

INCIDENT

Aircraft Type and Registration:	Airbus A320, EI-DIJ	
No & Type of Engines:	2 CFM 56-3A3 turbofan engines	
Year of Manufacture:	1992	
Date & Time (UTC):	29 March 2006 at 1330 hrs	
Location:	Ballykelly, County Londonderry, Northern Ireland	
Type of Flight:	Public Transport (Passenger)	
Persons on Board:	Crew - 6	Passengers - 39
Injuries:	Crew - None	Passengers - None
Nature of Damage:	None	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	57 years	
Commander's Flying Experience:	14,000 hours (of which 1,800 hrs were on type) Last 90 days - 69 hours Last 28 days - 69 hours	
Information Source:	AAIB Field Investigation	

Synopsis

The Airbus A320 was operating a scheduled flight from Liverpool (John Lennon) Airport (LPL) to Londonderry/Eglinton Airport (LDY) in Northern Ireland. At 8 nm from LDY, the operating crew reported that they were having problems with the ILS glideslope on approach to Runway 26. They judged that they were too high to carry out a safe landing from the ILS approach and requested permission from ATC to carry out a visual approach. The aircraft then flew a right descending orbit and a visual circuit, from which it landed. Upon landing, the crew were advised by ATC that they had, in fact, landed at Ballykelly Airfield (BKL), 5 nm to the east-north-east of LDY.

History of the flight

The aircraft was operating on behalf of another operator.

The crew reported at 0455 hrs for a four sector day starting and ending at Liverpool (John Lennon) Airport (LPL). Their third sector was from LPL to Londonderry (LDY); the commander was Pilot Flying (PF) and the co-pilot was the Pilot Not Flying (PNF). It was a limitation, set by the operating company, that commanders were to perform the landing and the takeoff at LDY; this was due to the short runway. A feature of this airfield is that a single track railway line crosses the Runway 26 extended centreline, very close to the start of the runway, and aircraft inbound to this runway are sequenced to avoid trains.

The flight from LPL proceeded uneventfully until the crew of the A320 was handed over from Scottish Area Control to Eglinton Approach. Prior to the crew changing frequency, Eglinton Approach was controlling a Beech 200 aircraft, callsign CALIBRATOR, that had just finished calibrating the ILS at LDY and was routing outbound to a position 25 nm east of LDY. The pilot of an Army Gazelle helicopter then came onto the frequency stating that he was routing from Coleraine (18 nm east-north-east of LDY) to Londonderry City, via Ballykelly Airfield (BKL). The Gazelle pilot was informed by ATC of the Beech 200 and that an A320 would soon be coming onto frequency and was advised to stay below 1,500 ft amsl and to remain south of the ILS centreline. The pilot acknowledged these requests.

Upon making radio contact with Eglinton Approach at 1320 hrs, the A320 crew were instructed to descend to 3,500 ft amsl and to report ILS localiser established at COLRE, a holding fix 15 nm on Runway 26 extended centre line at LDY. ATC advised the A320 crew that a Beech 200 was holding 10 nm east of COLRE, not above 3,000 ft amsl; this was to facilitate their arrival.

At 1322 hrs, the helicopter pilot reported that he was 3 nm north-east of Bellarena gliding site, 9 nm north-east of LDY. ATC asked him to fly the last 3 nm to BKL not above 500 ft agl, as the A320 was on the ILS. Two minutes later, the A320 crew were asked how far they had to go to COLRE; the crew replied they were established on the localiser. ATC cleared the A320 for an ILS/DME approach to Runway 26 and to report "PASSING FOUR DME." They were then advised that they might see the helicopter passing through the BKL overhead from north to south, not above 500 ft.

The crew of the Beech 200 then requested if they might extend outbound to 30 nm before turning inbound. This

request was approved and ATC informed them that the ILS traffic was now on the localiser at 15 nm and to report 15 nm inbound.

At 1326 hrs, when the A320 was 8 nm from LDY, the crew transmitted "THE ILS ISN'T REALLY GIVING US DECENT GLIDE PATH INFORMATION. WE'RE GONNA MAKE A VISUAL APPROACH FROM HERE. WE'RE SHOWING 8, BUT IT LOOKS A BIT LESS THAN THAT." ATC cleared them for the visual approach and instructed them to "REPORT ON A 4 MILE FINAL", which they acknowledged. At this point the commander disconnected the autopilot and lowered the nose to increase the aircraft's rate of descent.

