Investigation Report

The Investigation Report was written in accordance with para 18 of the Law Relating to the Investigation into Accidents and Incidents Associated with the Operation of Civil Aircraft stating facts only.

Identification

Type of Occurrence: Serious Incident
Date: 16 May 2016
Location: Dusseldorf
Aircraft: Airplane
Manufacturer / Model: Airbus Industry / A319-132
Injuries to Persons: None
Damage: Minor damage to aircraft
Other Damage: None
State File Number: BFU16-0592-5X

Factual Information

During the descent a fumes event occurred in the cockpit of an Airbus A319-132. The pilots donned their oxygen masks. An emergency was declared. The airplane landed at the arrival aerodrome Dusseldorf Airport, Germany.
History of the Flight

The Airbus A319-132, which had 142 passengers and 5 crew members on board, was on a flight from Dresden to Dusseldorf.

During the approach, close to the radio beacon Warburg (WRB) at approximately Flight Level (FL) 160, the flight crew noticed smell and smoke in the cockpit. At that time the co-pilot was Pilot Flying (PF) and the Pilot in Command (PIC) Pilot Monitoring (PM).

The following description of events is based on the analysis of the Cockpit Voice Recorder (CVR), the Flight Data Recorder (FDR), and witness statements. The PIC stated that the smell was noticeable from about 2136 hrs\(^1\) until the landing and the smoke only a few seconds. The pilots donned their oxygen masks right away. The PIC called the flight attendant via intercom\(^2\) and asked whether smoke or smell were noticeable in the cabin. The purser confirmed that the smell was noticeable in the cabin and two flight attendants in the aft galley had donned their Protective Breathing Equipment (PBE). Therefore, the PIC declared emergency and asked for direct approach to runway 23L of Dusseldorf Airport. “[Call Sign], Mayday, Mayday, Mayday, we have smoke in cockpit, request direct, final runway 23L.”

The co-pilot stated that at 2136 hrs the Electronic Centralised Aircraft Monitoring (ECAM)\(^3\) indicated for approximately 2 seconds an avionic smoke detection warning. The FDR recorded this warning at 2136 hrs. The co-pilot stated that the first indications for smoke could be noticed at the right side of the cockpit, close to the sidestick. The pilot stated that the Smoke Fumes Removal checklist had been considered. Since the airplane had at the time already been on approach to runway 23L at Dusseldorf Airport the checklist had not been applied due to the short time span available.

While taxiing the Auxiliary Power Unit (APU)\(^4\) was started. The APU bleed air was not used for the air conditioning system. After the landing the airplane taxied to parking position V23.

The passengers disembarked via mobile stairs. Subsequently, the crew went to the Florence Nightingale hospital in Kaiserwerth (KWD) where they were examined.

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\(^1\) All times local, unless otherwise stated

\(^2\) Airplane on-board communications system

\(^3\) Indication aircraft system and error and warning reports

\(^4\) The APU generates energy for the board net and bleed air for the air condition
Personnel Information

Pilot In Command

The 42-year-old PIC held an Airline Transport Pilot’s Licence (ATPL(A)) issued on 6 January 2014 by the Luftfahrt-Bundesamt (German aviation authority, LBA) in accordance with Part-FCL (Flight Crew Licensing). The licence listed the ratings as PIC for A319/320 in accordance with Instrument Flight Rules (PIC IR). The rating was valid until 30 November 2016.

He held a class 1 medical certificate valid until 27 August 2016 which was provided to the BFU.

The operator stated that the PIC had a flying experience of about 6,650 hours, of which about 4,012 hrs were on A319/320.

Co-pilot

The 49-year-old co-pilot held an Airline Transport Pilot’s Licence (ATPL(A)) issued on 27 July 2015 by the Luftfahrt-Bundesamt in accordance with Part-FCL. The licence listed the ratings as co-pilot for A319/320 in accordance with instrument flight rules (COP IR). The rating was valid until 31 August 2016.

The BFU was provided with a class 1 medical certificate valid until 17 November 2016.

The operator stated that the co-pilot had a flying experience of about 12,191 hours, of which about 9,915 hrs were on type.

Aircraft Information

The Airbus A319-132 is a short and medium range transport aircraft equipped with two fan jets.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Airbus Industry</th>
</tr>
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<tbody>
<tr>
<td>Year of manufacture:</td>
<td>2006</td>
</tr>
<tr>
<td>Manufacturer’s Serial Number (MSN)</td>
<td>2813</td>
</tr>
<tr>
<td>Operating hours</td>
<td>30,255</td>
</tr>
<tr>
<td>Flight cycles</td>
<td>22,312</td>
</tr>
<tr>
<td>Engine type</td>
<td>International Aero Engines IAE V2500</td>
</tr>
</tbody>
</table>
The aircraft had a German certificate of registration and was operated by a German operator.

**Static Inverter**

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Avionic Instruments LLC</th>
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</thead>
<tbody>
<tr>
<td>Model number</td>
<td>2A3250-1AS-1830</td>
</tr>
<tr>
<td>Serial Number</td>
<td>AA11135526</td>
</tr>
<tr>
<td>Part Number</td>
<td>1-002-0102-1830</td>
</tr>
</tbody>
</table>

The static inverter supplies the sockets, located left and right behind the pilots, with power. The operators usually use them for the Electronic Flight Bags (EFB)\(^5\).

