

**16/2003**

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- 1 **OPERATIONAL CONSIDERATIONS WHEN THE ACCURACY OR RELIABILITY OF NAVIGATION EQUIPMENT IS IN DOUBT DURING THE APPROACH PHASE**

### 1.1 Introduction

- 1.1.1 The Air Accidents Investigation Branch (AAIB) is participating in an investigation into a serious incident where an Airbus A320 aircraft carried out two go-arounds, the first, after unreliable VOR navigation information and the second, after experiencing an EGPWS "Too Low Terrain" alert. Whilst the technical investigation continues, it is considered prudent to remind operators and their flight crews of the following recommendations and advice.

### 1.2 Background

- 1.2.1 The same crew and aircraft flew from London (EGLL) to Addis Ababa (HAAB) via Alexandria (HEBA) operating without incident to this en-route stop, disembarking passengers and refuelling. A long desert leg was flown via Khartoum with few navigation aids available for updating aircraft position. The aircraft was not fitted with GPS. On arrival at Addis Ababa VOR/DME (ADS), the crew were cleared to carry out a standard VOR/DME approach to runway 25L. There was a thunderstorm around 5 nm southwest of the airfield and therefore ADF information was not used. Navigation accuracy was low inbound and changed to high in the area of the VOR. The VOR/DME identified correctly and indications appeared normal up to the start of the procedure, but during the outbound leg an unexpected large correction left was required to acquire the radial.
- 1.2.2 After flying the ADS DME 13 nm arc, both a left turn to intercept the correct 249 degree inbound QDM, and descent to 11200 FT AMSL was commenced. The VOR radial started fluctuating during the descent and the indications disappeared. With no adequate visual reference, a standard missed approach was flown and the aircraft joined the hold. The crew confirmed with ATC that the VOR/DME was serviceable and the crew carried out a navigation accuracy check that appeared normal and elected to carry out a further approach.
- 1.2.3 Again the VOR fluctuated occasionally during the inbound leg and a "400 FT" radio altimeter callout was heard approximately 5 nm from the airfield at which point the Captain initiated a go-around and the crew heard the EGPWS Terrain Clearance Floor "Too Low Terrain" alert. It would appear that the aircraft was around 2.6 nm north of intended position. The aircraft cleared terrain by 56 ft.
- 1.2.4 Evidence so far indicates that the VOR was transmitting an erroneous signal that the aircraft may have used to update the Flight Management Guidance System (FMGS) position. The map showed the aircraft to be in approximately the expected position, but because this aircraft is **not** fitted

with GPS, any error transmitted from the VOR could result in an error in the computed FMGS position because position refinement is taken only from ground-based navigation aids in non-GPS aircraft. Similarly, the EGPWS terrain mapping position information was in error due to the navigational inaccuracy and therefore failed to work as expected.

## **1.3 Advice to Flight Crews**

1.3.1 Flight crews are reminded of the necessity of carefully monitoring the portrayal of navigational information, especially when flying in areas of limited navigational aids. In the event that the accuracy or reliability of navigation information is in doubt, or if conflicting navigational information is evident, then an immediate go around should be flown when below SSA. If an EGPWS alert is received then crews are reminded to carry out the correct actions immediately with the required vigour.

## **1.4 Recommendations**

1.4.1 Operators should ensure that the details of this incident, and the advice contained above, are brought to the attention of their flight crews.

1.4.2 Operators should endeavour to use aircraft with GPS on routes that involve long sectors both over water and terrain that terminate in remote areas served with few navigation aids. This will ensure that both FMS position update computations and EGPWS are provided with a choice of information sources from ground-based and satellite navigation systems

## **2 RUNWAY INCURSION AWARENESS**

### **2.1 Introduction**

2.1.1 Recent incident investigation and analysis conducted in the UK and other States has highlighted that the incidence of runway incursions is increasing and that such events pose a potentially significant risk to aircraft safety.

2.1.2 A runway incursion is any occurrence at an airport involving the unauthorised or unplanned presence of an aircraft, vehicle or person on the protected area of a surface designated for aircraft landings and departures.

### **2.2 Purpose**

2.2.1 This FODCOM advises AOC holders of some of the measures that are being taken to raise awareness of the hazards associated with runway incursion and of actions that can be taken to reduce the frequency of incursions.

### **2.3 Awareness campaign**

2.3.1 Over the coming months a series of posters will be distributed to increase awareness of the topic. Runway incursions can be caused by airside vehicle drivers, pilots and air traffic controllers. While individual posters will be targeted at a particular group, it is intended that the posters will identify to all those concerned, the dangers involved with operations in the vicinity of runways and emphasise measures that can be taken to reduce the incidence of incursions.

2.3.2 Other methods of raising awareness of the topic will include, the production of a computer-based presentation to assist in the briefing of drivers/controllers/pilots, the publication of an AIC, articles in aviation journals and the distribution of 'reminder' stickers for airside vehicles.

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## 2.4 Recommendation

- 2.4.1 It is recommended that Operators support the awareness campaign by distributing posters and other informative material to appropriate personnel and to incorporate awareness campaign products into safety activities.

Captain D Chapman  
Head Flight Operations Department  
14 May 2003

*Recipients of new FODCOMs are asked to ensure that these are copied to their 'in house' or contracted maintenance organisation, to relevant outside contractors, and to all members of their staff who could have an interest in the information or who need to take appropriate action in response to this Communication.*