

# FINAL REPORT

AAIU Synoptic Report No: 2009-004

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In accordance with the provisions of S.I. 205 of 1997, the Chief Inspector of Air Accidents, on 18 December 2007 appointed Mr. Paddy Judge as the Investigator-in-Charge to carry out a Field Investigation into this Serious Incident and prepare a Synoptic Report.

<b>Types and Registrations:</b>	(1) AGUSTA WESTLAND - A109, N449J (2) LEARJET – 31A, EI-MAX
<b>Nos. and Types of Engines:</b>	(1) 2 x Pratt and Whitney 206C (2) 2 x Garret AIRESEARCH - TFE 731
<b>Aircraft Serial Numbers:</b>	(1) 11056 (2) 233
<b>Year of Manufacture:</b>	(1) 2000 (2) 2002
<b>Date and Time (UTC):</b>	17 December 2007 @ 08.43 hrs
<b>Location:</b>	Dublin Airport (EIDW), Runway (RWY) 10
<b>Types of Flight:</b>	Private
<b>Persons on Board:</b>	(1) Crew – 1      Passengers – Nil (2) Crew – 2      Passengers – 2
<b>Injuries:</b>	Crew – Nil      Passengers – Nil
<b>Nature of Damage:</b>	None
<b>Commanders' Licences:</b>	(1) FAA Commercial Pilot Rotorcraft- Helicopter (2) JAR Airline Transport Pilot Licence
<b>Commanders' Details:</b>	(1) Male, aged 39 years (2) Male, aged 52 years
<b>Aircraft Commanders' Flying Experience:</b>	(1) 2,350 hours, of which 200 were on type (2) 14,400 hours, of which 805 were on type
<b>Notification Source:</b>	ATC Watch Manager EIDW
<b>Information Source:</b>	AAIU Field Investigation

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## SYNOPSIS

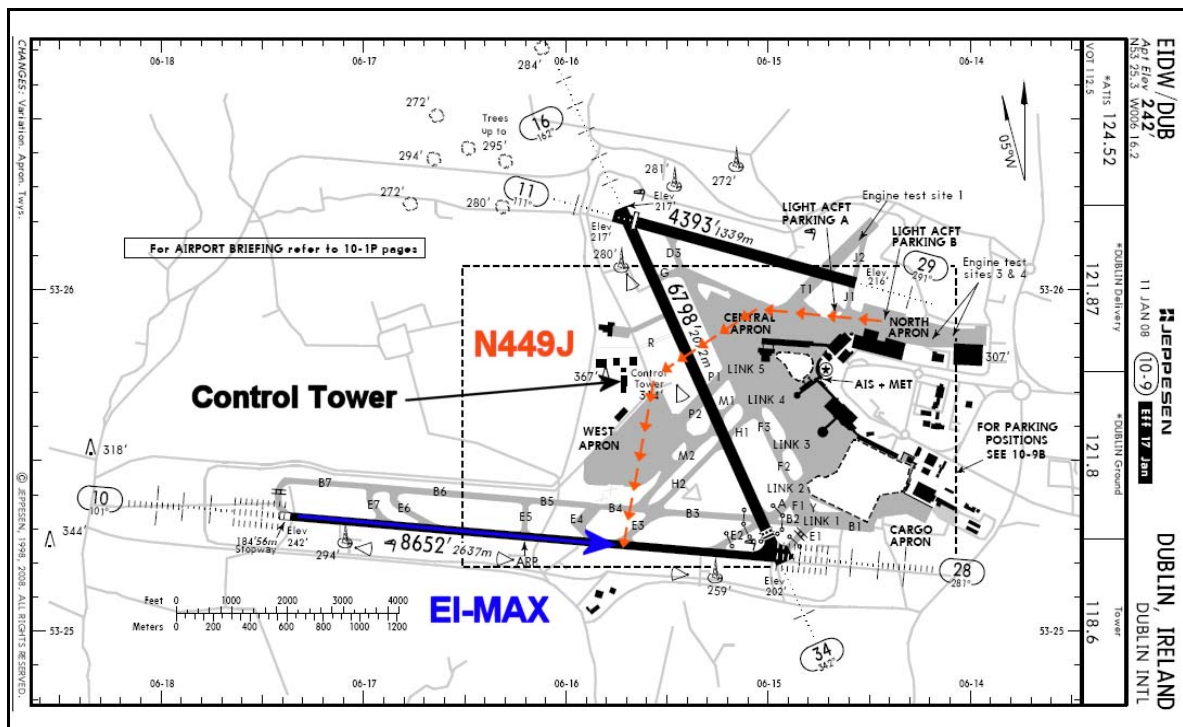
An airmis occurred at Dublin Airport when a helicopter crossed the active runway in front of an aircraft that was taking off. On becoming airborne the Pilot of the Learjet aircraft was forced to take immediate evasive action to avoid a collision. There was little vertical or horizontal separation between the two aircraft at the time of the occurrence. There was no damage to either aircraft.

