Air Accident Investigation Unit Ireland

INTERIM STATEMENT
SA-227-BC Metro III, EC-ITP, Cork Airport, Ireland
10 February 2011

An Roinn Iompair
Turasóireachta agus Spóirt
Department of Transport,
Tourism and Sport

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INTERIM STATEMENT

Accident to Fairchild Metro III EC-ITP at Cork Airport on 10 February 2011

A Preliminary Report on this accident was published on 16 March 2011. EU Regulation 996/2010 requires that, *'if the Final Report cannot be made public within 12 months, the safety investigation authority shall release an interim statement at least at each anniversary of the accident or serious incident, detailing the progress of the investigation and any safety issues raised.'* This Interim Statement should be read in conjunction with the published Preliminary Report.

The aircraft departed Belfast City Airport (EGAC) on an international scheduled passenger service to Cork Airport (EICK). Low Visibility Procedures (LVP) were in operation at the destination. The aircraft carried out two ILS[1] approaches, each followed by a missed approach. The aircraft then entered a holding pattern following which a third ILS approach was made to Runway (RWY) 17. The approach was continued below Decision Height (200 ft) and a missed approach was initiated. Approaching the runway threshold, the aircraft rolled to the left followed by a rapid roll to the right during which the right wingtip contacted the runway surface. The aircraft continued to roll and impacted the runway in a fully inverted position. The aircraft departed the runway surface to the right and came to rest in soft ground. A significant quantity of mud entered the aircraft through a fracture in the roof, partially filling the cabin. Six persons (including the two Flight Crew members) were fatally injured, four were seriously injured and two received minor injuries. The propeller blades on both engines were severely damaged; three of the four propeller blades on the right-hand engine detached during the impact sequence. Fire occurred in both engines after impact. These fires were extinguished expeditiously by the Airport Fire Service.

Following a preliminary examination at the accident site, the wreckage was removed to the AAIU wreckage facility at Gormanston in County Meath on Sunday, 13 February 2011 where further examination was conducted.

The propellers, engines and associated engine control components were examined at the respective manufacturers' facilities in the United States. These examinations were conducted under the control of the Investigation and with the assistance of the US National Transportation Safety Board (NTSB) Accredited Representative and Advisers, and technical experts from the relevant manufacturers.

The Aircraft Technical Log Book was examined by the Investigation; no recorded defects or deferred defects were entered between 9 November 2010 and the date of the accident.

Prior to the removal of the wreckage, the Flight Data Recorder (FDR) and Cockpit Voice Recorder (CVR) were removed and downloaded (a transcript of the final 17 seconds of the CVR recording was published in the Preliminary Report). The CVR comprised four tracks, three of which provided audio recording for the final half hour of the accident flight; the fourth track was not used. During the final approach the Co-Pilot was Pilot Flying (PF). The CVR recorded the Commander stating that he would handle the power during the approach; this was acknowledged by the PF.

1 **ILS:** Instrument Landing System.

The Captain's and First Officer's flight instruments and the two navigation receivers were sent to the United Kingdom for detailed examination under the supervision of the UK Air Accident Investigation Branch (AAIB). No pre-impact defects were identified other than low sensitivity on the No. 2 Glideslope receiver. However, the CVR recorded the Flight Crew confirming that the localiser and glideslope were captured successfully.

The FDR data comprised a total of 106 hours of aircraft operation. The Operator was unable to provide the FDR data frame layout to the Investigation, which is required to decode the FDR recording. With the assistance of the NTSB, a data frame layout was obtained which allowed parameters to be decoded.

The Terrain Awareness Warning System (TAWS) computer was also recovered and sent to the manufacturer in the United States for data extraction under NTSB supervision. Aircraft position information was obtained from TAWS and Cork ATC Radar records.

Examination of the propeller assemblies showed that, at the moment of impact, the blades on both propellers were at a blade angle of approximately 40°, which was appropriate for a power setting commensurate with a go-around. No pre-accident defects were identified with either of the propeller assemblies, and the evidence indicates that the propellers were operating correctly at the time of impact.

The engines were disassembled at the manufacturer's facility under the supervision of the Investigation. No pre-accident defects were identified with the engines, other than the engine control component issue noted below, and the evidence was consistent with both engines operating at high power at the time of impact.

