

BAe 125-800A, N453TM

AAIB Bulletin No: 10/99 **Ref:** EW/C99/1/6 **Category:** 1.1

Aircraft Type and Registration: BAe 125-800A, N453TM

No & Type of Engines: 2 Garrett TFE731-5R-1H turbofan engines

Year of Manufacture: 1991

Date & Time (UTC): 22 January 1999 at 1805 hrs

Location: Farnborough Airport, Hampshire

Type of Flight: Private

Persons on Board: Crew - 2 - Passengers - 3

Injuries: Crew - None - Passengers - None

Nature of Damage: Damage to right trailing edge flap

Commander's Licence: Airline Transport Pilot's Licence (USA)

Commander's Age: 37 years

Commander's Flying Experience: 7,500 hours (of which 2,000 were on type)
Last 90 days - 200 hours
Last 28 days - 15 hours

Information Source: AAIB Field Investigation

The aircraft had been based at Cork Airport (Ireland) for about 10 months for non-scheduled corporate passenger operations. The aircraft was crewed by one full time pilot (the commander at the time of this accident) and part-time contract co-pilots. The commander had operated into Farnborough Airport on a number of previous occasions.

On 21 January, the aircraft operated Cork-Farnborough-Blackpool-Cork with the same commander, who finished duty at 2145 hrs after a 9.75 hour duty period. On 22 January the commander, and the duty co-pilot for the day, reported for duty at 1500 hrs. The aircraft departed from Cork at 1626 hrs for a flight to Blackpool; the destination for five of the passengers. The aircraft then departed from Blackpool at 1720 hrs for Farnborough, where the three remaining passengers would leave the aircraft before it was positioned empty to Cork. The commander was the handling pilot for the sector.

The crew was aware from the Farnborough Terminal Aerodrome Forecast (TAF) that fog was forecast to be present at the time of the planned arrival and the flight plan indicated that Southampton and Biggin Hill Airports were the nominated landing alternates (where the visibilities were 6 km and 2,000 metres respectively). The fog had been present for much of the afternoon at Farnborough, with a Runway Visual Range (RVR) of 200 metres being recorded from 1513 hrs until the time of the accident. The surface wind was calm, visibility 100 metres in fog, overcast

cloud below 100 feet, temperature +1°C, mean sea level pressure 1026 mb. The nominated duty runway was Runway 25, which has a threshold elevation of 219 feet amsl.

The aircraft was being operated under US Federal Aviation Regulations Part 91, Instrument Flight Rules which, for private aircraft operations, does not preclude the commencement of an instrument approach when the visibility is below the prescribed minimum RVR for the type of approach being conducted. The crew had reference to the Jeppesen approach plate for the Precision Approach Radar (PAR) approach procedure for Runway 25 at Farnborough. For an approach speed Category C aircraft such as the BAe 125, this procedure gave approach minima of: Decision Altitude (Height) of 510 (291) feet, and RVR 650 metres (these figures had been produced to comply with JAR-OPS criteria).

The commander had undertaken a European operations briefing course in the USA but could not recall the precise detail of the UK 'Approach Ban' legislation. Detail of this legislation was contained in the Air Traffic Control section of the Jeppesen Airway Manual, but this was not referred to by the crew prior to the approach.

At 1750 hrs, during the aircraft's descent to the north of Farnborough, under the control of Ockham Sector of the London Area and Terminal Control Centre (LATCC), the commander indicated to the controller that he would like to try the PAR approach to Farnborough if possible and also requested the current weather at Southampton. During the conversation, the commander indicated that he was not sure if he could make the approach under UK regulations. The controller indicated that he would coordinate the request with Farnborough ATC. A handover telephone conversation then took place at 1751 hrs between LATCC and Farnborough controllers, during which the possibility of the aircraft diverting to Southampton was mentioned. There was no reference during this conversation to the pilot being unsure if he could make the approach under UK regulations.

At 1753 hrs, the LATCC controller indicated to the commander that Farnborough had been informed of the pilot's request and transferred the aircraft to Farnborough Radar control. On initial contact, the Farnborough radar controller sought to confirm his understanding that the aircraft was going to make an approach at Farnborough. The commander responded that if it was 'OK with your ops' then he would like to 'try the approach' and requested a PAR precision approach. The radar controller confirmed that the approach would be a PAR to Runway 25 and read the latest actual weather report, later confirming that the current RVR was 200 metres. He also indicated that 'our ops will have no reason not to accept you' and 'you're making the approach on your minima.'