**Electronic Centralised Aircraft Monitor - Warning**

The avionic smoke detection warning was generated in flight and indicated on the ECAM. The warning was transmitted via the Aircraft Communications Addressing and Reporting System (ACARS) to flight operations. Fig. 1 shows the report generated by ACARS.

![Fig. 1: ACARS report, all times UTC](Source: Operator/BFU)

**Meteorological Information**

On 16 May 2016 sun set in the Dusseldorf region was at 2117 hrs. According to the aviation routine weather report (METAR) of 2120 hrs of Dusseldorf Airport visibility was more than 10 km, the wind was variable and light. The clouds at 2,000 ft were 1/8 to 2/8, at 3,400 ft 3/8 to 4/8, and at 7,400 ft 5/8 to 7/8. Temperature was 10°C, the dewpoint 6°C, and the barometric air pressure (QNH) 1,019 hPa. The forecast for the next two hours predicted no significant changes.

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\(^5\) The EFB is an electrical gadget for information management of the flight crew. On the EFB Operational Manuals (OM), navigation charts, and special software for the performance calculation of the airplane, are installed.
Aids to Navigation

The approach was conducted using the Instrument Landing System (ILS) with the identifier IDNE to runway 23L of Dusseldorf Airport.

Radio Communications

Radio transmissions with the air traffic control unit were conducted in the English language. The CVR recording showed that during the rest of the flight while both pilots used the microphones of their oxygen masks they, from time to time, experienced communications problems.

Aerodrome Information

The information regarding Dusseldorf Airport (EDDL) was copied from the Aeronautical Information Publication (AIP). Dusseldorf Airport is located 7.4 km north of the city of Dusseldorf. Aerodrome elevation is 147 ft AMSL.

Runways

<table>
<thead>
<tr>
<th>Runway</th>
<th>Dimensions</th>
<th>Surface</th>
<th>Approach System</th>
</tr>
</thead>
<tbody>
<tr>
<td>05R/23L</td>
<td>3,000 m x 45 m</td>
<td>Concrete</td>
<td>Both runways Cat II &amp; III</td>
</tr>
</tbody>
</table>

Flight Recorder

Flight Data Recorder and Cockpit Voice Recorder

Manufacturer CVR       L-3COM
Model                  FA2100
Serial number          13715

Manufacturer FDR       L-3COM
Model                  FA2100
Serial number          403146
The CVR and the FDR were seized by the BFU and read out at the avionics laboratory at the BFU facility. Both recorders were undamaged. The quality of the CVR recording was good. The quality of the recorded transmissions was very good. A Flight Data Systems Handheld Multi Purpose Interface was used to download the FDR data. Analysis of the data occurred using Insight Analysis.

Findings on the aircraft

After the landing, the maintenance organisation of the operator identified a static inverter as source of the smell. The BFU seized the component and it was also examined at the avionics laboratory at the BFU. The examination revealed that one of the circuit boards and one condenser showed traces of heat development.
Survival Aspects

Self-protection of the Flight and Cabin Crews

The flight crew donned their respective oxygen masks. Depending on the setting, they provide fresh mixture with up to 100% oxygen. The aft cabin crew used the PBE stored at each flight attendant’s seat. The oxygen masks of the passengers were neither automatically nor manually triggered.

Medical and Pathological Information

Approximately 2 hours after the occurrence, the flight crew was examined at the Florence Nightingale Hospital in Kaiserswerth (KWD) in the scope of the berufsgenossenschaftlichen Durchgang-Arzt-Verfahrens (worker’s compensation board’s accident insurance consultant procedure). The BFU asked each crew member to provide their medical test results. The cabin crew did not provide any data. The flight crew provided excerpts of their test results. The physical and toxicological results of both crew members were unremarkable. Only the carbon monoxide concentration (CoHb) of the capillary blood gas analysis showed standard or slightly elevated value.
Organisations and their Procedures

In the Quick Reference Handbook (QRH) the operator had stipulated a procedure for flight crews in case smoke/fume or avionic smoke occurred. The PIC stated that the Smoke Fumes Removal checklist was not applied because of time shortage. Priority had been the coordination with air navigation services and a quickest possible landing.

Additional Information

Information of the Static Inverter Manufacturer

The manufacturer stated in writing that the supplier of the capacitor C306 (P/N 1-001-0306-0054) identified quality deficits in the production line. Subsequently, production was changed. Delivered static inverters were corrected in accordance with the Service Bulletin 1830-25-37 Initial Release (Revision 0). The replacement capacitors are optimised.

Investigator in charge: Norman Kretschmer
Assistance: Hans-Werner Hempelmann

Braunschweig, 20 October 2019
This investigation was conducted in accordance with the regulation (EU) No. 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and the Federal German Law relating to the investigation of accidents and incidents associated with the operation of civil aircraft (Flugunfall-Untersuchungs-Gesetz - FlUUG) of 26 August 1998.

The sole objective of the investigation is to prevent future accidents and incidents. The investigation does not seek to ascertain blame or apportion legal liability for any claims that may arise.

This document is a translation of the German Investigation Report. Although every effort was made for the translation to be accurate, in the event of any discrepancies the original German document is the authentic version.

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