

# Fuel starvation, Virgin Atlantic Airbus 340-642, 5<sup>th</sup> February 2005

(precis from AIB report 4/2007)

0330hrs: Aircraft was 11 hours into a flight from Hong Kong to London, at 38000 feet

No 1 engine lost power and ran down; pilots suspected a leak had emptied the tank feeding no 1 engine, but a few minutes later no 4 engine also lost power.

Pilots opened fuel cross-feed valves and No 4 engine recovered to normal operation

Pilots observed that fuel tank feeding no 4 engine was also indicating empty.

Fuel management problem was diagnosed. Fuel had not been transferring to the inner wing tanks.

Further fuel transfer was attempted but doubt about indications led to diversion to Schiphol where the plane landed successfully on 3 engines.

**Failure 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).

The flight crew attempted a relight of No 1 engine at FL380, whereas the Quick Reference Handbook states that the maximum guaranteed altitude for a relight is FL300.

**Failure 2:** Due to FCMC input 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.

**Failure 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.

**Failure 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 data bus outputs failed.

Total fuel quantity (as opposed to useable fuel quantity in the engine feed tanks) continued to be displayed on the fuel status page. The flight crew did not recall seeing any amber on the fuel system display page throughout the flight.