The A320 crew then asked that, if they had to fly a missed approach, could they join the visual circuit downwind. ATC informed them that it would be a right hand circuit and added that there was also a rain shower approaching from the northwest. They then said that they would go-around now and join right hand down wind. ATC requested them to keep it "REASONABLY TIGHT", as they were expecting a train in eight minutes and needed to "TRY [to] SQUEEZE YOU IN AHEAD OF HIM." Without changing configuration, or pressing the go-around buttons on the thrust levers, and after having re-engaged the autopilot, the A320 crew started a descending 360° turn and re-positioned onto the right base leg for a visual approach to Runway 26.

The A320 crew then asked for a QNH check, which was passed, and replied "YEAH THAT CONFIRMS THE ILS WAS A WAY WAY OUT." They then added that they had lost the signal for the ILS too. ATC then informed them that they would talk to the electrical engineers, but believed all ILS indications in the tower were normal. The Beech 200 pilot then transmitted that he had indications that the ILS had been turned off and asked the ATCO to

speak to the ground crew. They subsequently confirmed that both ILS transmitters were functioning correctly.

As the A320 turned onto right base for Runway 26, ATC instructed the crew to "CONTINUE THE APPROACH AND CALL ON FINAL." Shortly afterwards the A320 crew reported "AT ABOUT TWO MILES NOW." At 1330 hrs, the ATCO, who was visual with the A320, then cleared it to land; this was acknowledged by the crew. Shortly before touchdown the EGPWS Mode 5 "GLIDESLOPE" aural warning sounded, followed by a "TERRAIN AHEAD" alert. Due to the distracting nature of this warning, the co-pilot attempted to silence it by pressing the TERR OFF button in the overhead panel.

About 50 seconds later, the ATCO asked the A320 crew to report their DME; they replied "WE'VE JUST TOUCHED DOWN.", to which the ATCO responded "IT WAS THE WRONG AIRPORT, YOU'VE LANDED AT BALLYKELLY." The A320 crew replied "I KNOW WE HAVE." The ATCO then instructed them to remain on the ground and await further instructions.

After completing the landing roll, the aircraft turned around at the end of the runway. ATC instructed the operating crew to shut down the aircraft's engines and await the arrival of ground handling equipment from LDY. The passengers and baggage were subsequently unloaded and taken by road to LDY.

Approval to fly the aircraft out of BKL, using a different operating crew, was subsequently given by the Irish Aviation Authority, in conjunction with the authorities at LDY and BKL. The aircraft, with just an operating crew on board, departed BKL from Runway 02 at 1925 hrs after the runway had been measured and inspected for debris.

Flight Recorders

The sources of information interrogated during this investigation were the Cockpit Voice Recorder (CVR), the Flight Data Recorder (FDR), the Quick Access Recorder (QAR), the Enhanced Ground Proximity Warning System (EGPWS) and radar recordings.

CVR

The CVR was found to be unserviceable, having failed approximately 16 days before the incident. This had not been detected despite a requirement to carry out a daily test.

FDR, QAR and EGPWS

The FDR, QAR and EGPWS yielded useful information pertaining to the incident and the data correlated well with each other. The following information is an amalgamation of these sources.

After departure, the aircraft climbed to FL220 and headed north-west. For all but the very first part of the 40 minute flight, the ILS frequency (108.30 MHz) for Runway 26 at Londonderry/Eglinton was selected. The aircraft autopilots acquired the ILS localizer and glideslope and tracked them for approximately 2.5 nm before both autopilots were disengaged. The aircraft was then flown, using the commander's sidestick, left of the Londonderry/Eglinton Runway 26 extended centreline and more in line with the centreline for Runway 26 at Ballykelly. The aircraft began to descend below the Londonderry ILS glideslope, following which a descending orbit to the right was carried out. This put the aircraft even further below the glideslope. The first half of the orbit was controlled using the left autopilot and selected HDG/FPA modes, the second half and subsequent landing was flown manually.

