AUTONOMOUS DISTRESS TRACKING (ADT)

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**TIMELINE - TRAGIC EVENTS & OPPORTUNITIES FOR IMPROVEMENTS**

- **19 May 2016:** MS 804 Crash  
  **Impact:** Raised a number of concerns with respect to the public’s trust in international civil aviation and led to a series of rapid actions

- **08 March 2014:** MH 370 Disappearance

- **01 June 2009:** AF 447 Crash

  - **May 2014:** ICAO Special Multidisciplinary meeting
  - **June 2015:** GADSS concept made by Adhoc working group
  - **March 2016:** ICAO Council adoption of GADSS-related global aircraft tracking initiatives
07:41am
Air France notifies B&L of missing plane, first steps taken to launch search.

02:14am
Last automated message sent to Air France maintenance headquarters.

02:20am
AF-447 due in Senegal airspace but never makes contact.

01:33am
Last radio contact with Brazilian air traffic control.

10:29pm (GMT)
Air France flight 447 departs Rio de Janeiro for Paris. 216 passengers and 12 crew members aboard.

01:55:57am
Cpt. Dubois goes on scheduled break, leaving two co-pilots in charge in the cockpit.

02:10:38am

02:18:07am
Co-pilot Bonin makes disastrous decision to pull the nose of the plane up. Plane starts to climb rapidly, which soon leads to aerodynamic stall.

02:18:17am
First stall warning. Nose is still up, vertical speed increasing.

02:11:22am
Top of the rollercoaster. The plane stalls, starts to fall out of the sky—dropping at 10,000 feet per minute.

02:31:43am
Cpt. Dubois re-enters the cockpit. Says to Bonin, “What are you (co-pilot) doing?” No one acknowledges the plane is in a stall.

02:32:30am
Co-pilot Bonin says: “Am I going down now?” Apparently so discombobulated he has no idea whether the plane is going up or down.

02:33:23am
Computer’s synthetic voice announces “Pull up!” But it is too late. Co-pilot Robert’s last words: “We’re going to crash. I can’t believe it.”

02:34:28am
Air France 447 hits the water.
GLOBAL AERONAUTICAL DISTRESS AND SAFETY SYSTEM (GADSS)

• ICAO developed GADSS Concept of Operations, released June 2017.

• Will enhance aviation safety for crew and passengers of commercial aircraft and SAR responders.

• Idea is to not lose anymore aircraft out at sea and able to locate the aircraft.

• The 2019 edition of the IAMSAR Manual (released Spring/Summer 2019) will contain general guidance regarding GADSS that applies to certain aircraft.
GLOBAL AERONAUTICAL DISTRESS AND SAFETY SYSTEM (GADSS)

• The first phase, commenced 1 January 2018 with Underwater Locating device (ULD) on frequency 37.5 kHz attached to the aircraft flight recorder; and, a ULD on frequency 8.8 kHz attached to the aircraft frame.

• The second phase commenced 8 November 2018 for the aircraft tracking function of automated reporting of position at least every 15 minutes.

• The next phase commences 1 January 2021 for the autonomous distress tracking (ADT) function of reporting positional updates at least once every minute.
GLOBAL AERONAUTICAL DISTRESS AND SAFETY SYSTEM (GADSS)

• OBJECTIVES

(1) Ensure timely detection of aircraft in distress (timely initiation of SAR actions).

(2) Ensure tracking of aircraft in distress and timely accurate location of end of flight (accurate direction of SAR actions).

(3) Enable efficient and effective SAR operations.

(4) Ensure timely retrieval of flight recorder data.
GLOBAL AERONAUTICAL DISTRESS AND SAFETY SYSTEM (GADSS)

• FUNCTIONS
(1) Aircraft Tracking
(2) Autonomous Distress Tracking (ADT)
(3) Post flight localization and recovery
AUTONOMOUS DISTRESS TRACKING (ADT)

• 01 January 2021
• **Brand new** aircraft to be outfitted with ADT device after 2021.
• Applies to certain passenger & cargo aircraft.
• All aircraft with take-off weight greater than 27,000KG/30TON or seating capability over 19.
• Expected duration of operation 370minutes (6.2hrs).
  • **Note: Not 24 hours like an ELT**
• Distress can only be de-activated using the same mechanism that it was activated originally in case of recovery from distress.
• Aircraft will be allowed to replace installed ELTs with newer ADT devices.
  • **Consequence – loss of homing and exact location**
Global Aeronautical Distress Safety System

- Autonomous Distress Tracking

- Provides automatic A/C position at least once every minute
- Must be active prior to accident event
- Location of an accident site within 6 NM
- Operates autonomously of aircraft power
- Results in Distress signal to appropriate aircraft operator
- May be manually activated
- Cannot be isolated

Only protected aeronautical safety spectrum, or protected distress spectrum (e.g., 406.1 MHz), can be used
ELT (DT)

- COSPAS-SARSAT will start approving specialized ELTs for distress tracking (DT) in 2019
- Does not have the 121.5 MHz homing capability
  - May optionally equip 121.5 MHz homing
- Linked to new COSPAS-SARSAT system
- Transmits position, aircraft ID and country of origin
- For only 370 minutes (6.2 hrs)
- Every 5 seconds the first 2 minutes
- Every 10 seconds 2-5 minutes
- Every 30 seconds after 5 minutes
- The only way to cancel the distress alert is by having the same reason it was activated solved
Activated when the plane is still flying via 4 main automatic triggers (manual activation available).

(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.
AUTONOMOUS DISTRESS TRACKER

- Get aircraft position BEFORE the accident/crash.
- Help with past ELT issues of being destroyed after crash or not activating at all due to crash.
AUTONOMOUS DISTRESS TRACKER

QUESTIONS