Foreseen Safety Strides with Lightweight Flight Recorders on Humanitarian Aviation

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WFP ECCAIRS Database Statistics

Number of WFP occurrences per category
(AC MTOW < 5,700 kg and HC MTOW < 3,180 kg) / year

- Aeroplane
- Helicopter

10th Global Humanitarian Aviation Conference
Available Lightweight Flight Recorders

- Robust (compliant with specs ED-155)
- Lightweight
- Dozens of parameters
- Audio
- Image

Image Recording Analysis
Examples of Cost of Installation

<table>
<thead>
<tr>
<th>Installation type</th>
<th>Retrofit analog aircraft</th>
<th>Forward fit with bus</th>
<th>Forward fit with bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recorder</td>
<td>9 000 € single unit</td>
<td>6 700 € single unit</td>
<td>10 000 € single unit</td>
</tr>
<tr>
<td>Associated equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquisition system</td>
<td>Included</td>
<td>800 €</td>
<td>Airframe development</td>
</tr>
<tr>
<td>Analogue aircraft</td>
<td>Included</td>
<td>4 500 €</td>
<td></td>
</tr>
<tr>
<td>Microphone Camera</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labour</td>
<td>3 days (3 x 8 h) 1 man</td>
<td>1 day (8 h) - 1 man</td>
<td>1 day (8 h) - 1 man</td>
</tr>
<tr>
<td>Certification</td>
<td>2 000 € for first record</td>
<td>2 000 € for first record</td>
<td>2 000 € for first record</td>
</tr>
<tr>
<td>Test flight</td>
<td>800 € for first record</td>
<td>800 € for first record</td>
<td>800 € for first record</td>
</tr>
<tr>
<td>Total</td>
<td>11 800 € + labour cost</td>
<td>10 000 € + labour cost</td>
<td>12 800 € + labour cost</td>
</tr>
<tr>
<td>Parameters/Audio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image/Parameters/Audio</td>
<td>14 500 € + labour cost</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ICAO Standards

- All turbine-engines in Commercial Air Transport ops
  - A/C MTOW < 5,700 kg with TC after 01/01/2016 and
  - H/C 2,250 kg < MTOW < 3,180 kg with TC after 01/01/2018

- Shall install
  - A lightweight or a flight data recorder or an
  - Image recorder capable of recording flight path and speed parameters displayed to the pilot(s)

- Recommended for new built after 01/01/2016 or 2018
Accident Cessna Caravan (1/2)

- 8 fatalities on 19 November 2005 at Stupino (Russia)
- Ivolga-Avia Cessna 208B Grand Caravan registered P4-OIN
- Classification: Loss of control in icing conditions
- Russian regulations required the Caravan to carry both cockpit voice and flight data recorders
- Thanks to the flight recorders, investigators have been able to piece together the final moments of the flight

Accident Cessna Caravan (2/2)

- In icing conditions, pitch attitude was about 9° nose-up and airspeed was 102 knots when the airplane stalled
- The stall-warning system did not activate before the stall occurred
- Investigators urged restrictions on Cessna 208 icing operations
- It would have been impossible to understand this issue without the flight data recordings
- 3 fatalities on 30 March 2013 in Alaska (USA)
- DPS AS350 B3 helicopter registered N911AA
- Crash following encounter with instrument meteorological conditions after departure from remote landing site
- The helicopter was equipped with an image recording system designed to also record two-tracks audio, position, altitude, and groundspeed information

Accident AS350 (2/2)

- According to images recovered from the helicopter’s onboard Appareo Systems Vision 1000, as the helicopter completed a 360° turn, the pilot caged the attitude indicator.
- After this, the helicopter entered a series of erratic turns, climbs, and descents and crashed.
- It would have been impossible to understand the causes of the accident without the image recording.
Benefits of Flight Recorder Installation

- Flight recorders will make it possible to:
- Analyse data to help maintenance issues thus reducing downtime/cost
- Collect/analyse data more frequently
- Better identify/capture undesirable events/trends
- Give situational information and help explain events
- Improve safety

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Thanks for your attention