A Mode 5 ‘soft’ EGPWS “GLIDESLOPE” alert¹ was triggered just before the orbit was complete, at a radio altitude of approximately 592 ft agl. At this time the glideslope deviation was greater than five dots. Before this, the enabling conditions for a glideslope alert had not been met, despite the large glideslope deviations². The descent continued and, ten seconds later, at 509 ft agl, an EGPWS “TERRAIN AHEAD, PULL UP” warning was triggered; which would have repeated continuously whilst the ‘threat’ existed. At the time of the alert, the commander had ‘terrain’ displayed on his Navigation Display (ND) and this alert would have highlighted the ‘threatening’ terrain on his display. The co-pilot did not have terrain displayed on his ND but the alert would have caused that page to appear. Ten seconds later, at 384 ft agl, the EGPWS look-ahead functions were inhibited using the TERR OFF selection on the overhead panel. This inhibited a further three alerts that would have otherwise been given. The aircraft touched down at Ballykelly 34 seconds later. The Flight Management System position indicated that the aircraft was within 175 m of the intersection of the runways at Ballykelly when the aircraft touched down. Figure 1 shows the final section of the flight.

Footnotes

¹ Mode 5 provides two levels of alerting for when an aircraft descends below the glideslope, resulting in activation of EGPWS caution lights and aural messages. The first level alert occurs when below 1,000 ft and the aircraft is 1.3 dots or greater below the beam. This turns on the caution lights and is called a ‘soft’ alert, because the audio message ‘GLIDESLOPE’ is enunciated at half volume. 20% increases in the glideslope deviation cause additional ‘GLIDESLOPE’ messages enunciated at a progressively faster rate. The second level alert occurs when below 300 ft Radio Altitude (RA) with two dots or greater glideslope deviation. This is called a ‘hard’ alert because a louder ‘GLIDESLOPE GLIDESLOPE’ message is enunciated every three seconds, continuing until the ‘hard’ envelope is exited. The caution lights remain on until a glideslope deviation less than 1.3 dots is achieved.

² The alert conditions require the presence of a valid localiser deviation within two dots and a RA below an upper boundary determined by a combination of rate of change of altitude and RA.

On this aircraft, there are no parameters recorded to identify whether the glideslope alerting function has been inhibited, unlike the terrain-ahead warning mentioned above. This function and its associated button are separate from the terrain-ahead warning ‘inhibit’ status that was recorded. Had the glideslope alerting function not been inhibited then, at 300 ft agl, the status of the alert should have switched from soft to hard and the “GLIDESLOPE GLIDESLOPE” aural warning would have been continuously repeated every three seconds.

Airport information

Londonderry’s main runway is orientated 26/08. Runway 26 has a LDA of 1,817 m and its threshold is a short distance inland from the adjacent beach. A single-track railway line passes through the undershoot area, with up to 14 train movements per day, and railway personnel are required to telephone the ATCO at LDY to notify the time of departure and the estimated time that a train will cross the end of the runway.

As a result, the following warning is published in the UK Aeronautical Information Package (AIP):

‘Aircraft will not be permitted to land on Runway 26 or depart Runway 08 from 5 minutes before the passage of a train until the train is past. Aircraft may experience approach delays of up to 10 minutes where movements conflict with the passage of a train.’

The approach lighting for Runway 26 is 550 m in length. It initially consists of a line of five high intensity omni-directional sequenced strobe lights, in the water, supplemented with a simple ODALS³ system, between the shoreline and the threshold.

Footnote

³ Omni Directional Approach Lighting System.

