



Swiss Confederation

## Summary Report

A summary investigation, in accordance with article 45 of the Ordinance on the Safety Investigation of Transport Incidents (OSITI), was carried out with regards to the following serious incident. This report was prepared to ensure that lessons can be learned from the present incident.

<b>Aircraft</b>	Airbus A319-111	HB-JYK	
<b>Operator</b>	EasyJet Switzerland SA, route de l'Aéroport 5, 1215 Genève 15 Aéroport		
<b>Owner</b>	EasyJet Airline Company Limited, Hangar 89/Luton Airport, LU2 9PF Bedfordshire, Great Britain		
<b>Commander</b>	Dutch citizen, born 1976		
<b>Licence</b>	Airline Transport Pilot Licence Aeroplane (ATPL(A)) according European Aviation Safety Agency (EASA), issued by the Civil Aviation Authority (CAA) of the United Kingdom		
<b>Flight hours</b>	<b>total</b> 10 652 h	<b>during the last 90 days</b> 179:46 h	
	<b>on the type of incident</b> 7470 h	<b>during the last 90 days</b> 179:46 h	
<b>First officer</b>	Swiss citizen, born 1978		
<b>Licence</b>	ATPL(A) according EASA, issued by Federal Office of Civil Aviation (FOCA) of Switzerland		
<b>Flight hours</b>	<b>total</b> 5148 h	<b>during the last 90 days</b> 201:03 h	
	<b>on the type of incident</b> 3341 h	<b>during the last 90 days</b> 201:03 h	
<b>Location</b>	15 NM northwest of Thessaloniki (LGTS)		
<b>Coordinates</b>	---	<b>Altitude</b> 7000 ft AMSL <sup>1</sup>	
<b>Date and time</b>	30 may 2017, 08:14 UTC <sup>2</sup> (Local Time = UTC + 2 h) All information in this report is in UTC.		
<b>Type of operation</b>	Scheduled		
<b>Flight rules</b>	Instrument Flight Rules (IFR)		
<b>Flight phase</b>	Cruise		
<b>Type of incident</b>	Fume event		
<b>Point of departure</b>	Thessaloniki (LGTS), Greece		
<b>Point of destination</b>	Basel (LFSB), Switzerland		
<b>Injuries to persons</b>	<b>Crew</b>	<b>Passengers</b>	<b>Third persons</b>
Minor	0	0	0
None	6	152	-
<b>Damage to aircraft</b>	Not damaged		
<b>Other damage</b>	None		

<sup>1</sup> AMSL: Above Mean Sea Level

<sup>2</sup> UTC: Universal Time Coordinated

## General Remarks

The present investigation was delegated to the Swiss Transportation Safety Investigation Board by the Hellenic Air Accident Investigation and Aviation Safety Board.

