


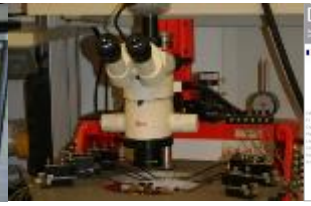


BEA

Bureau d'Enquêtes et d'Analyses
pour la sécurité de l'aviation civile

Flight Data Recovery and Triggered Transmission

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Flight Data Recovery over Water

- BEA launched in August 2009 an international working group in the framework of AF447 investigation

- Evaluate new technology to safeguard flight data and/or to facilitate the localization and recovery of on-board recorders
  - Flight data transmission
  - New flight recorder technology
  - Wreckage localization technology

- Analyze technical feasibility as well as cost of various solutions

Flight Data Recovery WG

100 members from 50 organisations

60 participants

attending the meetings

Manufacturers
Airlines
Associations
Service providers

Airbus, Boeing, Astrium, Iridium, Inmarsat, Star System, Flyht, SITA, L3Com, Honeywell, GE, DRS, EADS, Dukane, Benthos, ARINC, SESAR ACSA, IXwaves Air France, Fedex, IATA, IFALPA

Civil Aviation Authorities

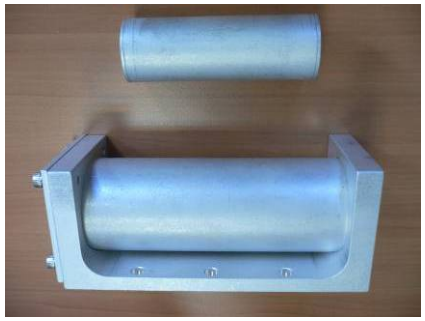
Investigation Authorities

Solution Evaluation

- Analysis of past events over water including AF447
- 38 identified events between 1996 and 2014
- 8 recorders not found

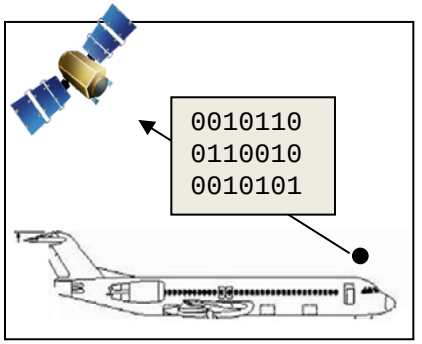
- Solution evaluation based on:
  - Technical feasibility: maturity & equipment
  - Cost: per aircraft & per ground station
  - Benefit: applicability to past events

Flight Data Recovery Conclusions



- Extended duration of transmissions by the flight recorder's ULB (90 days instead of 30 days)
- Installation of low frequency ULBs (8.8 kHz)
  - ↪ Standards included in the ICAO Annex 6

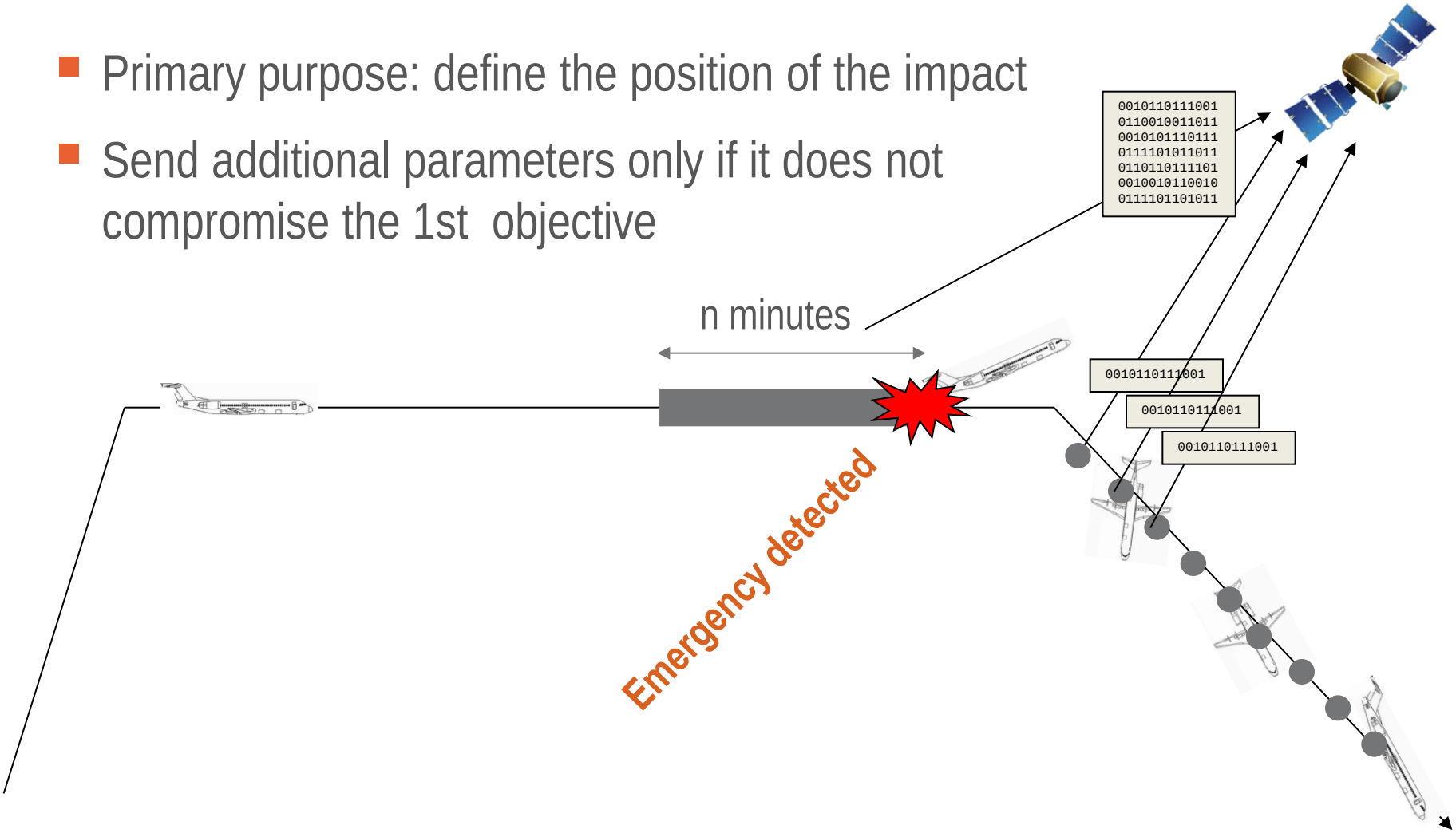
- Regular transmission of basic aircraft parameters
- Triggered transmission of flight data. On this point, additional work was deemed necessary and the BEA launched a new international working group