FDR data showed that, from the earliest recordings (106 hours prior to the accident) there was a mismatch between the torques being delivered by the two engines. In general, the recordings showed that the torque being delivered by No. 2 engine exceeded that being delivered by No. 1 engine by up to 5%. It was also noted that, as the power levers for both engines were being advanced prior to take-offs, the torque response for No. 2 engine was faster than that for No. 1 engine.

During laboratory examination of the engine control components, an anomaly was found on the P_{T2}/T_{T2} sensor associated with the No. 2 engine. This sensor, which is located in the inlet to the first stage compressor, provides total pressure and total temperature information for the scheduling of the associated fuel control unit (FCU).

The bellows of the No. 2 engine P_{T2}/T_{T2} sensor, when examined, was found to be considerably shorter than required by the manufacturer's specification, and subsequently a leak within the system was identified. Laboratory testing demonstrated that, as a consequence of this defect, the P_{T2}/T_{T2} sensor was outputting a temperature value up to 135°F below the actual total temperature to the No. 2 FCU. This cold temperature signal resulted in incorrect scheduling of fuel flow to the No. 2 engine. This in turn had three effects on engine performance, all of which were found throughout the FDR data. These were:

(1) slower engine speed response when the condition lever was advanced,

(2) faster engine torque response when the power lever was advanced, and

(3) higher torque for a given power lever angle.

FDR data for the accident flight showed that, approximately eight seconds before the impact, the No. 1 engine torque was recorded at a value of -9% (negative torque). In approximately the same time-frame, the No. 2 engine torque had a minimum recorded torque value of 0%. The recorded torque levels for both engines subsequently increased rapidly and the engines remained at high power until impact. During the final seven seconds of the CVR recording, the stall warning horn aural alarm was heard on the recording.

The Investigation, with the assistance of the NTSB and the engine manufacturers, carried out a detailed analysis of the available recorded engine parameters, along with engine historical data for both engines, in order to calculate the fuel flow rates to the engines. The respective fuel flow rates were then used to calculate the power lever angles during this phase of flight. The data indicates that both power levers were simultaneously moved below the flight idle position of 40°, in the period from approximately eight seconds to six seconds before impact. Fuel flow calculations indicate that the power lever angles at this time were in the range 31° to 33°, i.e. below the flight idle position. Calculations also show that shortly before impact, the power levers had been advanced to angles within the range 72° to 75°.

The Investigation is currently carrying out a flight path analysis with the assistance of the NTSB, which will analyse the complex aerodynamic factors involved during the final phase of flight. This analysis, together with the limited FDR data available, may provide additional information regarding the loss of control of the aircraft.

The Investigation is also examining the operational control, the regulatory oversight of the operation and the effectiveness of that oversight. The examination of the complex relationships between the AOC[2] holder, the undertaking selling the service (Ticket Seller), and the undertaking which supplied the aircraft and flight crew, is continuing.

The Investigation notes that at a scheduled meeting of the Air Safety Committee of the European Commission on the 14 March 2011[3], Agencia Estatal de Seguridad Aérea (AESA), the Civil Aviation Authority of Spain, briefed the Commission *'that they decided to limit the AOC of [the Operator] to prevent operation of the Fairchild Metro 3s[4], and that they had initiated the process to suspend the AOC.'* The Commission sought to clarify whether AESA's surveillance activity had provided the evidence to show that the air carrier was capable of adequately supervising its remote operations. At a further meeting on 19 October 2011[5], AESA informed the Commission, inter alia, that *'the air carrier [Operator], following corrective actions by the company, had its AOC renewed, but limited to exclude the aircraft of type Metro III'.*

The Investigation is on-going and a Final Report will be issued in due course.

- END -

2 **AOC**: Air Operator Certificate.

3 Regulation (EU) No. 390/2011.

4 **Metro 3:** The aircraft type used on this UK-Ireland passenger operation.

5 Regulation (EU) No. 1197/2011.

In accordance with Annex 13 to the International Civil Aviation Organisation Convention, Regulation (EU) No 996/2010, and Statutory Instrument No. 460 of 2009, Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulation, 2009, the sole purpose of these investigations is to prevent aviation accidents and serious incidents. It is not the purpose of any such accident investigation and the associated investigation report to apportion blame or liability.

A safety recommendation shall in no case create a presumption of blame or liability for an occurrence.

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