Air Accident Investigation Unit Ireland

SYNOPTIC REPORT
SERIOUS INCIDENT
Boeing 737-8AS, EI-EBW
Airbus A320-214, EI-DER

Dublin Airport

19 May 2018

An Roinn Iompair
Turasóireachta agus Spóirt
Department of Transport,
Tourism and Sport

Foreword

This safety investigation is exclusively of a technical nature and the Final Report reflects the determination of the AAIU regarding the circumstances of this occurrence and its probable causes.

In accordance with the provisions of Annex 13[1] to the Convention on International Civil Aviation, Regulation (EU) No 996/2010[2] and Statutory Instrument No. 460 of 2009[3], safety investigations are in no case concerned with apportioning blame or liability. They are independent of, separate from and without prejudice to any judicial or administrative proceedings to apportion blame or liability. The sole objective of this safety investigation and Final Report is the prevention of accidents and incidents.

Accordingly, it is inappropriate that AAIU Reports should be used to assign fault or blame or determine liability, since neither the safety investigation nor the reporting process has been undertaken for that purpose.

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[1] **Annex 13**: International Civil Aviation Organization (ICAO), Annex 13, Aircraft Accident and Incident Investigation.
[2] **Regulation (EU) No 996/2010** of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation.
[3] **Statutory Instrument (SI) No. 460 of 2009**: Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulations 2009.

AAIU Report No: 2019-001
State File No: IRL00918032
Report Format: Synoptic Report
Published: 10 January 2019

In accordance with Annex 13 to the Convention on International Civil Aviation, Regulation (EU) No 996/2010 and the provisions of SI No. 460 of 2009, the Chief Inspector of Air Accidents on 19 May 2018, appointed Mr Leo Murray as the Investigator-in-Charge to carry out an Investigation into this Serious Incident and prepare a Report.

Aircraft Type and Registration:	(1) Boeing 737-8AS, EI-EBW (2) Airbus A320-214, EI-DER
No. and Type of Engines:	(1) 2 x CFM56-7B26 (2) 2 x CFM56-5B/4P
Aircraft Serial Number:	(1) 35010 (2) 2583
Year of Manufacture:	(1) 2009 (2) 2005
Date and Time (UTC)[4]:	19 May 2018 @ 06.46 hrs
Location:	Dublin Airport (EIDW), Co Dublin, Ireland
Type of Operation:	(1) Public Transport (Scheduled) (2) Public Transport (Scheduled)
Persons on Board:	(1) Crew - 6 Passengers - 176 (2) Crew - 6 Passengers - 137
Injuries:	(1) Nil (2) Nil
Nature of Damage:	(1) None (2) None
Commander's Licence:	(1) Airline Transport Pilot Licence (ATPL) issued by the Irish Aviation Authority (IAA) (2) Airline Transport Pilot Licence (ATPL) issued by the Irish Aviation Authority (IAA)
Commander's Age:	(1) 59 years (2) 40 years
Commander's Flying Experience:	(1) 18,701 hours, of which 13,981 were on type (2) 10,835 hours, of which 4,917 were on type
Notification Source:	Operator of Airbus A320-214 EI-DER
Information Source:	AAIU Report Forms submitted by each Flight Crew member and statements from ATCOs[5]

[4] **UTC**: Co-ordinated Universal Time. Times in this Report are quoted in UTC; to obtain local time add 1 hour.
[5] **ATCO**: Air Traffic Control Officer.

SYNOPSIS

Two Airbus A320 aircraft, EI-DVG and EI-DER, were holding in sequence for departure from Runway (RWY) 28 at Dublin Airport (EIDW). Both aircraft had been transferred to the Air Movements Controller (AMC) on the Tower frequency. EI-DVG was stationary at the taxiway (TWY) E1 hold line. EI-DER was stationary at the corner of Link 1 and had been cleared to TWY E1. A Boeing 737, EI-EBW, was cleared by the Surface Movements Controller (SMC) on Ground frequency to taxi to TWY E1. While taxiing towards TWY E1 in accordance with its clearance, EI-EBW passed in close proximity to the front of EI-DER and stopped behind the first aircraft. No collision occurred but the margin of clearance was such that the Commander of EI-DER directly requested the taxiing aircraft to stop as it approached. As EI-DER and EI-EBW were operating on different frequencies, the transmission from EI-DER could not have been heard by the flight crew of EI-EBW. By the time EI-EBW was transferred to the AMC on Tower frequency, it had already passed EI-DER and was stopped. There was no damage to either aircraft and no injuries.

