

**BAe ATP,
SE-MHF**

**8 nm west of Milton
Keynes**

03 May 2018

Serious Incident

Investigation Synopsis

The aircraft experienced a loss of DC electrical power during the cruise whilst operating a cargo flight from East Midlands Airport to Stansted Airport, resulting in the loss of a significant number of flight deck instruments and systems. The crew decided to return to East Midlands Airport where they made a normal landing, following which DC electrical power was restored without crew action. The loss of electrical power was consistent with a failure of the No 1 Transformer Rectifier Unit (TRU) or its contactor, followed by a subsequent failure of the DC essential busbar COUPLE function. Subsequent testing of the aircraft's electrical system did not identify the cause of either failure.

The investigation identified that the aircraft's FDR was recording intermittently due to corrosion caused by moisture ingress. Two safety recommendations are made, relating to the prevention of moisture entering the FDR on BAe ATP aircraft with the Large Freight Door (LFD) modification and for the replacement of flight recorders using magnetic tape.

Safety Recommendation 2019-001

Justification

Unlike later generation solid-state recorders, the unit in SE-MHF was not required to be tested for its waterproofness or the potential effects of dripping water. Therefore, to minimise the effects of moisture ingress on the performance of the FDR fitted to the ATP, the following Safety Recommendation is made:

Safety Recommendation 2019-001

It is recommended that the European Union Aviation Safety Agency (EASA) require BAE SYSTEMS to protect the flight data recorder fitted to those ATP aircraft equipped with large freight doors from the effects of rainwater and other liquids.

Date Safety Recommendation made: 18 April 2019

LATEST RESPONSE

Response received: 07 July 2022

The UK Civil Aviation Authority (CAA), in its role of primary certification authority for this aircraft type, issued on 15 June 2022 the Airworthiness Directive (AD) number G-2022-0012, which has been endorsed by EASA and published at the following link: <https://ad.easa.europa.eu/ad/G-2022-0012>

The AD specifically refers to this Safety Recommendation (2019-001), and mandates the content of the Service Bulletin (SB) ATP-31-027, issued by BAE Systems Ltd.

The AD requires a reduction in the interval of periodic data download of the Flight Data Recorder (FDR) / Data Acquisition and Recording Unit (DARU) to confirm correct functioning of this equipment. In addition, it

requires, whilst performing the FDR/DARU data download, to check and report back to BAE Systems any signs of water/moisture that might have percolated through and dripped onto the FDR/DARU from the cargo bay floor, and to make sure that the area is dry before closing up.

Furthermore, the AD confirms that BAE Systems is also working to develop a modification to provide protection of the FDR / DARU against moisture ingress.

Safety Recommendation Status **Open**

AAIB Assessment **Partially Adequate**

Action Status **Planned Action Ongoing Update Due 28 February 2023**

Feedback rationale

Whilst the AAIB welcomes the mandating of reduced inspection intervals and the introduction of a check for moisture ingress, the actions taken will not protect the flight recorder from the effects of rainwater or other liquids as recommended. As a consequence, this EASA response is assessed as 'Partially adequate' (EU 996/2010 refers).

However, the response does indicate that work is ongoing to develop a modification which could completely satisfy the intent of this Safety Recommendation, and the AAIB requests an update on the status of introducing this modification by 28 February 2023. (EU Regulation 996/2010 article 18 refers).

RESPONSE HISTORY

Response received: 03 July 2019

The European Union Aviation Safety Agency (EASA) has contacted BAE SYSTEMS to discuss the protection of the flight data recorder fitted to those ATP aircraft equipped with large freight doors from the effects of rainwater and other liquids.

AAIB Assessment – Partially Adequate Open

(SRIS Reference: GB.SIA-2019-0001)

Safety Recommendation 2019-002

Justification

It may still be several years before aircraft operating in Europe with magnetic-tape FDRs are finally retired from service, or a lack of spares require an operator to install an alternative solid-state FDR.

It is important that FDR systems are reliable and ensure high quality data is available to accident investigation authorities. Therefore, the following Safety Recommendation is made:

Safety Recommendation 2019-002

It is recommended that the European Union Aviation Safety Agency (EASA) set an end date to prohibit the use of flight data recorders that use magnetic tape as a recording medium, to ensure compliance with ICAO Annex 6 from that date.

Date Safety Recommendation made: 18 April 2019

LATEST RESPONSE

Response received: 03 July 2019

Prohibiting the use of flight data recorders (FDRs) that use magnetic tape as a recording medium was considered under European Union Aviation Safety Agency (EASA) rulemaking tasks RMT.0400 & RMT.0401 'Amendment of requirements for flight recorders and underwater locating devices'.

The results of the related regulatory impact assessment (RIA) are contained in the associated notice of proposed amendment NPA 2013- 26, which was published on 20 December 2013. As described in the RIA, a conservative assumption was that, on 1 January 2013, 20% of FDRs installed on aeroplanes operated for commercial air transport by EASA Member State operators were using magnetic tape technology. The proportion of magnetic tape FDRs was assumed to decrease at a rate corresponding to the renewal rate of the fleets of aeroplanes of EASA Member State operators. Assuming an economic life cycle of 30 years for an aeroplane, the proportion of magnetic tape FDRs on board aeroplanes was expected to decrease by 10% every 3 years. With this assumption, by 1 January 2019 the proportion of aeroplanes fitted with a magnetic tape FDR was estimated to be close to 0%. Therefore, requiring the replacement of magnetic tape FDRs for a few residual in-service aeroplanes was considered not to be justified.

Furthermore, prohibiting the use beyond 01 January 2019, of FDRs that use magnetic tape as a recording medium would need to be considered through a new rulemaking task which would be allocated a priority according to EASA's established rulemaking planning process. The FDR is not needed for safe flight and landing, it does not directly improve the survivability of aircraft accidents, and the number of aeroplanes of EASA Member State operators potentially impacted by phasing out of magnetic tape FDRs is minimal, so that such a rulemaking task would most probably be allocated a low priority.

Safety Recommendation Status Closed

AAIB Assessment Not Adequate

Action Status**Planned Action Not Completed****Feedback rationale**

The EASA has declined to set an end date for the use of recorders using magnetic tape as the recording medium and has stated that it would set a low priority on any new rulemaking task. The AAIB notes that this does not comply with ICAO Annex 6, Part I, para 6.3.1.2. (EU Regulation 996/2010 article 18 refers).

RESPONSE HISTORY

N/A

(SRIS Reference: GB.SIA-2019-0002)