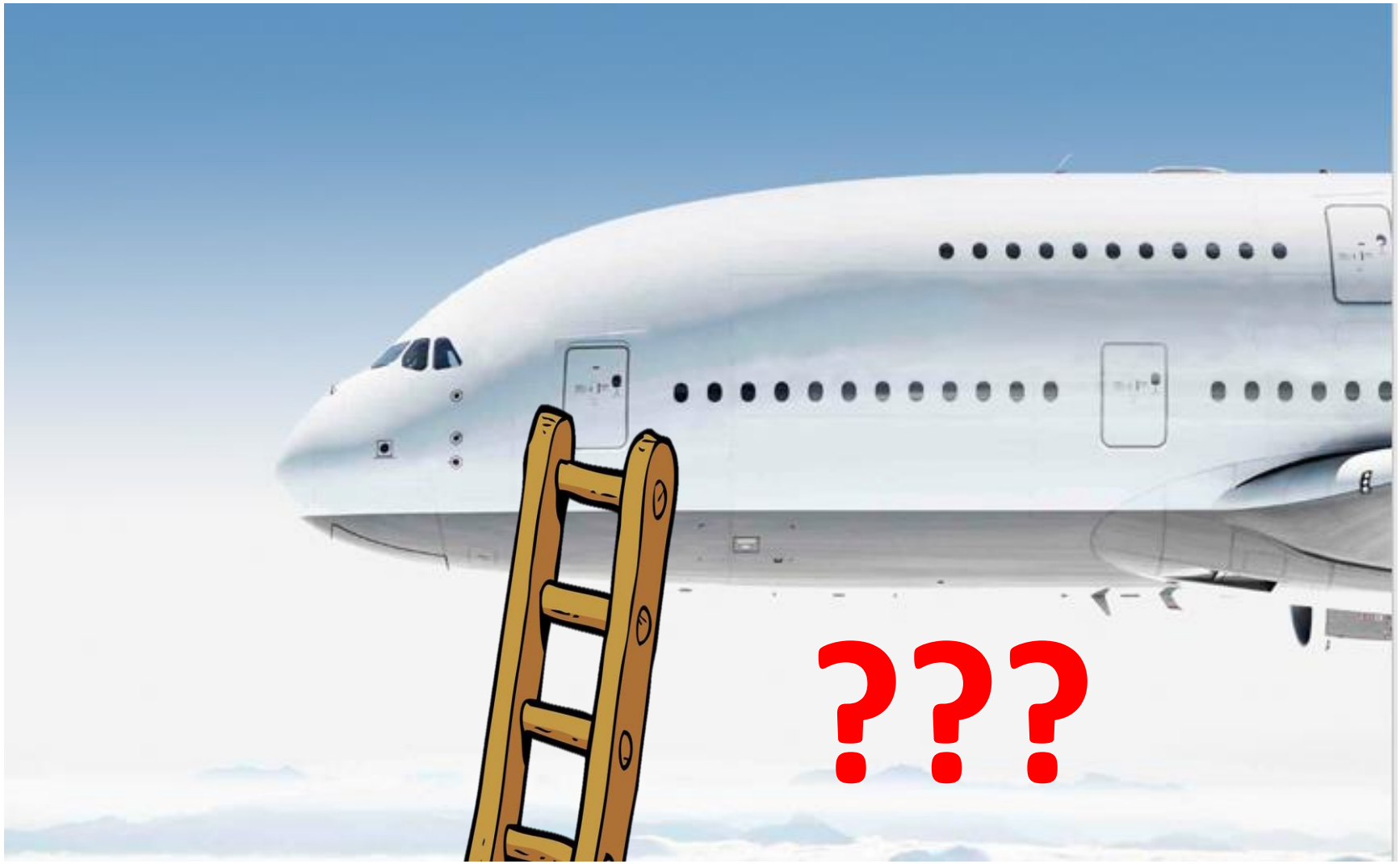

DISTRESS TRACKING
→ Automatic
→ Manual
AUTONOMOUS
6 NM
Aircraft behavior event that if left uncorrected, can result in an accident.
RESCUE COORDINATION CENTER

What's it for?

Annex 6 — *Operation of Aircraft*, Part I — *International Commercial Air Transport — Aeroplanes*

6.18.3 The operator shall make position information of a flight in distress available to the appropriate organizations, as established by the State of the Operator.