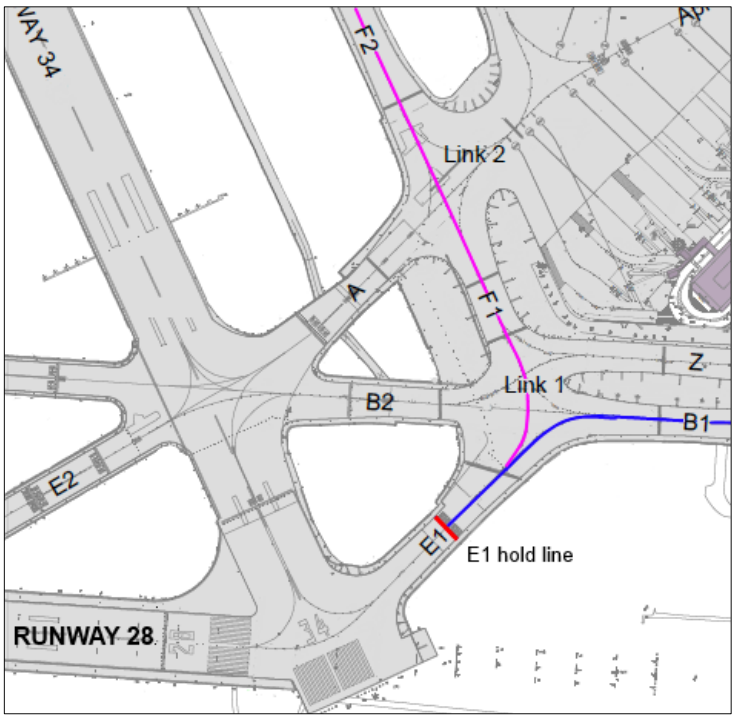
NOTIFICATION

The AAIU were made aware of the occurrence through the Safety Occurrence Reporting System (SOTS) following a safety report submitted by the Commander of EI-DER.

1. FACTUAL INFORMATION

1.1 History of the Flight

The layout of Taxiways between the apron and RWY 28 is shown in **Graphic No. 1**. The taxi route of EI-DER from TWY B1 to TWY E1 is shown in blue; the taxi route of EI-EBW from TWY F2 to TWY E1 is shown in magenta. The TWY E1 hold line is shown in red.



Graphic No. 1: Taxi route of EI-DER (blue line) and EI-EBW (magenta line)

EI-DER pushed back from the south side of Pier 4 and was initially cleared to taxi on TWY B1 and to hold short on Link 1. EI-DER was then further cleared to continue to TWY E1. As it approached Link 1, the SMC instructed the aircraft to hold before Link 1 as a '*company*' aircraft (EI-DVG) that had pushed back from the north side of Pier 4 was subject to a departure slot. EI-DER had just passed the hold line at Link 1 but as the Link 1 area is quite extensive there was no issue with the company aircraft passing in front. After EI-DVG had passed, EI-DER was instructed to continue to E1. The Commander of EI-DER stopped mid-way in the turn but left significant space behind EI-DVG ahead.

EI-EBW, under the control of the SMC and on Ground frequency, was holding on TWY F2 short of Link 2. With EI-DVG stationary at TWY E1 and EI-DER stationary on Link 1, EI-EBW was cleared by the SMC to proceed to TWY E1. As EI-EBW approached Link 1, the Commander of EI-DER saw that the EI-EBW was not stopping but proceeding in front of them to position behind the first A320. The Commander of EI-DER expected EI-EBW to stop, but when it continued, the Commander of EI-DER transmitted directly to the other aircraft: '[Callsign] *hold position there please*' followed four seconds later by a transmission to the Tower Controller. The AMC then instructed EI-EBW to hold position but realised that that aircraft was still on the Ground frequency and could not have heard any of the previous transmissions. The AMC transmitted that there had been some confusion on the Ground frequency. The Commander of EI-DER remarked that *'… just to be clear the* [Operator] *only just had wingtip clearance to go in front of us there*'. This was acknowledged by the AMC.

1.2 Ground Radar Recording

A screen capture of the A-SMGCS[6] ground radar (**Image No. 1**) shows the relative positions of the aircraft with EI-DVG stationary at the hold line on TWY E1, EI-DER stationary on Link 1 and Airbus A330 EI-EAV about to stop on TWY B1. EI-EBW is in a turn on Link 1 to position behind EI-DVG.

