

**OPERATOR : HELIOS AIRWAYS**

**OWNER : DEUTSCHE STRUCTURED FINANCE & LEASING GMBH & CO**

**MANUFACTURER : BOEING CO**

**AIRCRAFT TYPE : B 737 – 31S**

**NATIONALITY : CYPRUS**

**REGISTRATION : 5B-DBY**

**PLACE OF ACCIDENT :** Hilly terrain in the vicinity of Grammatiko village, approximately 33 km northwest of Athens International Airport 38° 13.894' N, 23° 58.214' E

**DATE AND TIME : 14 AUGUST 2005 - 09:03:32 h**

Notes: 1. All times in the report are Coordinated Universal Time (UTC) (Local time in Hellas was UTC + 3 h)

2. Correlation of the times used in the radar and radio communication recordings, and the FDR and CVR showed differences of less than 12 seconds. The FDR time was used as the master time in this report.

## **SYNOPSIS**

On 14 August 2005, a Boeing 737-300 aircraft, registration number 5B-DBY, operated by Helios Airways, departed Larnaca, Cyprus at 06:07 h for Prague, Czech Republic, via Athens, Hellas. The aircraft was cleared to climb to FL340 and to proceed direct to RDS VOR. As the aircraft climbed through 16 000 ft, the Captain contacted the company Operations Centre and reported a Take-off Configuration Warning and an Equipment Cooling system problem. Several communications between the Captain and the Operations Centre took place in the next eight minutes concerning the above problems and ended as the aircraft climbed through 28 900 ft. Thereafter, there was no response to radio calls to the aircraft. During the climb, at an aircraft altitude of 18 200 ft, the passenger oxygen masks deployed in the cabin. The aircraft leveled off at FL340 and continued on its programmed route.

At 07:21 h, the aircraft flew over the KEA VOR, then over the Athens International Airport, and subsequently entered the KEA VOR holding pattern at 07:38 h. At 08:24 h, during the sixth holding pattern, the Boeing 737 was intercepted by two F-16 aircraft of the Hellenic Air Force. One of the F-16 pilots observed the aircraft at close range and reported at 08:32 h that the Captain's seat was vacant, the First Officer's seat was occupied by someone who was slumped over the controls, the passenger oxygen masks were seen dangling and three motionless passengers were seen seated wearing oxygen masks in the cabin. No external damage or fire was noted and the aircraft was not responding to radio calls. At 08:49 h, he reported a person not wearing an oxygen mask entering the cockpit and occupying the Captain's seat. The F-16 pilot tried to attract his attention without success. At 08:50 h, the left engine flamed out due to fuel depletion and the aircraft started descending. At 08:54 h, two MAYDAY messages were recorded on the CVR.

At 09:00 h, the right engine also flamed out at an altitude of approximately 7 100 ft. The aircraft continued descending rapidly and impacted hilly terrain at 09:03 h in the vicinity of Grammatiko village, Hellas, approximately 33 km northwest of the Athens International Airport. The 115 passengers and 6 crew members on board were fatally injured. The aircraft was destroyed.

The Air Accident Investigation and Aviation Safety Board (AAIASB) of the Hellenic Ministry of Transport & Communications investigated the accident following ICAO practices and determined that the accident resulted from direct and latent causes.

The direct causes were:

- Non-recognition that the cabin pressurization mode selector was in the MAN (manual) position during the performance of the Preflight procedure, the Before Start checklist and the After Takeoff checklist.
- Non-identification of the warnings and the reasons for the activation of the warnings (Cabin Altitude Warning Horn, Passenger Oxygen Masks Deployment indication, Master Caution).
- Incapacitation of the flight crew due to hypoxia, resulting in the continuation of the flight via the flight management computer and the autopilot, depletion of the fuel and engine flameout, and the impact of the aircraft with the ground.

The latent causes were:

- Operator's deficiencies in the organization, quality management, and safety culture.
- Regulatory Authority's diachronic inadequate execution of its safety oversight responsibilities.
- Inadequate application of Crew Resource Management principles.
- Ineffectiveness of measures taken by the manufacturer in response to previous pressurization incidents in the particular type of aircraft.

The AAIASB further concluded that the following factors could have contributed to the accident: omission of returning the cabin pressurization mode selector to the AUTO position after non-scheduled maintenance on the aircraft; lack of cabin crew procedures (at an international level) to address events involving loss of pressurization and continuation of the climb despite passenger oxygen masks deployment; and ineffectiveness of international aviation authorities to enforce implementation of actions plans resulting from deficiencies documented in audits.

In the months following the accident, the AAIASB made seven interim safety recommendations: five recommendations to the National Transportation Safety Board and to the manufacturer, four of which already resulted in the implementation of corrective actions, one recommendation to the Cyprus Air Accident and Incident Investigation Board and the airlines based in Cyprus, for which corrective action had already been taken, and one recommendation to the Hellenic Civil Aviation Authority (HCAA), which also resulted in the implementation of corrective action. In addition, the FAA in the United States issued an Airworthiness Directive (AD) which informed flight crews about upcoming, improved procedures for pre-flight setup of the cabin pressurization system, as

well as improved procedures for interpreting and responding to the Cabin Altitude Warning Horn and to the Takeoff or Landing Configuration Warning Horn.

The report also identifies a number of additional safety deficiencies pertaining to:

maintenance procedures; pilot training, normal and emergency procedures; organizational issues of the Operator; organizational issues related to safety oversight of maintenance and flight operations by Cyprus DCA, EASA/JAA and ICAO; issues related to the aircraft manufacturer's documentation for maintenance and flight operations; and issues related to handling by the International Authorities of precursor incident information so as to implement preventive measures in a timely manner. As a consequence of the above, in its Final Report the AAIASB promulgated an additional eleven safety recommendations, addressed to the Republic of Cyprus, EASA, JAA and ICAO.

In accordance with ICAO Annex 13, paragraph 6.3, copies of the Draft Final Report were sent on 18 May 2006 to the States that participated in the investigation, inviting their comments. The comments sent to the AAIASB by the relevant Authorities in Cyprus, the United Kingdom and the United States were taken into account in the Final Report. The State of Cyprus requested that their comments be appended to the Final Report