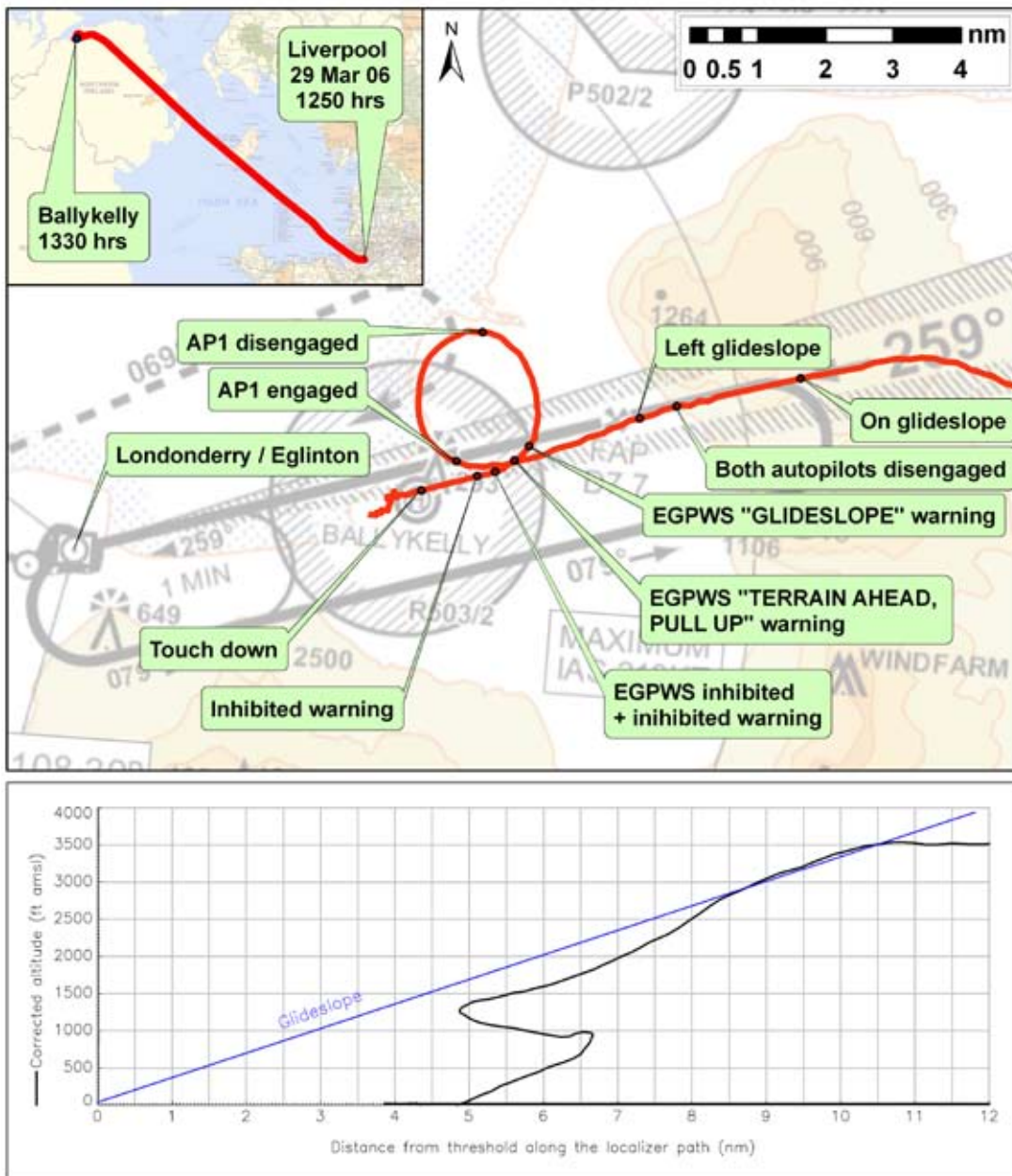


Figure 1

Approach and Landing Section of the Flight derived from the Flight Recorders

Pilots are reported to have commented that Runway 26 at Londonderry is very difficult to see from a distance, as the approach lights apparently do not stand out on a bright day.

Ballykelly, an ex-RAF airfield, is located 5 nm east-north-east of LDY and is now used by the British

Army. Until 2003, it was used by C130 Hercules aircraft and, up to that time, the runway was inspected for condition annually. The airfield mostly supports helicopter operations and occasional Islander aircraft training flights and parachute jumping operations. The main runway has the same orientation as LDY, ie 26/08 and Runway 26 is 1,698 m in length with a threshold

