

**INCIDENT**

<b>Aircraft Type and Registration:</b>	Boeing 737-300, EC-JUC	
<b>No &amp; type of Engines:</b>	2 CFM 56-3C1 turbofan engines	
<b>Year of Manufacture:</b>	1990	
<b>Date &amp; Time (UTC):</b>	18 July 2006 at 1425 hrs	
<b>Location:</b>	Near Aldergrove Airport, Belfast	
<b>Type of Flight:</b>	Public Transport (Passenger)	
<b>Persons on Board:</b>	Crew - 6	Passengers - 142
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	None	
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence	
<b>Commander's Age:</b>	39 years	
<b>Commander's Flying Experience:</b>	7400 hours (of which 5800 were on type) Last 90 days - 210 hours Last 28 days - 90 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot, radar data, R/T transcripts and witness information	

**Synopsis**

Whilst flying a non-precision approach, the flight crew mistook an unlicensed runway under the final approach track to be Runway 07 at Belfast (Aldergrove) Airport. A go-around was carried out from a low height and the aircraft subsequently positioned visually for a landing at Aldergrove. The final approach was unstable and included significant manoeuvring close to the ground.

**History of the flight**

The aircraft was flying from Liverpool to Belfast (Aldergrove) Airport when the incident occurred, and was being operated by a Spanish airline on a charter arrangement for a British carrier. The aircraft had been vectored by Aldergrove Approach Control for a VOR/

DME approach to Runway 07. The weather was fine, with CAVOK conditions reported. Once established on final approach, the crew were transferred to the Aldergrove Tower controller and, after calling 'short finals,' were cleared to land.

The Approach controller was alerted to the fact that the aircraft had descended to an unusually low altitude by the lower height filter on his display, set to trigger an alert as an aircraft descended below 400 ft. He warned the Tower controller that the aircraft was apparently preparing to land at Langford Lodge, a private and unlicensed airfield 3.5 nm south-west of the Runway 07 threshold. The Tower controller immediately instructed

the crew to climb, which they did. In a brief report, the commander stated that the crew were aware of Langford Lodge airfield, but that in the excellent visibility they still mistook it for Aldergrove Airport. He also reported that he checked the approach chart when it became clear that the aircraft was high on the approach and, realising at that point that they had misidentified the runway, initiated a go-around.

After the go-around the crew were given the option of repositioning visually for landing, which was accepted. The Tower controller watched the aircraft fly a wider than normal visual circuit, before 'flying through' the runway centre line, prompting her to think that the crew may have misidentified the runway again. However, the aircraft corrected to the centre line by making a series of turns at low altitude before landing. There were no injuries to the 6 crew or 142 passengers on board, though several passengers appeared upset and at least one made an official complaint to the chartering airline about the incident.

The low approach at Langford Lodge and the unstable approach at Aldergrove were reported to the chartering airline by a positioning staff member on board the aircraft. The subsequent return flight to Liverpool was cancelled as a result, and passengers were accommodated on later flights.