## Pre-flight History

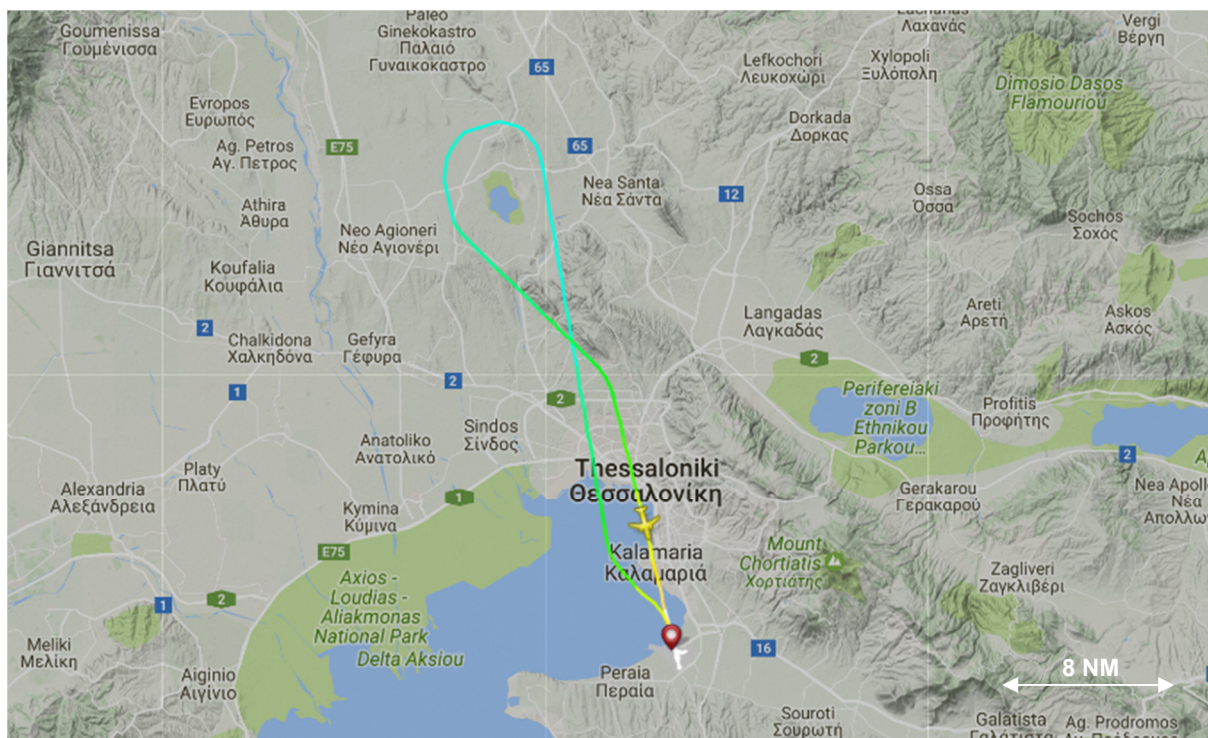
Following the preceding flight from Basel (BSL) to Thessaloniki (SKG), the Senior Cabin Crew Member (SCCM) informed the flight crew of a brief observation of both haze and fumes, noticeable in the cabin upon landing. The cabin crew thought it was associated with the hard braking. One of the flight crew members also noticed something but thought that it was coming from outside the aircraft.

During turn-around, while completing the external walk-around, special attention was given to an eventual bird strike; no signs were found. In addition, the cabin crew was briefed to inform the flight deck immediately if anything abnormal was to be observed on the flight back to Basel.

## Course of Events

After engine start all indications were normal and no fumes were observed. During taxi to runway 34, with the air conditioning pack (PACK) number 2 selected OFF, in accordance with the company's Standard Operating Procedures (SOP), the SCCM was asked again for any signs of fumes or smoke, neither of which was observed.

After take-off from runway 34 at 08:11 UTC the flight crew switched on the air conditioning pack and cleaned up the aircraft without event. When passing through 7000 ft AMSL, approximately 3 minutes after take-off the flight crew noticed a strong stench, similar to that of a dirty oven. Upon inquiry, the SCCM confirmed that the oven was not on and the smell was also noticeable in the front galley. Subsequently, the flight crew informed the SCCM, that the aircraft would return to Thessaloniki and that the flight crew would don oxygen masks, so that the SCCM would be mentally prepared for possible impaired communication.



**Figure 1:** Flight path of HB-JYK as depicted on FlightRadar24

Reaching flight level (FL) 100 the flight crew levelled off the aircraft and initiated the emergency procedure for smoke and fumes, including donning oxygen masks. Accordingly, they sent a

radiotelephony urgency signal Pan Pan at 08:15:14 UTC, followed by a distress signal Mayday 30 seconds later, stating their intention to divert the flight back to Thessaloniki.