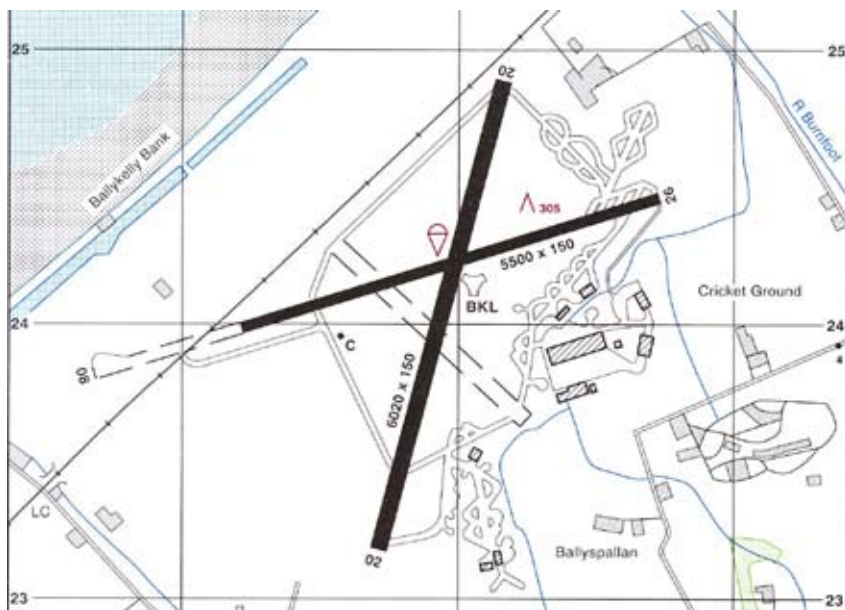


Figure 2

Diagram of the layout of Ballykelly Airfield

displaced by 479 m, giving a useable length of 1,219 m. A railway line, which is fenced off, crosses the far end but there is an additional 372 m of unusable runway the far side of this railway.

Runway 26 at BKL is mostly made of concrete that, in places, was showing signs of break-up. A tarmac section in a good state of repair, 662 m in length, had been laid in the middle of the runway. No runway lights were installed.

Only one set of aircraft touchdown tyre marks were found on the runway, ie two sets of 'double' tyre marks, and these were a short distance past the runway designator numbers. This was close to the touchdown position computed from the FDR data (see paragraph headed Flight Recorders). The spacing between these marks, for both sets of main gear tyres, was measured at 91 cm. The aircraft manufacturer reported that, for the A320, this dimension is 92.7 cm. Given

that these were the only tyre marks on the runway, their location and their spacing left little doubt that they had been made by EI-DIJ. Having landed just past the runway numbers, this gave the A320 an adequate amount of runway within which to stop; the Landing Distance Required (LDR) for EI-DIJ, at its landing weight, was 728 m.

Meteorological information

The synoptic situation at 1200 hrs showed a low pressure over northern parts of the British Isles as well as to the west. Generally good weather was affecting much of Northern Ireland

although there was a risk of showers in what was essentially an unstable air mass.

The METAR issued just before EI-DIJ landed at BKL showed that the wind was from 250°/15 kt, the visibility was in excess of 10 km, with FEW cloud at 2,500 ft agl and SCATTERED cloud at 3,200 ft agl.

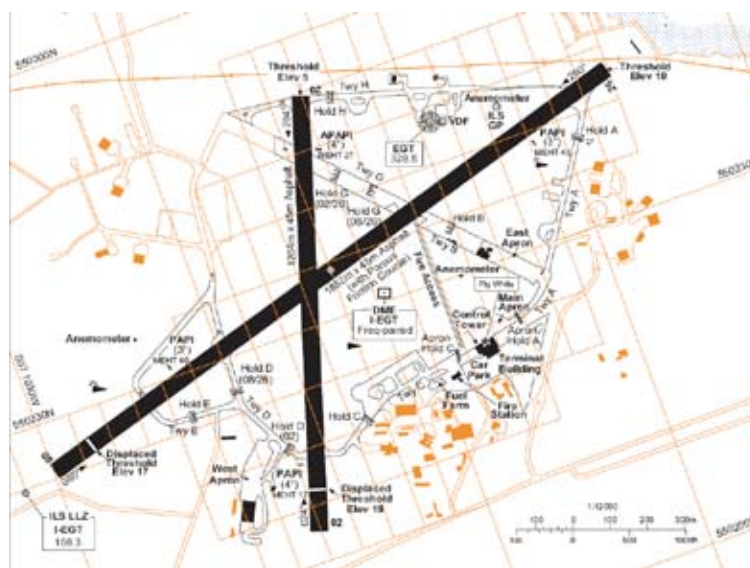


Figure 3

Diagram of the layout of Londonderry Airport

Operating crew’s comments

Commander

The operating company had provided the operating crew with airfield charts for LDY that had been published by a commercial provider, Figure 4. For three days prior to the incident flight, the commander tried in vain to obtain a copy of the LDY airfield charts, through the LPL operations office and another commercial provider. This was to be fully prepared for the flight into this limiting airfield. However, he did obtain a copy of these charts the day after the incident and stated that, had he seen these previously, he would have been fully aware of the existence of BKY and would not have landed there. This was due to the different presentation of the data, in particular, the manner in which BKL was