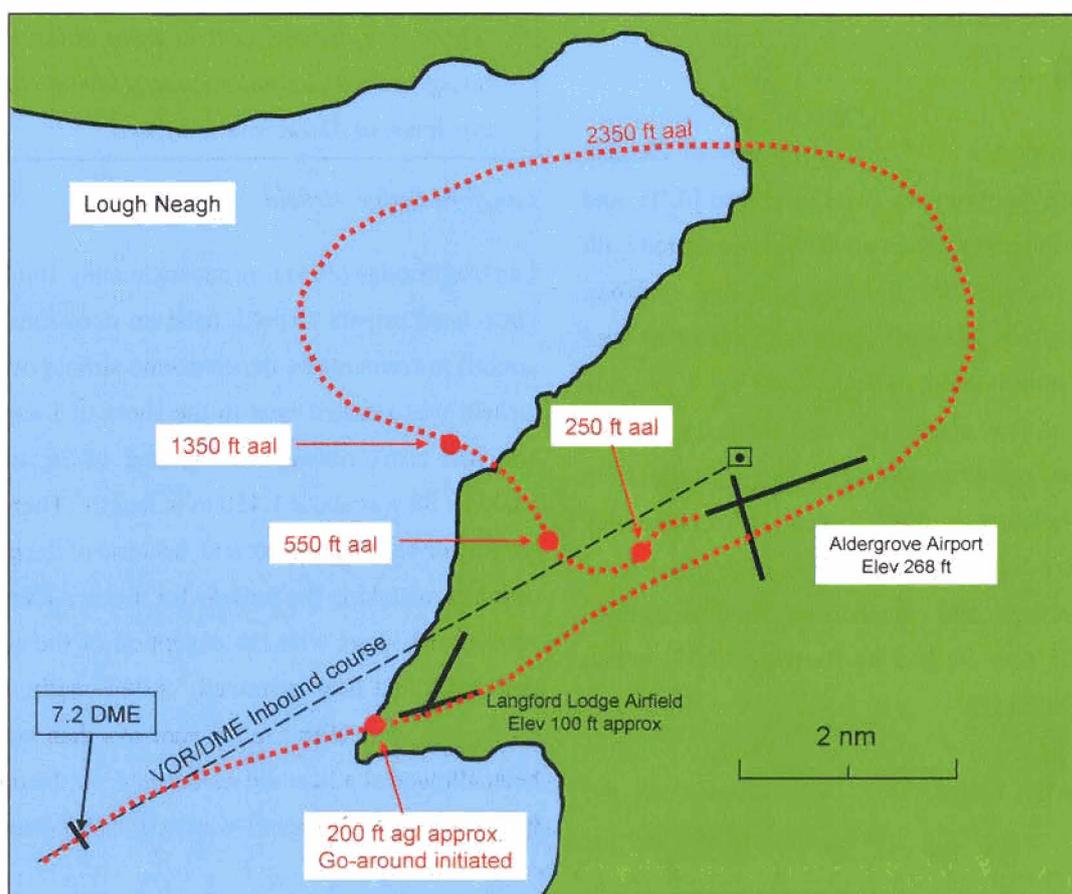
### **Recorded information**

Radar and R/T data were recorded and available to the investigation. On first contact with Aldergrove Approach Control, the crew acknowledged receipt of the current ATIS information and were placed under radar vectoring for a VOR/DME approach to Runway 07. When the crew reported that they had established on final approach, they were cleared to descend on the VOR/DME procedure and were transferred to the Aldergrove Tower controller.

There was other landing traffic ahead, and the crew were instructed by the Tower controller to continue the approach. About two minutes later the crew made a 'short final' call, but this was made over the transmission of another aircraft and so was partly blocked. The controller asked the crew to confirm that they were calling 'short final', to which the crew replied "SHORT FINAL" again, and then the controller issued clearance to land on Runway 07. Very soon afterwards the Approach controller said to the Tower controller "(CALLSIGN)'S GOING FOR LANGFORD". The Tower controller immediately transmitted "(CALLSIGN) CLIMB IMMEDIATELY, I SAY AGAIN CLIMB IMMEDIATELY". The crew responded with "WE ARE CLIMBING IMMEDIATELY".

The Tower controller then said "...ALDERGROVE IS THREE MILES FURTHER ALONG THE APPROACH, ARE YOU VISUAL WITH THE LIGHTS OF ALDERGROVE?", and the crew replied "OK SORRY SORRY, WE WAS APPROACHING TO AN OLD RUNWAY". The crew then reported visual with Aldergrove and were cleared to reposition visually for Runway 07.

Radar data shows that the aircraft began to deviate to the right of the inbound VOR/DME course at about 2.5 nm from Runway 08 at Langford Lodge, or about 6.5 DME from the VOR/DME (Figure 1). Descent from 2,400 ft had begun at 7.2 DME, which was the correct descent point for the procedure. Mode C information showed the average descent rate to the point of go-around to be about 1,700 ft/min. The vertical profile also showed a gradually increasing rate of descent, with the lower 1,000 ft being flown at an average of approximately 2,000 ft/min. The aircraft took 74 seconds to travel from the final descent point at 7.2 DME to the point of go-around, just short of the runway at Langford Lodge. There are two returns at a minimum altitude of 300 ft amsl, about 200 ft above the airfield level, before the aircraft Mode C indicated a climb.



**Figure 1**

Radar-derived track and height information

The aircraft then flew a wide visual circuit to the north of the airport. Limitations on the accuracy of the radar data precluded a highly detailed analysis of the aircraft's manoeuvres on finals to Runway 07, but the aircraft appears to have turned inside the runway centre line initially, and then 'flew through' the centre line to the south. It then corrected to the centre line again with a relatively large angle, before manoeuvring at low altitude to align with the runway. The 'fly through' occurred at about 500 ft aal and the subsequent manoeuvring to regain the centre line was still taking place as the aircraft descended through 250 ft aal.

#### Witness information

A captain with the chartering airline, who was familiar

with Aldergrove Airport, was positioning on the aircraft and occupying a window seat. He reported that the aircraft was not on the normal approach path and thought that the crew was probably making an approach to Langford Lodge. A go-around was made at an estimated 50 to 100 ft, after which a public address was made by the flight crew informing the passengers that a landing had not been possible due to a blocked runway. The passengers reportedly remained calm until the later stages of the next approach, when the aircraft executed steep turns, first to the right and then to the left, at an estimated 100 to 200 ft just before landing. The Tower controller also described significant manoeuvring close to the ground before the aircraft was aligned with the landing runway.

