AUTONOMOUS DISTRESS TRACKING (ADT)

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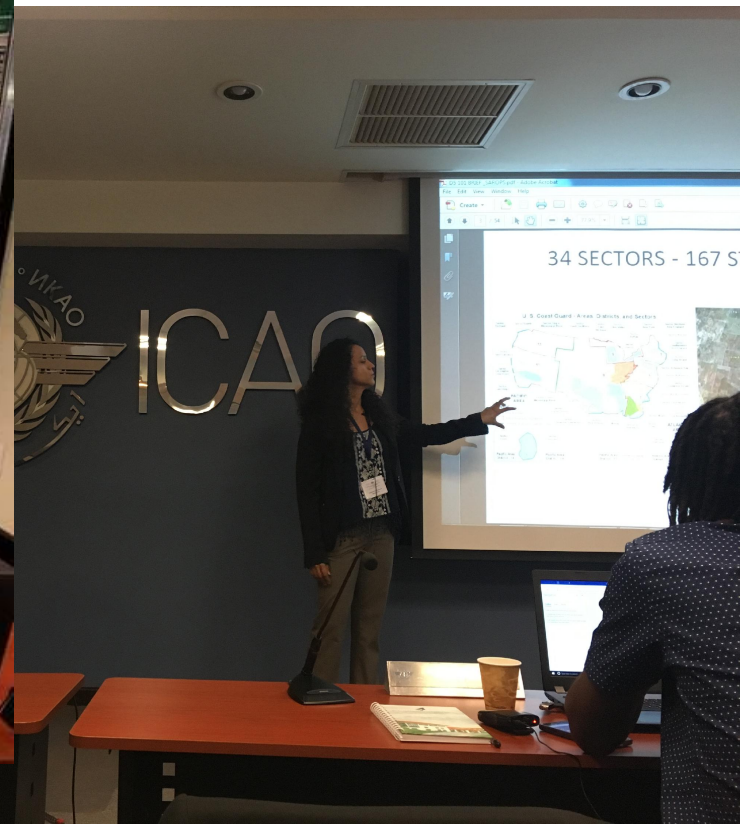
INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO)

