**Federal Department of the Environment,
Transport, Energy and Communications** **N° 1745**

Final Report
of the Aircraft Accident
Investigation Bureau

concerning the incident

of the aircraft EC-GCA

on 3rd October 1999

at Geneva Airport

Bundeshaus Nord, CH-3003 Berne

Aircraft Accident Investigation Bureau

INVESTIGATION REPORT

THIS REPORT HAS BEEN PREPARED FOR THE SINGLE PURPOSE OF ACCIDENT/INCIDENT PREVENTION. THE LEGAL ASSESSMENT OF ACCIDENT/INCIDENT CAUSES AND CIRCUMSTANCES IS NO CONCERN OF THE ACCIDENT INVESTIGATION (ARTICLE 24 OF THE AIR NAVIGATION LAW)

AIRCRAFT	Boeing B757 - 200	EC-GCA
OPERATOR	Air Europa, E – 07009 Palma de Mallorca	
OWNER	Air España SA, E – 07009 Palma de Mallorca	

PILOTS	2			
LICENCES	Spanish ATPL			
FLIGHT EXPERIENCE (PIC)	**Total**	9’400	**In the previous 90 days**	179
	On accident type	545	**In the previous 90 days**	179
FLIGHT EXPERIENCE (COPI)	**Total**	3’600	**In the previous 90 days**	143
	On accident type	2’137	**In the previous 90 days**	54

PLACE	Geneva Airport		
COORDINATES	---	**ALTITUDE**	---
DATE AND TIME	03 October 1999, 0840 UTC		

TYPE OF FLIGHT	Commercial scheduled flight / Air Europa Flight 631
PHASE OF FLIGHT	Level off to cruise
TYPE OF INCIDENT	Smoke in cockpit

INJURIES TO PERSONS

	Crew	Passengers	Others
Fatal	---	---	---
Serious	---	---	---
Minor or none	5	202	---

DAMAGE TO AIRCRAFT	Windshield cracked
OTHER DAMAGE	---

HISTORY OF FLIGHT

After level off at flight level (FL) 330 the cockpit crew noticed smoke on the left-hand side of the cockpit. The smoke was accompanied by odour typical for an electrical fire or an overheated electrical motor. The crew decided to divert to Geneva where they made a successful landing.

Nobody was hurt during the disembarkation of the plane.

INVESTIGATION

The airport authority of Geneva informed the Swiss Federal Aircraft Accident Bureau about the accident. An investigation according to ICAO Annex 13 was opened on the same day. The crew was interrogated in Geneva and the technical investigation was done under supervision of SR-Technics together with maintenance staff of the operator.

The investigation continued on the next day.

During the investigation the Flight Data Recorder (FDR) and Cockpit Voice Recorder (CVR) where sent to Zurich for the readout. A readout of the FDR was not possible for different reasons. Therefore the investigation was also done on this problem. The French Bureau Enquête Accidents was asked for help. This is the reason for which the investigation took longer than usual.

FINDINGS

- All crew members held valid licences.
- The aircraft had no story of smell or smoke.
- During the investigation all electrical fans and equipment was checked. When the windshield heater was switched on, the smoke reappeared. After a short time the windshield cracked.
- The electrical resistance measured at the affected terminals (J5 to J1 and J4 to J1) of the heater system were out of specification (approximately 50 Ohms instead of 11.15 Ohms max.).
- The flex wire conductor from one terminal (J5) to the bus bar inside the window is fused underneath terminal block **J5.** At the location of the fused conductor the terminal block and window frame show carbonised areas.
- This local increase of heating resistance and temperature was not detected by the fail safe provision of the control unit.
- A direct readout of the FDR in Zurich was unsuccessful. Thereby the technical staff found the original Allied Signal seal on the crash protected unit was already broken.
- The investigation of the FDR showed the causes for the damage to the tape. The analyse of the data registered on the tape showed big variations in the speed of the tape. This is the main reason for the bad quality of the registration.
- Honeywell answered that this damage can be the result of a direct readout

process when the tape is put into a continuous run mode. This mode generates a higher tape tension than normal flight record mode and can cause a worn tape to flare at the edges and come of the tape guide rollers.

- The time at which the seal was broken and whom has done this was not to be found.

ANALYSIS

The decision of the cockpit crew to divert to Geneva for landing was appropriate. The crews decision to ask for radar-vectors to the ILS 23 and perform a normal landing and disembarkment of the passengers therefore was appropriate. After having shut down the engines the smoke stopped.

The terminal block with the too high electrical resistance causing the overheat and thereby the smoke would have continued to malfunction. The heat on the windshield would have continued to rise. It can not be defined if the windshield would also have cracked in flight if the crew had decided to continue to the destination instead of diverting to Geneva, as in flight the windshield was cooled by the outside air.

CAUSE

The incident was caused by a faulty electrical resistance on a terminal block of the windshield heater system at the left-hand windshield producing an "electrical smoke".

Berne, 26 June 2002 Aircraft accident investigation Bureau