- Installation of ED-112A deployable recorders
  - ↪ ICAO FLIRECP proposed amendments to Annex 6

Triggered Transmission Concept

- Primary purpose: define the position of the impact
- Send additional parameters only if it does not compromise the 1st objective



Triggered Transmission Objectives

- Are there triggering criteria that meet the 2 following conditions:
  - Is the probability of detection of an upcoming catastrophic event at a maximum?
  - Is the probability of a nuisance-triggered transmission reduced to a minimum?
- Are satellite connection and transmission times compatible with the warning time provided by the emergency situation detection criteria?
- Does satellite antenna technology allow for continuous transmission, even for aircraft in unusual attitudes with high pitch and roll rates?

- Database of flight data from accidents and normal flights
- Connectivity with Inmarsat and Iridium constellations

Triggered Transmission Conclusions

- Robust emergency detection criteria are achievable
- The WG concludes that it is technically feasible to significantly reduce the search area for wreckage by:
  - Triggering transmission of appropriate data via SatCom prior to impact, and/or
  - Automatically activating next generation ELTs prior to impact, and/or
  - Increasing the frequency of position reports.

  - The joint EUROCAE WG-98 / RTCA SC-229 is developing specifications for triggering criteria and second generation ELTs
  - ICAO FLIRECP proposed amendments to Annex 6 regarding Distress System based on triggered transmission

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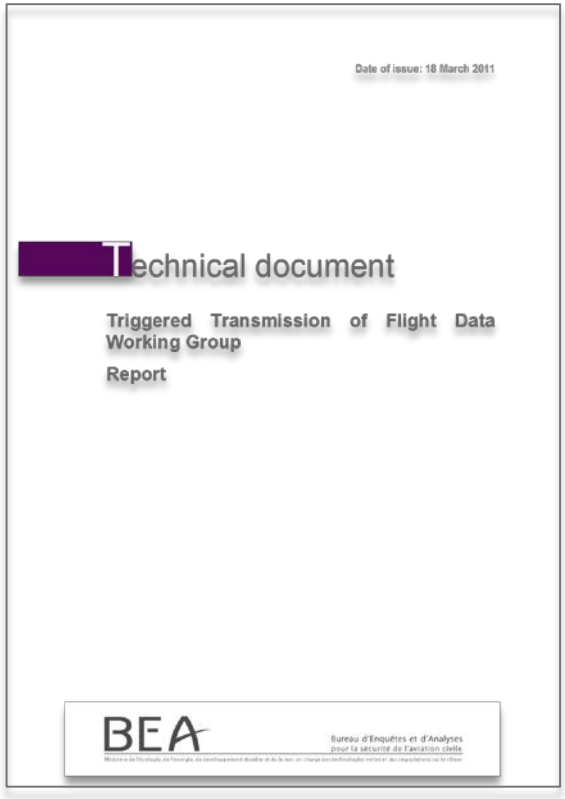
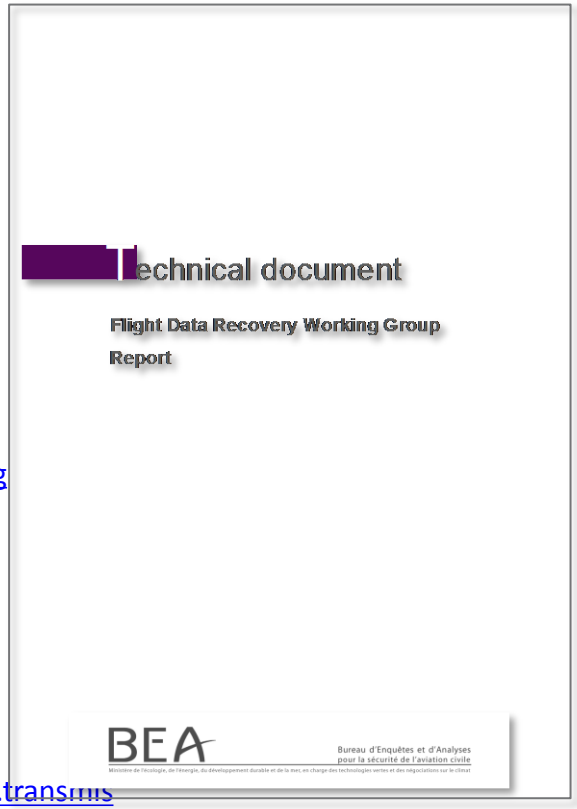


http://www.bea.aero/en/enquetes/flight.af.447/triggered.transmission.of.flight.data.pdf



http://www.bea.aero/en/enquetes/flight.af.447/flight.data.recovery.working.group.final.report.pdf

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