

4 Safety Recommendations

The following Safety Recommendations were made during this investigation and were published in April 2006 in AAIB Special Bulletin 3/2006:

- 4.1 Safety Recommendation 2006-051:** It is recommended that the aircraft manufacturer, Airbus, reviews the existing ECAM actions for the A320-series aircraft, given the possibility of the simultaneous in-flight loss of the commander's and co-pilot's primary flight and navigation displays. They should consider whether the priority of the items displayed on the ECAM should be altered, to enable the displays to be recovered as quickly as possible and subsequently issue operators with a revised procedure if necessary.

Airbus has responded to this Safety Recommendation stating that it would not be acceptable to change the priority of the ECAM action items for the following reasons:

- there are other failure modes in which the selection of the AC ESS FEED is not the most important action,
- the current ECAM action prioritisation was arrived at after taking into account many different safety analyses,
- Changing the priority of the ECAM items would require validation on all airframe engine combinations and could have an impact on other engine or electrical alerts,
- New priorities could introduce new operational issues which would need to be reviewed and approved by the regulatory authorities (EASA/FAA).

- 4.2 Safety Recommendation 2006-052:** It is recommended that the aircraft manufacturer, Airbus, should review the A320-series aircraft Master Minimum Equipment List Chapter 31, INDICATING/RECORDING SYSTEMS and reconsider whether it is acceptable to allow the ECAM lower display unit to be unserviceable. They should amend the requirement, as necessary, to take account of the possibility of the simultaneous in-flight loss of both the commander's and co-pilot's primary flight and navigation displays and the ECAM upper display.

In response to this Safety Recommendation, Airbus has reviewed the content of the A318/A319/A320/A321 MMEL regarding dispatch with the lower ECAM display inoperative.

MMEL Sections 1 and 2 were updated in August 2006 to include the condition that an operational test of the AC Essential bus transfer function and indication must be performed once per day if the lower ECAM is inoperative. The Aircraft Maintenance Manual will also be updated to include the test procedure.

This Safety Recommendation was made to ensure that the operating crew would always have information presented on ECAM as to the actions required to recover the systems should a similar event occur. The response of Airbus to the recommendation did not address this problem, which is that if the Lower ECAM screen were not available, in the event of a similar failure, there would not be any information displayed to the crew as to what action they should take to recover the systems. Accordingly, Airbus propose to amend the A320 family MMEL section 2 regarding dispatch with the lower ECAM inoperative, to remind crews of the necessary recovery action should the AC ESS bus, and therefore all DUs be lost:

‘In case of failure of AC Bus 1, all DUs are lost:

- Apply AC ESS BUS FAULT procedure of FCOM 3.02.24
(Select AC ESS FEED at ALTN) to recover AC ESS BUS’

- 4.3 Safety Recommendation 2006-053:** The aircraft manufacturer, Airbus, should identify those aircraft with the single power supply to the standby artificial horizon and advise the operators of the potential implications of this configuration.

In response to this Safety Recommendation Airbus has advised operators through OIT 9SE999.0115/05/BB Rev 1, that for aircraft without the ISIS wiring configuration to the standby instruments, the standby horizon may be unusable after five minutes if the DC ESS bus is lost.

- 4.4 Safety Recommendation 2006-054:** It is recommended that the aircraft manufacturer, Airbus, revises the information about the power sources for the standby artificial horizon provided in Flight Crew Operating Manuals for the A320-series aircraft to reflect the actual status of the aircraft to which they apply.

In response to this Safety Recommendation Airbus has updated A320 family Flight Crew Operating Manual Section 3.02.24 page 11, Section 1.34.20 page 1 and Section 1.34.97 page 1 to reflect the different power supply configurations for the standby horizon.

The following additional Safety Recommendations are also made:

4.5 Safety Recommendation 2007-062: It is recommended that the European Aviation Safety Authority should, in consultation with other National Airworthiness Authorities outside Europe, consider requiring training for flight by sole reference to standby instruments for pilots during initial and recurrent training courses.

4.6 Safety Recommendation 2007-063: Airbus should introduce a modification for A320 family of aircraft which have the pre-ISIS wiring configuration for the standby instruments, in order to provide a back-up power supply which is independent of the aircraft's normal electrical power generation systems.

Since the issue of Special Bulletin 3/2006, Airbus has advised that Modification 37317 has been introduced by Service Bulletin SB A320-24-1120 issued May 2007. This modification provides an automatic reconfiguration of the power supply to the AC ESS bus in the event of AC 1 bus failure. This modification largely satisfies the intent of Safety Recommendation 2007-063.

4.7 Safety Recommendation 2007-064: The European Aviation Safety Agency should mandate either Airbus Service Bulletin SB A320-24-1120 or the provision of a back-up power supply for the standby horizon which is independent of the aircraft's normal electrical power generation systems, on A320 family aircraft.

4.8 Safety Recommendation 2007-065: In order to ensure that the standby instruments on A320 family aircraft remain adequately illuminated following the loss of the left electrical network, Airbus should introduce a modification to provide a power supply for the standby instrument integral lighting which is independent of the aircraft's normal electrical power generating systems.

In response to Safety Recommendation 2007-065 while it was still at the draft stage, Airbus advised that Service Bulletin A320-33-1057 had been issued in May 2007 to introduce Modifications 37329 and 37330. These modifications provide a backup supply to the cockpit floodlight above the standby instruments.

4.9 Safety Recommendation 2007-066: The European Aviation Safety Agency should mandate the provision of a power supply for the standby instrument integral lighting which is independent of the aircraft's normal electrical power generating systems, on A320 family aircraft.

4.10 Safety Recommendation 2007-067: Airbus should conduct a study into the feasibility of automating the reconfiguration of the power supply to the AC Essential bus, in order to reduce the time taken to recover important aircraft systems on A320 family aircraft following the loss of the left electrical network.

In response to this Safety Recommendation, while it was at the draft stage, Airbus issued Service Bulletin SB A320-24-1120 in May 2007. This introduced Modification 37317 which provides automatic reconfiguration of the power supply to the AC ESS Bus in the event of AC BUS 1 failure.

4.11 Safety Recommendation 2007-069: Airbus, in conjunction with the Generator Control Unit (GCU) manufacturer Hamilton Sundstrand, should modify the A320 family GCUs to provide the capability to record intermittent faults and to reduce their susceptibility to false differential protection trips.

4.12 Safety Recommendation 2007-070: The International Civil Aviation Organisation should expedite the introduction of a standard for flight deck image recording, and should encourage member states to provide legal protection, similar to that for cockpit voice recordings, for such image recordings.

4.13 Safety Recommendation 2007-071: British Airways PLC should review the advice given to flight crew concerning aircraft Technical Log entries, where an Air Safety Report (ASR) is also raised, to ensure that the aircraft Technical Log fully records the details of serious incidents and to ensure, as far as possible, that ASRs are received by the Flight Operations Safety Department in a timely a manner, irrespective of where the ASR is raised.

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