

**SERIOUS INCIDENT**

<b>Aircraft Type and Registration:</b>	ATR 72-212 A, EI-FCY	
<b>No &amp; Type of Engines:</b>	2 Pratt & Whitney Canada PW127M turboprop engines	
<b>Year of Manufacture:</b>	2013 (Serial no: 1139)	
<b>Date &amp; Time (UTC):</b>	15 May 2014 at 1923 hrs	
<b>Location:</b>	Manchester Airport	
<b>Type of Flight:</b>	Commercial Air Transport (Passenger)	
<b>Persons on Board:</b>	Crew - 4	Passengers - 48
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	None	
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence	
<b>Commander's Age:</b>	41 years	
<b>Commander's Flying Experience:</b>	6,263 hours (of which 5,028 were on type) Last 90 days - 147 hours Last 28 days - 40 hours	
<b>Information Source:</b>	AAIB Field Investigation	

**Synopsis**

On final approach to Manchester Airport, both multifunction computers (MFC) failed, resulting in the nosewheel steering system becoming inoperative. After landing, the aircraft deviated to the left side of the runway before the pilots brought it to a halt. After resetting the MFCs, they were able to taxi the aircraft to the terminal without further incident. Both the manufacturer and the operator have taken safety action because of this incident.

**History of the flight**

The aircraft was on a scheduled passenger flight from Cork Airport to Manchester Airport and had made an uneventful approach to Runway 23R. The co-pilot was PF and, after carrying out a normal landing, the aircraft started to deviate to the left of the runway centreline. The commander took control from the co-pilot in accordance with the normal procedure, and initially applied some rudder and then attempted to use nosewheel steering (NWS) to correct the deviation but the aircraft continued to turn left. The commander applied brakes and stopped the aircraft on the left side of the runway. The co-pilot noticed that the Multifunction Computer (MFC) modules 1B and 2B switch lights on the overhead panel were both indicating *FAULT*. The pilots reset the MFC modules and all systems were restored, allowing them to taxi the aircraft to its stand without further incident. Subsequently the commander reported that the NWS was ineffective during the landing roll and that no master cautions or warnings were observed, but that she noticed several engine indications were missing from the engine and warning display (EWD).

## Multifunction computers (MFC)

The MFC system consists of two independent computers, MFC 1 and MFC 2; each has two independent modules (A and B). The functions of the MFC system are to monitor, control and authorise various aircraft systems and to manage system failures and command associated warnings in the Flight Warning System (FWS). The MFCs are switched on and off by four pushbuttons (one for each module) on the overhead panel. These pushbuttons also contain FAULT lights.

Various aircraft systems are controlled through a variety of combinations of MFC modules. A significant number of electrical services are listed in the QRH as unavailable in the event of a failure of MFC 1B and 2B modules, including:

- FWS Master Warning
- FWS Master Caution
- FWS Aural alerts
- FWS Amber alerts on EWD
- Nosewheel steering<sup>1</sup>
- Anti-skid<sup>2</sup>

Although the FWS master warning and caution systems are unavailable, the manufacturer stated that, in the event of an MFC 1B and 2B failure on this aircraft variant, the MFC 1B and MFC 2B switch light alerts illuminate on the overhead panel and the master caution lights flash.

## Flight crew documentation

The Flight Characteristics section of the FCOM, for takeoff, states:

*'For take-off, use of nose wheel steering guidance is only recommended for the very first portion of the take off run as rudder becomes very rapidly efficient when airspeed increases (~40 kts) and ATR 72 exhibits a natural tendency to go straight.'*

For landing, it states:

*'-as speed reduces, and not later than about 40 kt (estimated) Capt takes NWS control, co-pilot hold control column fully forward.'*

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## Footnote

<sup>1</sup> NWS is unavailable because the weight-on-wheels system becomes inoperative.

<sup>2</sup> The manufacturer elaborated that only the touchdown protection element of the anti-skid system becomes inoperative. The touchdown protection system is designed so that, at main gear compression, the braking action is inhibited when wheel spin-up is below 35 kt or for 5 seconds, in order to preclude inadvertent brake application prior to wheel spin-up.

The minimum equipment list (MEL) allows for aircraft dispatch with NWS inoperative and there are no additional limitations on aircraft operation in this situation.

### **Analysis**

Failure of both MFC 1B and 2B causes the weight-on-wheels system to be unavailable, which results in the NWS becoming inoperative. When the commander realised that the NWS was inoperative, she concentrated on stopping the aircraft but also noticed that there were unusual indications on the EWD. The pilots diagnosed and rectified the dual MFC failure after they observed the FAIL lights on the overhead panel. They were unaware of the failure until after the aircraft had stopped.

After landing, the commander applied some rudder before attempting to use the NWS to keep the aircraft straight. The FCOM indicates that the rudder is effective in maintaining directional control above 40 kt. However, when the commander took control, it is likely that the aircraft speed was such that rudder authority alone was insufficient to correct the deviation from the centreline.

### **Safety actions**

The manufacturer has issued a Service Bulletin that recommends the installation of MFC computers modified to S5 standard to address the cause of the dual MFC failure experienced by this crew. At the time of publication of this report, the implementation of the Service Bulletin has been delayed pending resolution of technical issues associated with it.

The manufacturer has identified some inaccuracies in the FCOM, which it will amend.

The operator has introduced dual MFC failure scenarios into flight crew recurrent training.