The Pilot of the helicopter had been given a conditional clearance to cross the runway after the Learjet had taken off. He crossed instead ahead of it and did not see the small Learjet, whose colour was dark grey, until the airmis. ATC procedures at EIDW have since been changed with conditional clearances to cross active runways no longer being issued to helicopters.

## 1. FACTUAL INFORMATION

### 1.1 History of the Incident

This serious incident happened in the early morning shortly after sunrise with good visibility. A light easterly wind dictated landings and take-offs on RWY 10. EI-MAX was operating a flight from EIDW to Zurich with two passengers on board. It taxied out to take-off in sequence. In the meantime the helicopter N449J, which had been parked on the North Apron overnight, was cleared to lift off and to route to abeam the Control Tower, which is north of the active runway. It hovered there at an altitude of 400-500 ft while awaiting clearance to cross the active runway.



**Graphic No. 1: 1Jeppesen plate EIDW 10-9 showing the track of both aircraft.**

EI-MAX was then cleared to take-off following which the ATC Controller asked the Pilot of N449J if he had the traffic rolling off RWY 10 in sight. He confirmed that he had and was issued with a conditional clearance by the Controller to pass behind that aircraft. However, he crossed in front of it.

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## 1.2 Interviews

### 1.2.1 Pilot of Helicopter

The Pilot stated that he had filed a VFR flight plan to a private site in South Wales, with an initial pick up of a passenger in the west of Dublin city. He was cleared to start by Dublin Ground ATC. He changed frequency to Dublin Tower and was cleared to lift off and route as far as the Control Tower. He stated that he was then asked if he was “*visual with the aircraft rolling onto RWY 10*”. He could see a Boeing 737 (B737) taxiing up to the holding point. The Pilot replied that he did, believing that it was the B737 that was being referred to, and was then cleared to cross “*behind him*”. He stated that he believed that the ATC controller wanted him to pass behind the taxiing B737 and to expedite the crossing. He did not see the Learjet on the runway; he believed that this was due to it being small and grey with low light levels, as it was shortly after sunrise. As he crossed the runway he saw the Learjet pass a short distance behind his aircraft. After listening to the ATC recordings the Pilot of the helicopter stated that it was clear he had misunderstood the ATC controller and misidentified the aircraft in question. He was of the opinion that, with hindsight, he should have confirmed the aircraft type and position with the controller before he crossed.

He said that it would have been helpful if the ATC phrase “*behind the departing traffic*” could be used as this would have alerted him to the traffic on climb out.

### 1.2.2 Commander of Learjet

The Commander stated that the First Officer (FO) was the handling pilot and flying the aircraft. They were cleared for take-off and, with landing lights on, the FO advanced the power. The aircraft was rotated at V1 and after V2 the Commander saw the helicopter about to cross the centreline of his flight path from left to right. The Commander immediately took control, pushed the nose down and banked left to avoid a collision. He passed below and just behind the helicopter.

The Commander subsequently stated that prior to the take-off he and the FO had discussed a slow rotation, due to the possibility of dislodging catering trays.

### 1.2.3 ATC Controller

The ATC Controller stated that, after he had issued the helicopter with a conditional clearance to cross the runway, he turned to observe an aircraft on finals for RWY 10 to which he transmitted information about a possible late landing clearance. He then looked back towards the runway and saw the Learjet and helicopter very close to each other on converging flight paths. He did not transmit a warning, as if he had done so he would have distracted the pilots at a critical moment. He stated that he then saw the Learjet “*dipping to avoid the helicopter*” and “*take evasive action by turning to the left and descending*”. He could not estimate the minimum horizontal separation between the aircraft due to his observation angle from the Control Tower.

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### 1.3 ATC Records

#### 1.3.1 ATC Transcripts

ATC transcripts indicate that the Ground Controller initially cleared N449J to lift off and then to route initially towards the Control Tower. This was acknowledged by N449J who was then changed to the Tower Control frequency.