## Aerodrome information

### *Aldergrove Airport*

Aldergrove Airport is 11.5 nm north-west of Belfast. The main instrument runway was designated 07/25, and was 2,780 m in length. Runway 07 was equipped with high intensity centre line lighting with one crossbar, high intensity green threshold lights with wing bars, and Precision Approach Path Indicators set for a 3° glide slope. The runway itself had high intensity runway edge lights and colour-coded centre line lights at 15 m spacing. The runway was marked with the runway designator, threshold bars, centre and edge lines, fixed distance markings and touchdown zone markings. Runway 07/25 was crossed by Runway 17/35, which was 1,891 m in length.

The VOR/DME, coded 'BEL' was situated on the airport, and was the only instrument approach aid for Runway 07. The VOR/DME final approach track (FAT) was 059°(M), 12° offset from the runway heading, and intercepted the runway centre line at 1.5 nm from the threshold. From the correct intermediate procedure altitude of 2,406 ft, final descent commenced at 7.2 DME, and an altitude / distance table was published to assist crews to fly the recommended 3° approach path. The approach chart published in the UK Aeronautical Information Publication carried the warning:

*"Langford Lodge aerodrome lies under the FAT 3.5 nm before THR (threshold)"*

Local procedures at Aldergrove required that all runway and approach lights be switched on whenever Runway 07 was in use, regardless of the weather conditions. The following message was attached to the ATIS broadcast during Runway 07 operations:

*"There is a disused airfield three miles west of Aldergrove with a similar runway layout. Runway zero seven at Aldergrove is lighted."*

### *Langford Lodge Airfield*

Langford Lodge (elevation approximately 100 ft) was an unlicensed private airfield, used on occasions for light aircraft movements by the corporate airfield owner. The airfield was situated near to the shore of Lough Neagh and had cross runways designated 08/26 and 03/21. Runway 08 was about 1,450 m in length. There were no runway or approach lights and, because of the possibility of pilots mistaking the runway for that at Aldergrove, all runway markings with the exception of the centre line markings, had been removed. Additionally, buildings on the site were closer to the runways than would have been allowed at a licensed aerodrome. At the time of the incident, a Beech aircraft was taxiing for departure on Runway 21 and was in radio contact with the Aldergrove Tower controller.

### **Air Traffic Control**

The Manual of Air Traffic Services (MATS) Part 1 contains procedures, instructions and information which are intended to form the basis of air traffic services within the United Kingdom. MATS Part 1 contained the following text:

*"A landing aircraft, which is considered by a controller to be dangerously positioned on final approach, shall be instructed to carry out a missed approach. An aircraft can be considered as 'dangerously positioned' when it is poorly placed either laterally or vertically for the landing runway."*

## Analysis

The presence of Langford Lodge Airfield was well documented in the relevant publications, and a warning message was included in the ATIS report received by the crew. Although the commander reported that this had been considered by the crew, subsequent events indicate they had underestimated the potential for misidentification, particularly in the prevailing good visibility.

Although the aircraft began its final descent from the correct point on the VOR/DME procedure, its rate of descent increased quickly to a value at least twice that which the crew would normally expect to use, and the aircraft deviated towards the runway at Langford Lodge. The crew must therefore have been visual with the private airfield from a very early stage on the approach, since otherwise they would have been following the recommended 3° approach using altitude / distance information and would not have deviated from the inbound course.

There were multiple cues to warn the crew that they were making an approach to the wrong airfield. Despite descending at the correct point, the apparent requirement for an immediate and sustained high rate of descent of up to 2,000 ft/min throughout the approach, which itself was a significant cue, clearly did not alert the crew to the situation. The crew's workload would have been high during the steep final approach, particularly if the

aircraft still needed to be configured for landing and the landing checklist completed. It is probable that the crew's attention would have been so focused on flying the aircraft that their ability to assimilate the other cues was drastically reduced, until the point that environmental cues became overwhelming or ATC broadcast their 'climb immediately' instruction. The recorded data indicates that these things happened almost simultaneously.

The crew's public address that the runway was blocked may have been prompted by the presence of the Beech aircraft taxiing on Runway 21 which, if seen early enough, may have reinforced the crew's belief that they were approaching what appeared to be an active airfield.

The subsequent visual approach at Aldergrove caused more concern to the passengers than the missed approach at Langford Lodge. Radar data supports the accounts of passengers and the Tower controller that the aircraft carried out significant manoeuvres at a very late stage on the approach. As the approach was clearly unstable, the crew would be expected to have carried out a further go-around. Additionally, the Tower controller, who was observing the aircraft's manoeuvres, had the authority to instruct the crew to go-around if she considered that the aircraft was 'dangerously positioned' according to the definition in MATS Part I