Whilst the First Officer (FO), acting as Pilot Flying (PF), initiated the descent in a left turn towards Thessaloniki with request for an ILS<sup>3</sup> approach under radar vectors to runway 16, the Commander (CMD), acting as Pilot Monitoring (PM), consulted the Quick Reference Handbook (QRH) for the “SMOKE/FUMES/AVNCS SMOKE” procedure<sup>4</sup> and completed the immediate actions, before contacting the SCCM again, to check on the situation in the cabin and requested that she make a passenger announcement. Since she confirmed that the situation was unchanged, the PM continued the paragraph of the procedure with regards to the air conditioning system and switched off the PACK 1. Upon inquiry, the SCCM confirmed that the situation improved. Accordingly, the PM stopped the procedure and assisted in the diversion to Thessaloniki.

Moments later, the SCCM called the flight deck and informed them that the smell was still there and that some of the cabin crew were getting headaches. The PM subsequently resumed the procedure. Given the time remaining, he completed the paragraph for air conditioning smoke and started with the smoke removal procedure. This included switching off both PACKs, opening the outflow control valve by bringing the manual vertical speed switch of the cabin altitude in the full up position and opening the ram air supply, upon confirmation from the PF, for fresh ambient air.

With the aircraft established on final approach at a distance of about 8 NM from touchdown the CMD took over the controls. He ordered the FO, now PM, to perform the overweight landing checklist, which was completed before the aircraft reached 1000 ft above aerodrome elevation (AAE). With a landing mass of 60.8 tons (maximum landing mass being 61 tons), the aircraft touched down at 08:24:54 UTC on runway 16 without event.

Once the cabin door was opened, the fire brigade completed a short check to see if there were any signs of fire or smoke on board, which was not the case. A doctor boarded the aircraft to see if anybody needed medical attention, but nobody asked for medical treatment. Thereafter, the aircraft was disembarked and handed over to maintenance for trouble-shooting. The post flight report (PFR) contained the following two warning maintenance status messages: VENT BLOWER FAULT registered at 08:16 UTC and AIR PACK 1+2 FAULT 3 minutes later.

On the ferry flight back to Basel (LFSB) the next day, the cabin crew in the rear cabin noticed the same smell for about 15 seconds being even stronger than on the incident flight. The flight crew did not notice any smoke, haze or fumes in the cockpit during the flight

### Findings and further Investigation

The avionics blower fan assembly of HB-JYK was replaced and the unit (part number: EVT3454HC) sent to the blower fan manufacturer for inspection. According to the shop-report no failure was found.

After the serious incident, HB-JYK was under observation and there has been no reoccurrence since.

According to the operator, HB-JYK had already had a series of fume events since the aircraft joined the fleet in January 2016 under Swiss registration. However, none of these events were related to the avionics ventilation system. Conversely, other aircrafts within the operator's air-bus fleet had a history of numerous events during which the avionics blower fan of the same

---

<sup>3</sup> ILS: Instrument Landing System

<sup>4</sup> This QRH procedure implements a global philosophy applicable to both cabin and cockpit smoke cases, including the steps for the diversion initiation, immediate actions as well as smoke origin identification and fighting if the smoke source cannot be isolated immediately. According to the source suspected, the flight crew enters one of the three paragraphs for either air conditioning smoke, cabin equipment smoke or avionics/cockpit smoke.

type was the root cause or the assembly had been subject to early removal. Due to operational interruptions impacting flight operations, Airbus was directly involved in solving this issue in 2016.

Airbus identified the avionics blower fan provided by a third party supplier as being subject to premature failures and early removals. A Technical Follow Up (TFU) created on 30 June 2016, identified the forward and rear ball bearings to be the most frequently observed failure mode, having its root cause in the quality of fan repairs, leading to incorrect balancing or inadequate assembly.

Accordingly, several actions were taken to mitigate and address the avionics fan issue:

1. Fan reliability improvement:
  - Recommendation for a fan overhaul between 8000 and 12 000 flight hours;
  - Revision 1 of the Component Maintenance Manual (CMM) issued in December 2016 improves the repair procedure and cancels in service wear limits.
  - Revision 2 of CMM issued in July 2017 introduces a vibration test in accordance with the one applied in production.
2. Mitigation of operational interruptions such as fume events:
  - Development of a Ball Bearing Health Monitoring (BBHM) function with the aim of monitoring fan vibration frequencies and to determine precursor sign (future indications) of ball bearing failure, including two alert thresholds of unserviceability on a temporary level (one-time resettable warning) and on a permanent level (protection).
  - The current fan electronic box was redesigned, adding components such as an accelerometer, a signal processor and a light-emitting diode (LED).
  - An in service evaluation with three operators started in June 2017 for a period of nine months.