How to distribute the information?



Location of an Aircraft in Distress Repository (LADR) – What is it?!

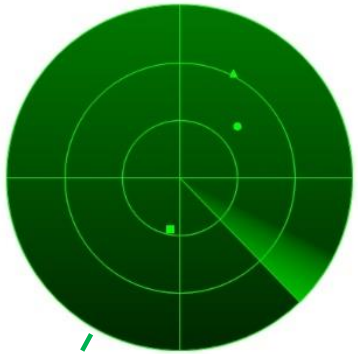
6.18 LOCATION OF AN AIRCRAFT IN DISTRESS

ATSU

RCC

Other

6.18 LOCATION OF AN AIRCRAFT IN DISTRESS



ATSU

LADR

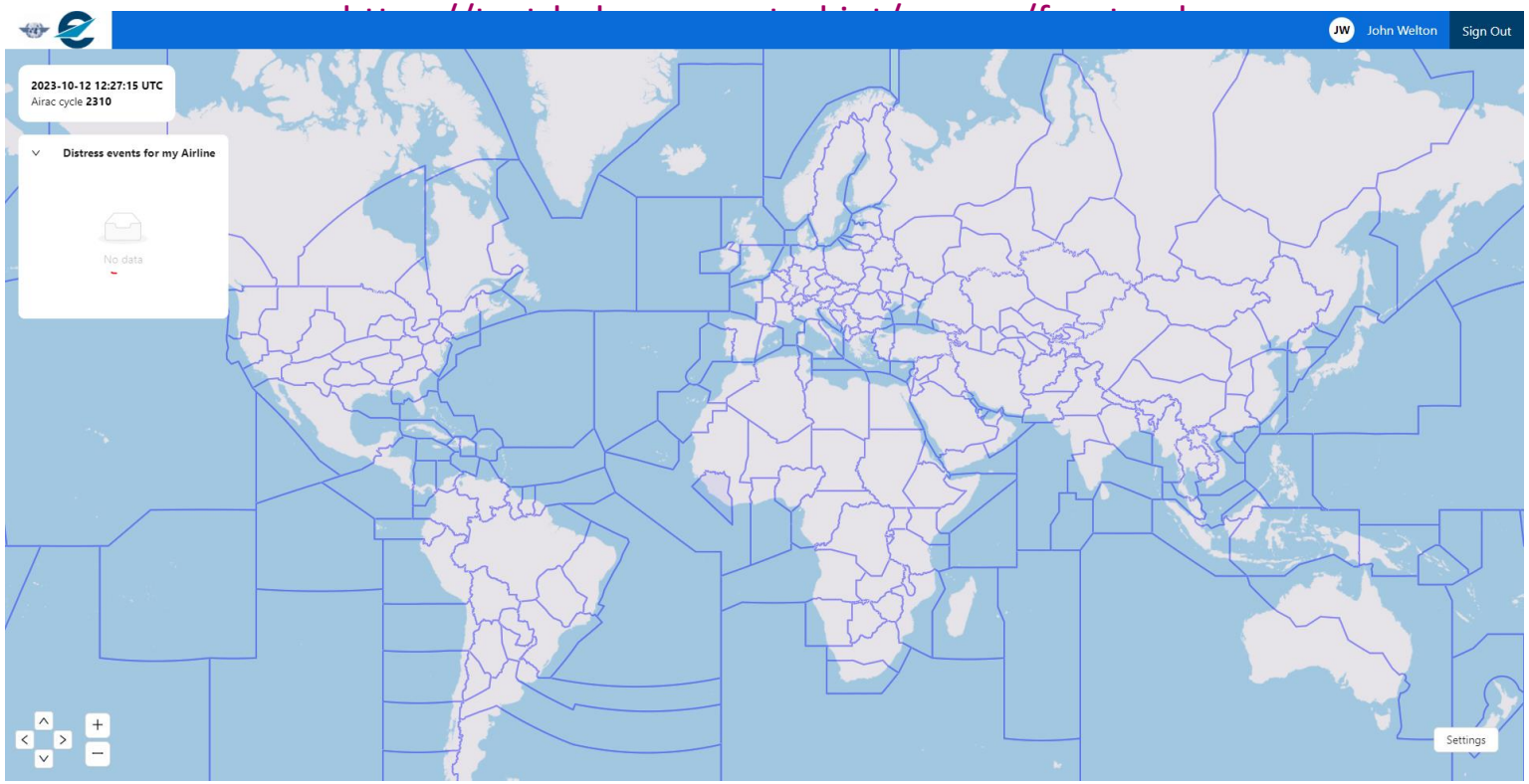
RCC

Other

Fri 27/10/2023 09:24
From: LADR@EUROCONTROL.INT
To: operations.supervisors.group@State.area.control.centre
Subject: New information has been received by the LADR

New information has been received by the LADR which matches your user profile. Please take appropriate action.

