

## Follow-up Action on Occurrence Report

*INCIDENT TO AIRBUS A340-642, G-VATL, EN ROUTE HONG KONG TO HEATHROW ON 8 FEBRUARY 2005*

**CAA FACTOR NUMBER** : F30/2007  
**FACTOR PUBLICATION DATE** : 04 September 2007  
**OPERATOR** : Virgin Atlantic  
**CAA OCCURRENCE NUMBER** : 2005/00888  
**AAIB REPORT** : AAR 4/2007

### SYNOPSIS

From AAIB Report:

Some 11 hours after takeoff, at about 0330 hrs with the aircraft in Dutch airspace and at Flight Level 380, the No.1 (number one) engine lost power and ran down. Initially the pilots suspected a leak had emptied the contents of the fuel tank feeding No.1 engine but a few minutes later, the No.4 engine started to lose power. At that point all the fuel crossfeed valves were manually opened and No.4 engine recovered to normal operation. The pilots then observed that the fuel tank feeding No.4 engine was also indicating empty and they realised that they had a fuel management problem. Fuel had not been transferring from the centre, trim and outer wing tanks so the pilots attempted to transfer fuel manually. Although transfer was partially achieved, the expected indications of fuel transfer in progress were not displayed so the commander decided to divert to Amsterdam (Schipol) Airport where the aircraft landed safely on three engines.

The investigation determined that the following causal factors led to the starvation of inner fuel tanks 1 and 4 and the subsequent rundown of engine numbers 1 and 4:

1. Automatic transfer of fuel within the aircraft stopped functioning due to a failure of the discrete outputs of the master Fuel Control and Monitoring Computer (FCMC).
2. Due to FCMC ARINC data bus failures, the flight warning system did not provide the flight crew with any timely warnings associated with the automated fuel control system malfunctions.
3. The alternate low fuel level warning was not presented to the flight crew because the Flight Warning Computer (FWC) disregarded the Fuel Data Concentrator (FDC) data because its logic determined that at least one FCMC was still functioning.
4. The health status of the slave FCMC may have been at a lower level than that of the master FCMC, thus preventing the master FCMC from relinquishing control of the fuel system to the slave FCMC when its own discrete and ARINC outputs failed.

During the investigation the AAIB issued six safety recommendations. Two were published in Special Bulletin S1/2005 on 08 March 2005 and four more in an interim report published in the February 2006 AAIB Bulletin.

## **FOLLOW UP ACTION**

The six Safety Recommendations made by the AAIB following their investigation are reproduced below together with the CAA's responses.

### **Recommendation 2005-036**

Airbus should review the FCMC master/slave determination logic of the affected Airbus A340 aircraft so that an FCMC with a detected discrete output failure or ARINC 429 data bus output failure cannot remain the master FCMC or become the master FCMC.

#### **CAA Response**

This Recommendation is not addressed to the CAA.

**CAA Status - Closed**

### **Recommendation 2005-037**

Airbus should review the logic of low fuel level warnings on affected Airbus A340 aircraft so that the FDC low fuel level discrete parameter always triggers a low fuel level warning, regardless of the condition of the other fuel control systems.

#### **CAA Response**

This Recommendation is not addressed to the CAA.

**CAA Status - Closed**

### **Recommendation 2005-108**

It is recommended that the European Aviation Safety Agency introduces into CS-25 the requirement for a low fuel warning system for each engine feed fuel tank. This low fuel warning system should be independent of the fuel control and quantity indication system(s).

#### **CAA Response**

This Recommendation is not addressed to the CAA.

**CAA Status - Closed**

### **Recommendation 2005-109**

It is recommended that the European Aviation Safety Agency should review all aircraft currently certified to EASA CS-25 and JAR-25 to ensure that if an engine fuel feed low fuel warning system is installed, it is independent of the fuel control and quantity indication system(s).

#### **CAA Response**

This Recommendation is not addressed to the CAA.

**CAA Status - Closed**

### **Recommendation 2005-110**

It is recommended that the USA's Federal Aviation Administration should introduce into FAR-25 a requirement for a low fuel warning system for each engine feed fuel tank. This low fuel warning system should be independent to the fuel control and quantity indication system(s).

#### **CAA Response**

This Recommendation is not addressed to the CAA.

**CAA Status - Closed**

**Recommendation 2005-111**

The Federal Aviation Administration should review all aircraft currently certified to FAR-25 to ensure that if an engine fuel feed low fuel warning system is installed, it is independent of the fuel control and quantity indication system(s).

**CAA Response**

This Recommendation is not addressed to the CAA.

**CAA Status - Closed**