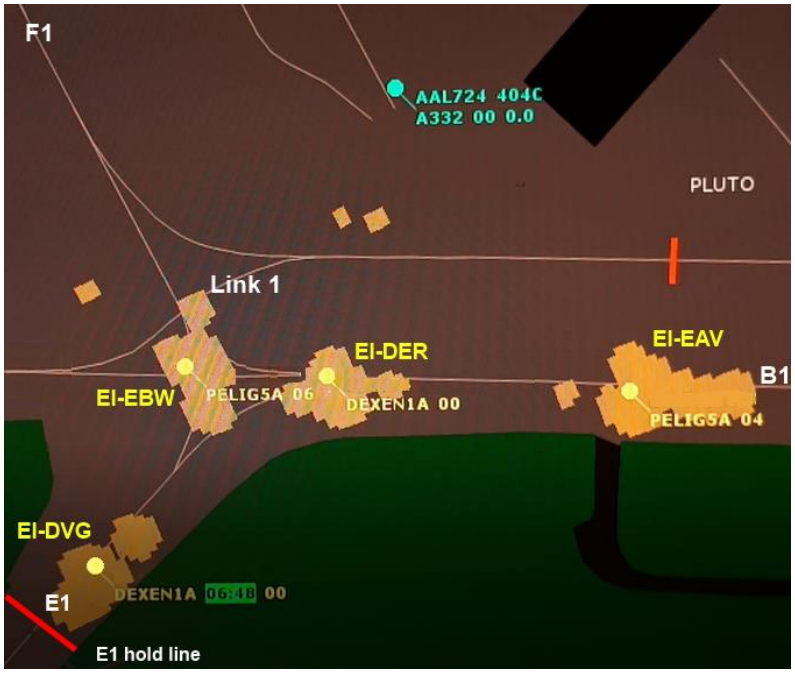


Image No. 1: Labelled A-SMGCS image of Link 1 showing the relative positions of each aircraft

[6] **A-SMGCS**: Advanced Surface Movements Guidance and Control System.

The A-SMGCS screen capture shows the primary target returns for each aircraft (which appear as yellow/amber blocked areas) and the secondary returns (as a bright yellow dot (with its associated departure route and other information).

1.3 Controller and Flight Crew Statements

In the following statements call-signs and flight numbers have been replaced with the aircraft registration in square brackets.

1.3.1 Surface Movements Controller (SMC)

'On the 19th May 2018 at 06.45z I taxied two [Operator name] *aircraft from B1 onto E1, the second of which was* [EI-DER] *and told them to monitor Tower frequency 118.6. When I glanced at the approach monitor I noticed there was a constant stream of approach aircraft and so I asked AMC to ask* [EI-DER] *on B1 to give way to* [EI-DVG] *as this aircraft was waiting the longest because of a slot restriction and I wanted to get* [EI-DVG] *to depart at the earliest opportunity.* [EI-DVG] *then taxied onto E1 to become number 1 to depart. I then heard the AMC controller re-clear* [EI-DER] *onto E1.* [EI-EBW] *was then taxiing along F3 and F2 and I took note the* [EI-DER] *was on the move again into Link 1 and then I assumed continuing onto E1 as there was space on E1. I instructed* [EI-EBW] *to taxi onto F1, E1 to hold short of runway 28 and 34, seeing that* [EI-DER] *was in the start of Link 1 did not deem it necessary to advise* [EI-EBW] *to give way to* [EI-DER]. *When I looked again I saw that* [EI-EBW] *had managed to get ahead of* [EI-DER] *while still on my SMC frequency.'*

1.3.2 Aircraft Commander (EI-EBW)

'During taxi to holding point runway 28 we have been cleared to hold at F2 Link, approaching the Link ATC cleared us to continue taxi to holding point E1 to hold short of runways 28-34. There was no aircraft at the holding point E1. We noticed an […] *A320 holding at Link 1. I remember saying to the first officer that the* […] *A320 was holding position a bit close to our taxi lane and I was about to ask confirmation to ATC. At that moment ATC called the* […] *aircraft and asked him to give way to* [our] *aircraft coming from the right and to taxi to holding point E1. I confirmed with the co-pilot that we had enough space to taxi in front of the* […] *A320 and I checked the wing tip clearance when approaching the closest point. There was enough room so I continued to taxi slowly to E1. As we were waiting at E1 I heard on the frequency that an* […] *crew was complaining about a* […] *aircraft taxing in front of them, I was surprised and wondered if they were talking about us. We took off a few seconds later.'*

The Commander later informed the Investigation that he estimated the distance between the nose of EI-DER and the left wingtip of his aircraft to be '*at least 5 metres*'.