Availability of the BBHM function is scheduled for the second quarter of 2018.
3. New avionics fan: a new standard, with an improved design, will be available as of the second quarter 2018.

### Weather at time and place of the serious incident

The weather was sunny with some shallow cumulus clouds over the surrounding terrain. At FL 100 the wind was blowing from NNW with roughly 10 knots. At the surface, there was a light breeze.

Weather	sunny
Cloud cover	1/8 – 2/8 at 2500 ft AAE
Visibility at LGTS	10 km or more
Wind at LGTS	290 degrees, 5 kt
Temperature and dew point at LGTS	22 °C / 12 °C
Sea-level pressure, QNH	1016 hPa, pressure reduced to sea level based on the values of ICAO <sup>5</sup> -standard atmosphere

---

<sup>5</sup> ICAO: International Civil Aviation Organization

## Analysis and Conclusion

Fire or smoke on board an aircraft can place the crew both in a potentially difficult situation and under great time pressure to act. Not only do they have to deal with the emergency itself, but also the passengers are likely to panic, should they become aware of the situation. If the source is not immediately obvious, the flight crew should therefore initiate a diversion, without delay, as was done in the present case.

Since the fumes were not accompanied by an ECAM<sup>6</sup> warning, the flight crew consequently referred to the “*SMOKE/FUMES/AVNCS SMOKE*” procedure in the QRH and performed the immediate actions, including donning oxygen masks, without delay. The PF focused on his flying duties, preparing the aircraft for approach, as well as informing the air traffic control (ATC) about the situation and their intentions. Meanwhile, the PM performed the QRH procedure, maintained communication with the cabin via the SCCM in a timely manner, assisted and monitored the PF’s actions, whenever possible. This task sharing followed the manufacturer’s cockpit philosophy for abnormal situations, whereby communication to ATC is transferred to the PF, since the cognitive capacity of the PM is mainly dedicated to the task of understanding and correctly applying the checklist. By delegating the explanatory passenger announcement to the SCCM, the CMD gained valuable time, allowing for the handling of emergency procedures as PM, in the short period of time available. In doing so, he also avoided scaring the passengers with the noise emitting from his oxygen mask.

Given the prevailing meteorological conditions, with westerly winds of low intensity, the decision for choosing the shorter way to runway 16, with an ILS approach, was appropriate. The mass of the aircraft at touchdown in Thessaloniki, approximately 10 minutes after the strong smell was first noticed on board HB-JYK, was already below the maximum landing mass.

Thanks to the rapid decision-making and prudent actions of the flight crew, the passengers and crew were not in serious danger at any given time. There is no information available that the crew members showed any signs of smoke inhalation, after the incident flight.

Given the fact that no fume events have reoccurred since the replacement of the avionics blower fan assembly, it can be concluded that the fumes noticed by the crew came from the failed unit as stated in the PFR, although no failure was found during the following shop inspection.

The avionics blower fan (part number: EVT3454HC) was identified as the root cause in many other fume events, thereby, leading to a set of measures already adopted by Airbus to further increase its reliability and mitigate operational impact.

In regards to Article 45 of the Ordinance on the Safety Investigation of Transport Incidents (OSITI), the STSB refrains from further investigation activities and hereby concludes the investigation with the present summary report.

Bern, 15. February 2018

Swiss Transportation Safety Investigation Board

---

<sup>6</sup> ECAM: Electronic Centralized Aircraft Monitoring, a system that keeps a watchful eye on all of the aircraft systems, monitoring them for any abnormal states. If something abnormal is detected, ECAM will alert the flight crew and provide an electronic procedure to help handle the abnormality.