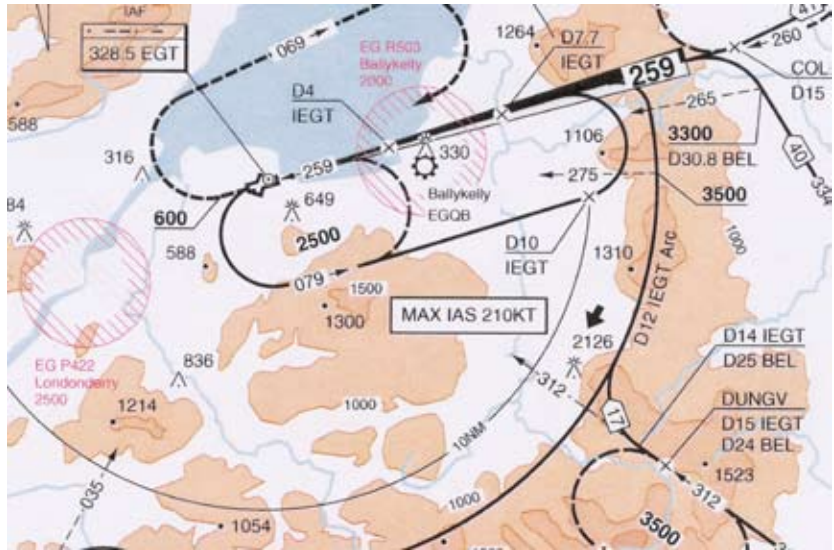


Figure 4

Section of approach chart used by the crew of EI-DIJ

depicted, Figure 5. He had been issued with a ‘brief’ by his company prior to operating the flight, but this contained no reference to BKL.

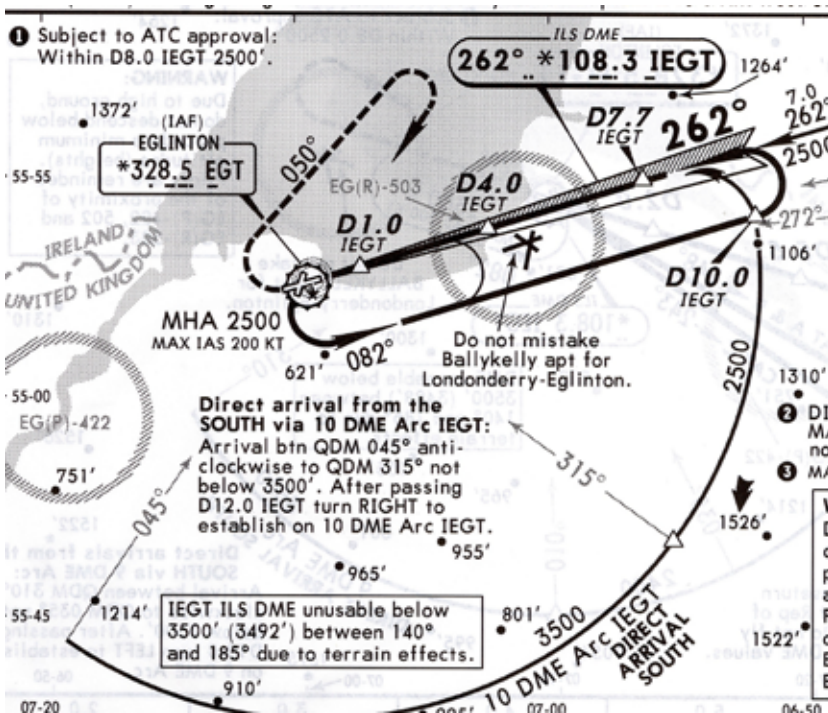


Figure 5

Section of the approach chart that the commander of EI-DIJ attempted to obtain prior to the flight, showing warning note re Ballykelly

Knowing that the runway at LDY was relatively short, he concentrated on flying an accurate approach to ensure that he landed on the threshold at the correct speed. He stated that, once he was visual with BKL, and not knowing there was another airfield in the vicinity, his mind-set was that this must be his destination airfield. At no time did the commander see LDY in the distance and the perceived problem with the ILS and the presence of the ILS calibrator aircraft all reinforced his perception that this was the correct, and only, airfield. He also felt that ATC was slightly ‘rushing’ him during the approach, due to the showers in the vicinity and the approaching train.