The aircraft was cleared to land just prior to the start of the final descent at 1803 hrs. A normal radar talkdown followed, with the aircraft following the specified 3.5° glidepath accurately. Only minor heading changes were required by the radar controller to keep the aircraft close to the runway extended centreline throughout. Just prior to 1805 hrs, the controller indicated that the aircraft was approaching procedure minimum and instructed a right turn by two degrees as the aircraft was slightly left of centreline and on the glidepath. On passing the procedure minimum, the aircraft was instructed to 'continue visually or go-around' in accordance with the normal phraseology. In response to this, the non-handling pilot indicated that the lights were in sight and the aircraft would continue the approach.

Prior to the commencement of the approach, the aircraft's Flight Management System (FMS) had been programmed with the runway threshold data, centreline and a 3.5° approach glidepath constructed. The commander's Horizontal Situation Indicator (HSI) was set to FMS Primary with Localiser displayed in the background. The copilot HSI display was set to Localiser. The approach

was flown in Heading Mode to facilitate compliance with ATC instructions. The flight director system therefore produced lateral and vertical guidance during the approach. The commander had briefed the copilot that the Decision Altitude would be 510 feet amsl, VREF 125 kt and calls were to be made for 'have lights', 'have runway' or 'go-around' as appropriate.

At Decision Altitude, the copilot called to the commander that the lights were in sight. The commander therefore decided to continue the approach and the copilot informed ATC accordingly. Immediately following this exchange, the commander asked the copilot 'how does it look?' The copilot had momentarily looked away from the approach lighting and, on checking again, became confused as to whether the aircraft was on centreline or to one side of the lights, so he delayed his response to the commander's question. The commander looked up from the flight instruments and saw some lights, a paved surface and line markings ahead of him so continued to land the aircraft.

The aircraft touched down on the tarmac surface that comprised the intersection of taxiways M and N to Runway 25. The touchdown vector was parallel to Runway 25, but displaced approximately 15 feet to the left of the left hand edge of it. After the aircraft had passed the intersections, both main wheels ran onto the grass surface, where they remained for the duration of the landing. Lift dump flaps were deployed with idle reverse thrust and minimum braking. The total landing run was 524 metres.

The crew informed ATC of the location of the aircraft and the airfield emergency services were deployed. The crew started the aircraft's APU and shutdown the engines. The aircraft was later recovered without further damage. However, the right trailing edge flap needed replacement, and both engines were returned to an overhaul agent for inspection after the ingestion of a significant amount of mud.

UK approach ban regulation

The Air Navigation (No 2) Order 1995, Articles 33, 34 and 35, contain references to aerodrome operating minima. In the UK, it is not permissible for an aircraft of any nationality, being public transport or privately operated, when making a descent at an aerodrome to a runway in respect of which there is a notified instrument approach procedure, to descend below a height of 1,000 feet above the aerodrome if the relevant RVR is less than the specified minimum for landing. This regulation is commonly referred to as an 'Approach Ban.'

In the case of N453TM, the RVR was significantly below the specified acceptable minimum value of 650 metres for the approach being conducted. The commander indicated, during radio transmissions, that he was unsure of the UK regulations in this respect and sought confirmation from ATC that making the approach was compliant with UK regulations. The phraseology used was non-standard and was not interpreted by the controllers involved as a request for legal guidance. At that time, ATC had no standard procedures which enabled the controllers to know which minima were applicable to which aircraft type, or any standard phraseology to indicate to an aircraft that the visibility was below acceptable limits.

Farnborough Airport is operated under contract on behalf of the Ministry of Defence, but complete civilianisation of the airport is pending. Air Traffic Control is currently provided by civilian controllers in accordance with procedures that are defined in the CAA Manual of Air Traffic Services (MATS) for operations by civil aircraft and procedures contained in the Military Air Traffic Operations Manual for operations by military aircraft.

On 1 March 1999, as a result of the CAA's consideration of the AAIB Report (1/96) into the accident to a Boeing 737 aircraft while making a Surveillance Radar Approach to Coventry Airport in fog, a new ATC procedure which introduced the concept of 'Absolute Minima' was introduced. This procedure is detailed in Supplementary Instruction No 1 of 1999 to the MATS Part 1.

Under this system, controllers are now required to pass an advisory message to a pilot who wishes to make an approach when the visibility is below the calculated Absolute Minimum. The visibility values for the Absolute Minimum for each runway and each type of approach are required to be calculated by Air Traffic Service (ATS) providers and displayed for reference by controllers. In the event of a pilot wishing to make an approach when the visibility is below the Absolute Minimum, then the controller must advise the pilot of this fact and then request his/her intentions. In the event that the pilot wishes to continue to make the approach, then the controller should advise that there is no known traffic to affect the conduct of the approach or the landing. The decision whether or not to make an approach rests with the aircraft commander and neither controllers nor ATS providers may prohibit an approach being made.

The procedure contained in Supplementary Instruction 1/99 to MATS Part 1 was adopted for use at Farnborough for operations by civil aircraft on 1 March 1999.