The following is the ATC recording of the transmissions made on the Tower frequency during the event. The ATC Controller initially cleared the Learjet, (EI-MAX), whose call sign was Hi-Flyer 31A, to take-off.

#### ATC Tower Transcript

<i>From</i>	<i>To</i>	<i>Transmission</i>
ATC	EI-MAX	<i>Hi-Flyer 31A, behind the landing Midlands Airbus, 2½ final, line up 10 and wait.</i>
EI-MAX	ATC	<i>Behind the landing Midlands Airbus lining up and wait, Hi-Flyer 31A.</i>
		Various transmissions then occurred that are not relevant to the incident
ATC	EI-MAX	<i>Hi-Flyer 31A, wind is calm, cleared to take-off 10, Good bye</i>
EI-MAX	ATC	<i>Cleared to take-off 10, Hi-Flyer 31A. So long</i>
ATC	N449J	<i>N449J Tower, do you have the traffic rolling off 10 in sight?</i>
N449J	ATC	<i>Yes, affirm 449J.</i>
ATC	N449J	<i>Roger 449J, cleared to pass behind that traffic, cross the active runway to Ballymun and then onwards to Heuston.</i>
N449J	ATC	<i>..er, cleared across the, behind the rolling traffic to Ballymun and then Heuston</i>
ATC	A229N	<i>Arran 22N, Number 1 now, continue approach. There will be helicopter traffic crossing the active runway, expect late landing clearance.</i>
A229N	ATC	<i>Continue on as we are? (Aer Arran.)</i>
N449J	ATC	<i>Runway vacated N449J</i>
EI-MAX	ATC	<i>What was that?</i>
ATC	N449J	<i>N449J, you passed in front of the rolling traffic</i>
N449J	ATC	<i>Ah, roger</i>

#### 1.3.2 Radar Information

The Radar tape recordings were obtained and reviewed by the Investigation. As the radar system updated its display every 4 seconds it was not possible to determine the exact moment of occurrence. However, during the occurrence Radar records showed that both aircraft were at an altitude of 400 ft at the same moment, or approximately 200 ft above the runway, with EI-MAX having a groundspeed of 173 kts and N449J a groundspeed of 95 kts respectively. It was not possible to measure horizontal separation distance from the radar records as both the radar return images from the aircraft were superimposed.

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## 1.4 ICAO Manual of Radiotelephony

The ICAO Manual of Radiotelephony Doc 9432 AN/925, Third Edition 2006 states” *ICAO phraseologies are developed to give efficient, clear, concise and unambiguous communications*”.

It states, *“it is not possible to provide phraseologies to cover every conceivable situation which may arise and the examples contained in the manual are not exhaustive, but merely representative of radio telephony phraseology in common use”*.

Section 4.5.7 states:

*“Conditional clearances shall not be used for movements affecting the active runway(s), except when the aircraft or vehicles concerned are seen by both the controller and pilot. When the conditional clearance involves a departing aircraft and an arriving aircraft, it is important that the departing aircraft correctly identifies the arriving aircraft on which the conditional clearance is based. Reference to the arriving aircraft type may be insufficient and it may be necessary to add a description of the colour or the company name to ensure correct identification”*.

## 1.5 EIDW ATC Procedure Change

Following this Serious Incident and a subsequent occurrence the Irish Aviation Authority (IAA) issued ATS Operations Notice (AON) No. 28/08 on the 25/04/2008. This contained, inter alia, the following:

*“The use of conditional clearances may no longer be used in relation to helicopters crossing the active runway.*

*For clarity, a controller may no longer point out an arriving or departing aircraft to a helicopter, and clear the helicopter to cross behind. The helicopter must be brought to a position clear of the runway and held there until the relevant traffic has passed, and then cleared to cross the runway.*

*It is accepted that this rule may cause delays to helicopters operating in the vicinity of the airfield and will increase the workload of tower controllers.*

*Due to this, Tower Controllers must be aware that their primary responsibility lies in the provision of a safe and expeditious service to traffic landing and departing Dublin Airport.”*

## 2. ANALYSIS

This Serious Incident happened in good weather conditions early on a winter’s morning just after sunrise. Light levels were consequently low.