The commander stated that he touched down close to the beginning of the paved surface, well before the marked runway threshold. He was concerned about the length of the runway and wanted to make sure he had the maximum amount of runway ahead on which to complete the landing roll. He added that, after touchdown, he felt he had an adequate amount of runway ahead of him in which to stop. The commander was aware of the “GLIDESLOPE” and “TERRAIN” warnings prior to landing but, as he was visual with the runway, he believed that they were spurious.

Co-pilot

The co-pilot had landed on Runway 08 at LDY twice before. He was not aware of the existence of BKL and stated that, he too, had the same mind-set as the commander. Whilst he remembered trying to cancel the EGPWS “GLIDESLOPE” warning, he did not remember hearing the “TERRAIN” warning or which button he pressed in the overhead panel.

Londonderry ATC procedures

LDY operates two radio frequencies, Approach and Tower. There is no radar facility at the airport, hence the ATC approach service is procedural. When the tower is staffed, it is done so by one ATCO who monitors and controls both frequencies, which are cross coupled. Additionally, he is responsible for carrying out ‘domestic’ duties that include the taking of landing fees, submitting flight plans and issuing ATC clearances. When the ATCO requires a break, the tower service closes down.

All aircraft landing on Runway 26, whether they are flying a visual or an instrument approach, are required to report at four DME. At this point, BKL would be behind a landing aircraft and would thus be out of sight to the pilots. This is a local order that does not appear in the Manual of Air Traffic Services Part 2.

ATCO’s comments

In order to de-conflict landing aircraft from the passage of trains, the ATCO plans on aircraft taking six minutes to fly down the ILS from COLRE to touchdown. If a confliction looks likely, he instructs the aircraft to hold at COLRE to increase the separation between the aircraft and a train.

On being advised by the A320 crew that they had a problem with the ILS glideslope, the ATCO telephoned the electronic engineers on site to ask them to check the serviceability of the ILS. Although he was visual with the A320 when it reported “AT ABOUT TWO MILES NOW” on final approach, the ATCO did not believe that the aircraft was about to land at BKL even though it appeared “slightly low”. (At this position, had the aircraft been approaching LDY, it would have been below the glideslope by approximately 400 ft.) With hindsight, the ATCO felt that he had a period of approximately 30 seconds in which it would have been possible to stop the A320 from landing at BKL, but believes that he did not do so because he, incorrectly, prioritised his attention to checking the serviceability of the ILS. Also, he was looking for the Gazelle helicopter at the time the A320 made its final approach to BKL. He added that, in the past, he had stopped both light and commercial aircraft from landing at BKL by using his Direction Finding equipment, and thus noticing the aircraft’s unusual relative bearing from the airfield. On one occasion, when he came on duty and was in the process of having the controller’s position handed over, he stopped a commercial aircraft from making this mistake. He attributed this to the fact that there were two people in the ATC tower at that time.

UK Aeronautical Information Package

The Aerodromes section of the UK AIP contains detailed information about civil licensed aerodromes. Commercial providers of airfield charts use this information to produce their own version of the charts, which may be supplied to commercial operators and airlines.

The AIP for Londonderry states the following under 'Warnings':

'Pilots are reminded of the close proximity of Ballykelly 5 nm to the east-north-east of this aerodrome. Ballykelly runway lighting may be observed from the final approach to Runway 26. Pilots of aircraft en-route and in the circuit should positively identify Londonderry/Eglinton before committing the aircraft to landing.'

On the approach plates for LDY in the UK AIP, BKL is depicted by a helicopter landing site symbol. This is an ICAO requirement due to the fact that the main activity is by helicopters. The information in the AIP is depicted by commercial providers in different formats and with varying amounts of information. The airfield charts, that the commander tried to obtain before the incident flight, depict the runway layout at BKL on all of its plates for LDY. They include the note "Do not confuse Ballykelly with Londonderry", pointing at this symbol, as illustrated in Figure 5. The AIP and commercial plates available to the crew of EI-DIJ did not have this warning or a depiction of the runway layout. However, the symbol on these plates did indicate that there was an aerodrome at Ballykelly, alongside which its name and ICAO code were printed. On other charts, this commercial provider has a symbol in the chart legend to depict an 'Aerodrome with a RWY parallel to RWY at procedure aerodrome'. They stated that they had not used this to depict the runway at BKL as "no such information is given anywhere in the UK AIP".