- Start of distress triggers autonomous transmissions.
- LADR generates notification email



- The LADR can be accessed as data files, or using the viewer shown here.
- As a single source, there is reduced risk of transcription errors in passing position information and updates via voice.
- The LADR helps operators fulfil their responsibility under Annex 6, 6.18.3, to “make position information of a flight in distress available to the appropriate organizations”.

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OPS Control Directory

- Contact data for operators and ANSPs (and soon, rescue coordination centres)
- Requirement applicable for ACCs and RCCs 28 November 2024 – Amendment 19 to Annex 12

Aircrafttracking@icao.int

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4

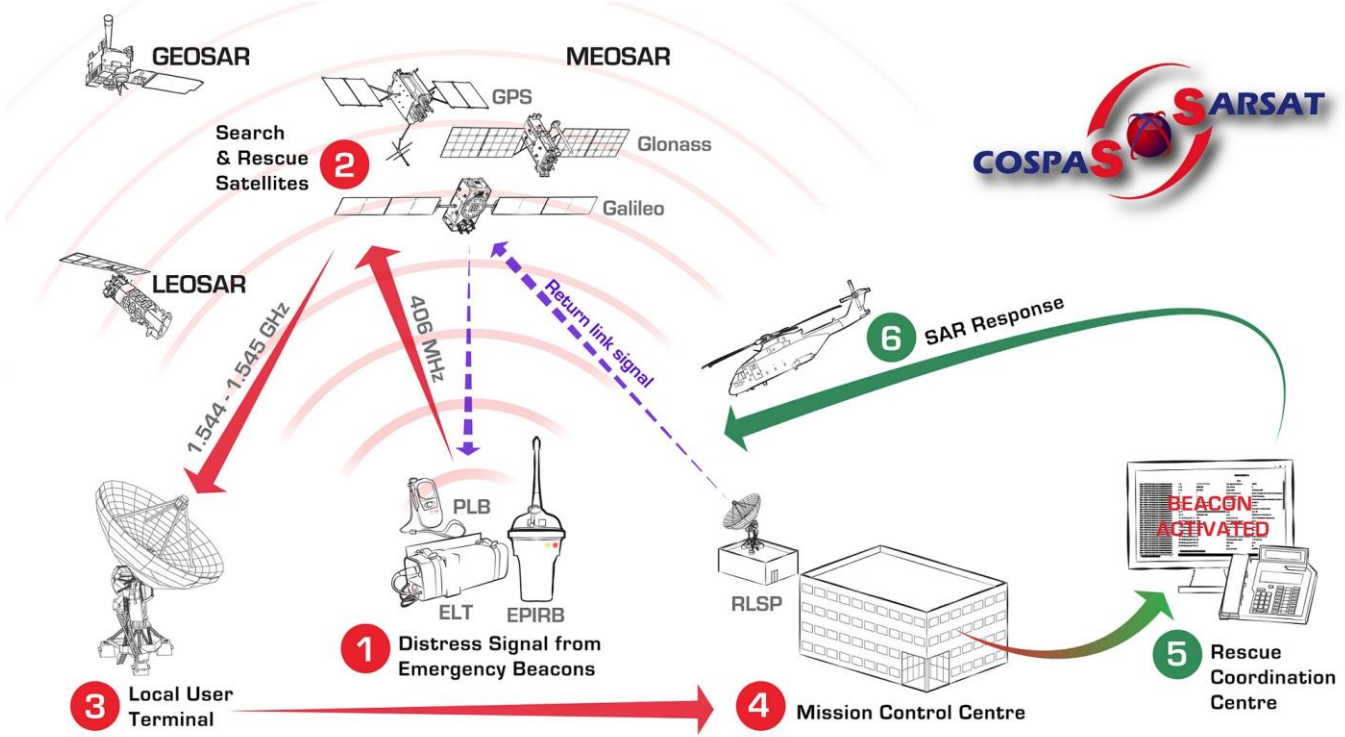
Post Flight Localization

Post Flight Localization

Emergency Locator Transmitter

Underwater Locating Devices

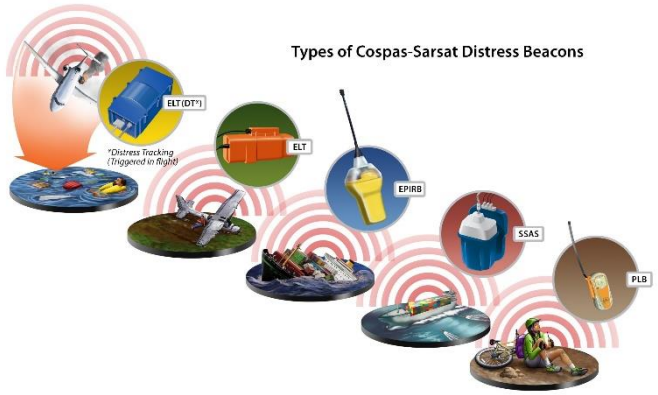
Flight Recorder Data Recovery



Images courtesy of Cospas-Sarsat

Emergency Locator Transmitters (ELTs)

- One of a range of beacon types in the Cospas-Sarsat system
- Automatically or manually activated
- Multiple types – fixed to the airframe or portable
- Transmits distress alerts via satellite on 406 MHz
- Position homed to using a signal on 121.5 MHz
- Operates for 48 hours