CARIBBEAN REGIONAL SAR PLAN AND SAR WORKSHOP



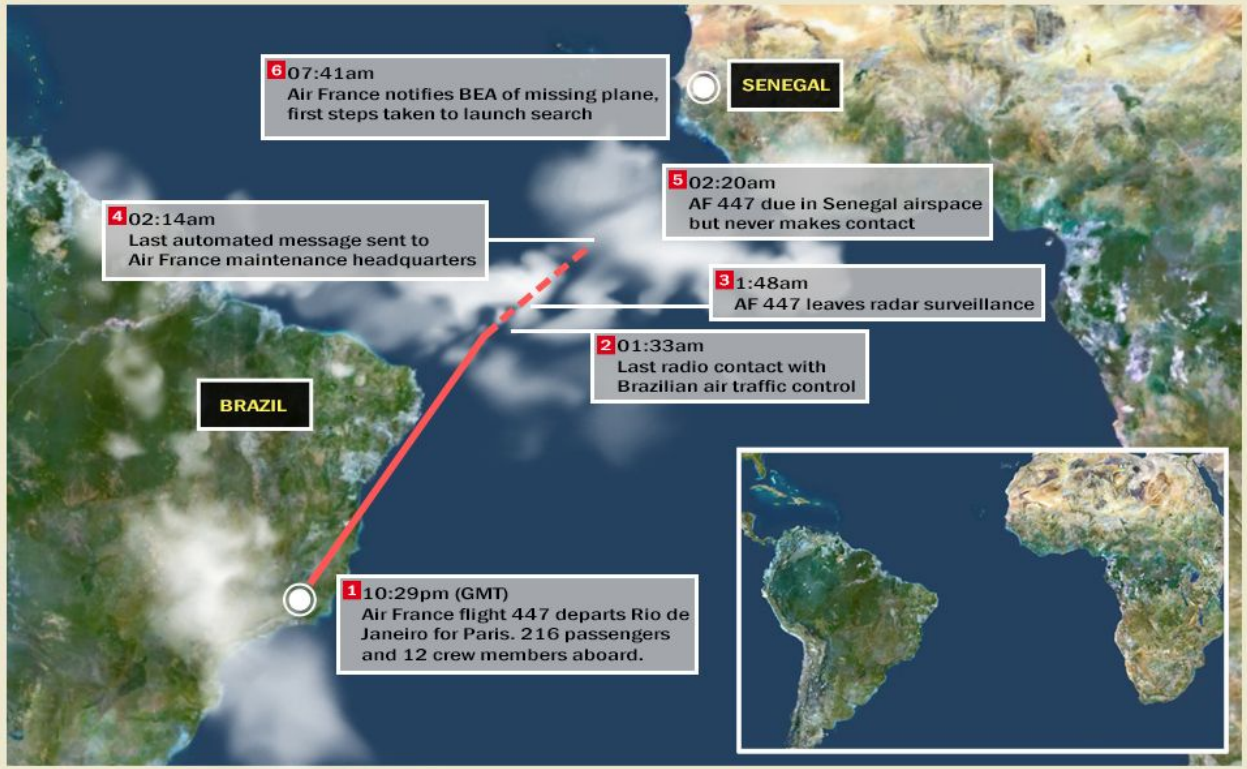
TIMELINE - TRAGIC EVENTS & OPPORTUNITIES FOR IMPROVEMENTS


File
malaysiaairlines
BREAKING NEWS
10 MINUTES NON-STOP NEWS
MALAYSIA AIRLINES FLIGHT MISSING
227 PEOPLE ON BOARD, INCLUDING 4 AMERICANS


SkyVector
Aeronautical Charts
VIETNAM
search area
Gulf of Thailand
South China Sea
normal flight path to China
search area
?
search area
LANGKAWI
KOTA BHARU
contact lost from civilian 2ndary radar at 35.000 feet
contact lost from military primary radar at 1.000 feet
PULAU PINANG
Strait of Malacca
MALAYSIA
MH 370


KAZAKHSTAN
malaysia
UZBEKISTAN
TAJIKISTAN
AFGHANISTAN
PAKISTAN
NEPAL
CHINA
BHUTAN
BURMA
THAILAND
Bay of Bengal
Known route
Suspected route
Possible routes
Countries included in the search
Last transponder contact with plane
Last radar contact with plane
Kuala Lumpur, Malaysia
INDONESIA
500miles
Southern Indian Ocean
Australia
Debris found 1500km from Perth

AIRFRANCE / FLIGHT 447



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

02:10:05am
Pitot tubes freeze. Air speed indicator goes haywire. Auto-pilot disconnects. Co-pilot Bonin now flying the plane.

02:10:07am
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.

02:10:11am
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.

02:11:43am
Capt. Dubois re-enters the cockpit. Says to Bonin, "What are you [expletive deleted] doing?" No one acknowledges the plane is in a stall.

02:12:30am
Co-pilot Bonin says: "Am I going down now?" Apparently so discombobulated he has no idea whether the plane is going up or down.

02:13:23am
Computer's synthetic voice announces "dual input" in the cockpit—the two copilots are putting contradictory inputs into their respective control sticks.

02:14:14am
Synthetic Voice: "Pull up!" But it is too late. Co-pilot Robert's last words: "We're going to crash. I can't believe it."

02:14:28 am
Air France 447 hits the water.

abcNEWS Illustration by Ma'ayan Rosenzweig

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

ADT

- **Autonomous Distress Tracking**

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

- **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**


COSPAS SARSAT
GEO
Glonass
GPS
LEO
Galileo
Return Link Message
GPS
Glonass
Galileo
GEO
LEO
ELT(DT)
Autonomous distress tracking of aircraft in flight
EPIRB
PLB
ELT
RLSP
Galileo
BEACON ALERT
SAR Crew Tasked
Distress Notification & Location
Processed Distress Beacon Data
LUTs
RCC
MCC

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 370minutes (6.2hrs)
- 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

ELT (DT)

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