Analysis

Throughout flying training, pilots are taught to believe their flight instruments unless they have good reason to doubt the information being presented. Once visual with BKL, the crew of the A320 were convinced that this was their destination airfield. Distracted by what they perceived was a problem with the ILS glideslope and DME, and the perceived slight sense of urgency from the ATCO, they became focused on landing at the only airfield they could see. Whilst BKL was marked on their approach plates, they failed to recognise the depiction as an airfield.

Not being aware that there was another airfield in the vicinity with a very similar layout, and misbelieving the (correct) ILS glideslope and DME indications, the crew continued towards the only airfield they could see, firmly convinced that they were landing at LDY. This was despite the distraction of the EGPWS warnings during the final stages of the approach. Had the approach been flown in IMC, there is little doubt that the operating crew would have flown the ILS to Decision Altitude and landed, without incident, at LDY.

There are varying degrees of information and formats associated with the approach plates for LDY from commercial providers of this information. Although at least one version of the approach plates contains a warning note for flight crews not to confuse BKL with LDY, it would seem appropriate that the AIP should be amended to add such a note. This should highlight the fact that the runways at BKL have a similar configuration to that of LDY, and this would ensure that commercial providers have all the information they need, to minimise the possibility of BKL being misidentified as LDY.

Following this incident, National Air Traffic Services (NATS) published a NOTAM, No L2352/06, which stated the following:

'Pilots are reminded of the close proximity of the Military helicopter site at Ballykelly AD, 5 nm east of Londonderry. Ballykelly AD has similar RWY directions and pattern to Londonderry. Pilots of aircraft en-route and in the circuit at Londonderry should positively identify Londonderry/Eglinton before committing their aircraft to land.'

Safety action taken

Prior to this event, the operating company had been looking at the merits of changing to another commercial

provider of airfield charts. As a result of this incident, they have changed their provider, although their original provider has now amended its charts, including a change to the symbol for BKL, to clarify the information presented to flight crews, Figure 6.

NATS have indicated that the warning contained in the NOTAM will be incorporated in to the UK AIP at the next suitable opportunity.

In view of these actions, it is not considered necessary to make any formal safety recommendations.

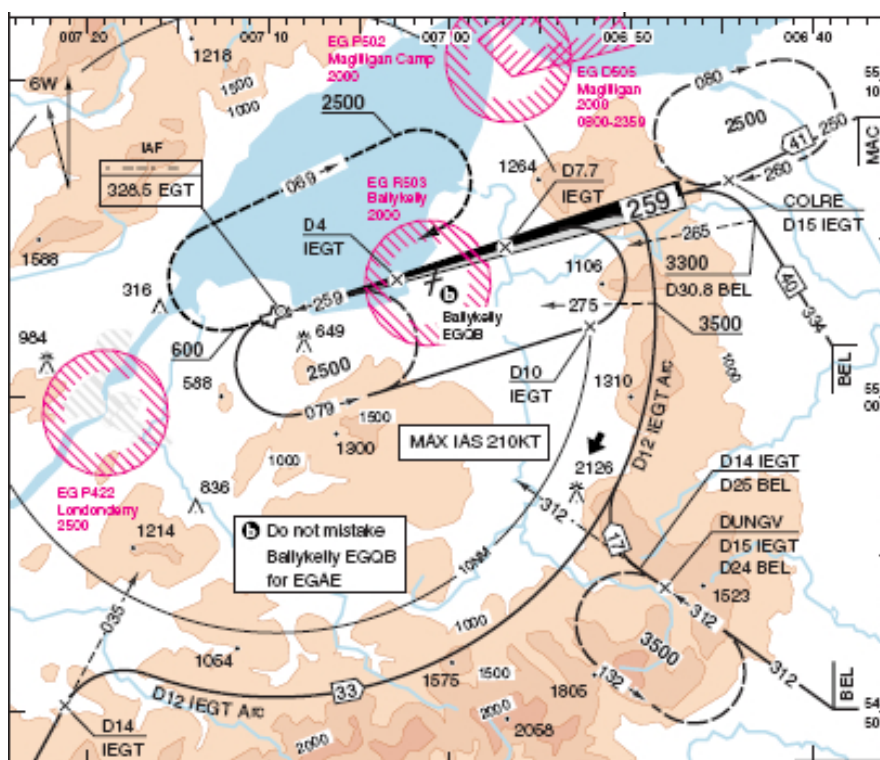


Figure 6

Modified version of the chart shown in Figure 4