- Recent improvements to survivability requirements



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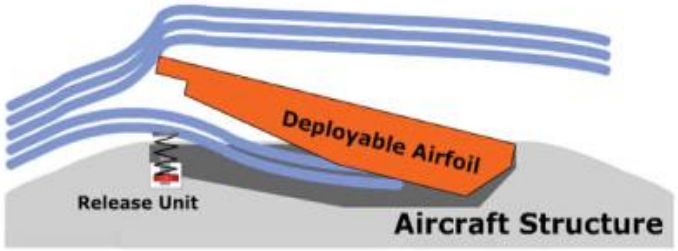
Underwater locating devices

- Securely attached to the airframe
- Transmit homing signal on 8.8 KHz for 30 days (37.5 KHz for 90 days if attached to a flight recorder)
- Automatically activated
- Allows location of wreckage below the water surface



Flight Recorder Data Recovery

- Flight data assists with determining probable cause of accidents
- Recovered data to be made available in a timely manner
- Continuous transmission of flight recorder data
- Triggered transmission of flight recorder data
- Automatic deployable flight recorders (ADFR)

Publications relevant to GADSS

Annex 6 — *Operation of Aircraft*, Part I — *International Commercial Air Transport — Aeroplanes*

Annex 11 — *Air Traffic Services*

Annex 12 — *Search and Rescue*

PANS-OPS, Volume III — *Aircraft Operating Procedures* (Doc 8168)

The International Aeronautical and Maritime Search and Rescue Manual, Volume I and II (Doc 9731)

The Global Aeronautical Distress and Safety System (GADSS) Manual (Doc 10165)

GADSS

Global Aeronautical Distress and Safety System

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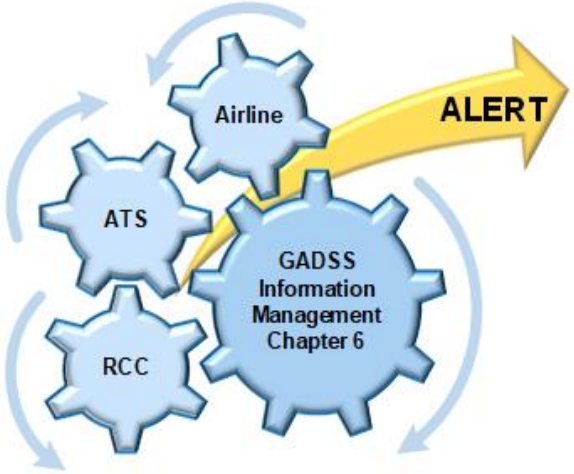

SAR

Flight Recorder
Data Recovery

Accident
Investigation

Thank You

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