### 2.1 Clearances

The ATC Tower records show that the Tower Controller cleared EI-MAX to take-off. EI-MAX confirmed this clearance and said good-bye, as it was required to change to a different frequency after departure. Immediately afterwards the Tower Controller asked the Pilot of the helicopter if he had the *“traffic rolling off 10”* meaning the aircraft on take-off in sight. The Pilot, who was listening out on the frequency, clearly replied, *“Yes, affirm 449J”*.

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The Tower Controller then issued a conditional clearance to the helicopter, i.e. that the helicopter was cleared across the runway conditional on being behind the rolling traffic. The Pilot then replied “..er, cleared across the, behind the rolling traffic to Ballymun and then Heuston”. The initial part of the transmission was clipped and it is possible that this initial word was “Roger”, which is an indication that the message was heard and understood. The response of the Pilot, though not precisely repeating the Controller’s instructions, was not ambiguous enough to cause the Tower Controller to question it.

After subsequently listening to the ATC recordings in the AAIU the Pilot stated that it was clear he had misunderstood the ATC Controller and misidentified the aircraft in question. He was of the opinion that with hindsight he should have confirmed the aircraft type and position with the controller before he crossed and believed it would have been helpful if the ATC phrase “*behind the departing traffic*” had been used as this would have alerted him to the traffic on climb out.

The ATC Controller used the phrase “*rolling traffic*”, which is normal ATC phraseology used to describe an aircraft during take-off but still travelling along the runway at the time. A clearance, such as the Pilot suggested, “*behind the departing traffic*” is less precise since a “*departing aircraft*” does not indicate phase of flight, which ranges from initial start up to climb to altitude and does not indicate whether the aircraft is travelling along the runway or has become airborne.

### 2.2 Conditional Clearances

The ICAO Manual of Radiotelephony suggests that when a conditional clearance involves a departing aircraft and an arriving aircraft the reference to the arriving aircraft type may be insufficient and that it may be necessary to add a description of the colour. Although the circumstances outlined in the manual differ from the incident nevertheless these principles are relevant. The Learjet was small and its colour dark grey. As the surface of the runway was also grey, the lack of colour contrast in the early morning light would have made the aircraft difficult to identify, even though its landing lights were on. The Investigation is of the opinion that this was probably a contributory factor in the occurrence and that it might have been helpful to the Pilot of the helicopter if the Controller had specifically identified the type and colour of the Learjet aircraft.

However, at the time the helicopter was hovering in the vicinity of the Control Tower and consequently both the Pilot and the Tower Controller would have had similar views of the runway and how clearly the Learjet could be seen. In addition, the Pilot was listening on the VHF frequency and should have heard the take-off clearance the ATC controller had just issued to the Learjet aircraft. Immediately afterwards, when the Pilot confirmed that he had the aircraft rolling in sight, the Controller issued the conditional crossing clearance. Ultimately it was the fact that the Pilot did not comply with or query the clearance that resulted in the airmiss. The subsequent decision by the Controller not to intervene or distract the pilots at a critical time during the occurrence was correct. The Investigation notes that conditional clearances, to allow helicopters to cross the active runway, are no longer used by ATC controllers at EIDW. Helicopters are now procedurally cleared by ATC across the active runway only when the runway strip is clear. The Investigation is supportive of this initiative and consequently no Safety Recommendation is considered necessary.

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## 2.3 Airmanship

During this serious incident an accident was narrowly avoided by the excellent airmanship displayed by the Commander of the Learjet. Having become airborne the Commander, on seeing the closing helicopter, immediately took over control of the aircraft from the handling pilot and took evasive action. He pushed the nose forward, banked left at a very low altitude of about 200 ft and narrowly avoided both a mid air collision and ground contact.

## 3. CONCLUSIONS

### (a) Findings

1. The Pilot of the helicopter confirmed that he had the rolling aircraft in sight.
2. As a consequence, ATC issued the helicopter with a conditional clearance to cross the active runway behind EI-MAX, a Learjet aircraft that was taking off.
3. The helicopter N449J crossed the active runway in front of EI-MAX, which had just become airborne.
4. The Pilot of the EI-MAX took immediate evasive action, thus avoiding a mid-air collision.
5. The Pilot of the helicopter misunderstood his ATC clearance and misidentified the rolling aircraft.

### (b) Probable Cause

The Pilot of the helicopter did not comply with the conditional clearance issued by the ATC Controller.

### (c) Contributory Cause

The size and dark-grey colour of the Learjet aircraft.

## 4. SAFETY RECOMMENDATIONS

This Investigation does not sustain any Safety Recommendations.

– END –