1.3.3 Aircraft Commander (EI-DER)

'During taxi for departure [EI-DER] *was initially cleared to taxi via B1 hold short of Link1. Next we were cleared to E1 to hold short 28/34 and contact 118.60. Shortly after we switched frequency we were told by tower to hold short Link 1. We had just crossed the division between B1 and Link 1 by approx. 2m and we informed ATC.*

They confirmed we were to hold position as a company aircraft with a slot was going to depart in front of us and they had confirmed they had sufficient room to taxi in front. This confirmation must have occurred on ground frequency as we heard no discussion on tower frequency.

We confirmed amongst ourselves (captain and co-pilot) that there was sufficient room and held position as instructed. The company aircraft taxied in front to E1 and we were then instructed to taxi to E1 hold short 28/34. We then moved forward and held position in the queue behind our company aircraft. Our position at this stage was on the bend between E1 and Link 1 approx. abeam signage on our left for B1/Link 1/E1. We were now well past the line for Link 1 and B1. We were still with tower frequency. After a short time we noticed a [other operator] *aircraft,* [EI-EBW]*, approaching from our right on the foxtrot taxiway. We watched the aircraft as it did not appear to be slowing down. When it crossed the junction of F1 and Link 1, taxiing at approx. 10-15 kts, I (captain) made a RT*[7] *transmission saying "…* hold position there please*" quickly followed by "Tower,* [EI-DER]*, that [Operator] does not have clearance to go in front of us". Tower replied "*[EI-EBW] *hold position". There was no reply to this instruction. The aircraft continued taxiing and taxied in front of our aircraft. I (captain) estimate that the wing tip of the* [other] *aircraft missed our aircraft nose and cockpit by approx. 3m. Tower confirmed that the* [other] *aircraft was still on ground frequency and that there had been "some sort of confusion". We asked if we could continue now to E1. Tower confirmed this and we replied "Clear to E1 and just to be clear that* [operator] *aircraft only just had the wingtip clearance to taxi in front of us".'*

1.4 Previous Occurrences

The area where this incident took place is designated on Aerodrome charts as an Aerodrome 'Hot Spot[8]' and has been the location of two previous aircraft ground collisions in the area of Link 2. Both of these accidents were the subject of AAIU Investigations and subsequent reports: AAIU Report 2015-019 was published on 9 October 2015, and AAIU Report 2016-003, which was published on 25 February 2016.

AAIU Report 2015-019 made three Safety Recommendations, including one to the Dublin Airport Authority (DAA) to:

> '*conduct a critical review of the taxiway system at Dublin Airport to ensure that taxiway routes are as simple as possible in order to avoid pilot confusion and the need for complicated instructions.'*

The DAA accepted the Safety Recommendation and following its review, carried out significant works to abolish TWY Y and realign TWY F1 to avoid a series of tight turns approaching Link 1 from TWY F2. The review included other measures including restrictions of turns that can be made from and to certain taxiways.

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[7] **RT**: Radio Telephony.

[8] **Aerodrome Hot Spot**: A location on an aerodrome movement area with a history, or a potential risk of collision, or runway incursion and where heightened attention by pilots/drivers is necessary (ICAO Doc 9870, Manual on the Prevention of Runway Incursions).

AAIU Report 2015-019 also found that:

> *'…it is not possible to accurately judge absolute distance between the wingtip and another object. Therefore, regardless of experience, there is a risk that in attempting to judge separation distance at close quarters to another object, a collision may occur.*
> *As such, pilots should err on the side of caution and if doubt exists as to whether an aircraft can be passed safely, the flight crew should stop, advise ATC, and request alternative instructions if available*.'

As a result of that Investigation, on 9 October 2015, the AAIU made a Safety Recommendation to the Operator concerned (the Operator of EI-EBW), that they '*should review the guidance material provided to flight crews regarding the difficulty associated with assessing wing tip clearance'*. This Safety Recommendation was accepted by the Operator who informed the AAIU that the following actions were being taken:

> *'1. Ground Collision (GCOL) included in all presentations by Base Captains to ATC units at their perspective bases including details of this event, this presentation was also presented at the IAA ATC Safety Week both in Dublin and Shannon by the Safety Manager.*
>
> *2. The Operator's Bow Tie risk model on GCOL was updated following this incident, including escalation factor night time operations with glare from lighting equipment.*
>
> *3. Safety Bulletin published on pilot crew dock highlighting a brief synopsis of the incident.*
>
> *4. Safety Office are to publish de-identified base investigation available to all staff.'*

1.5 Responsibility for Wingtip Clearance

The IAA Aeronautical Information Package (AIP), under EIDW AD 2.20 Local Traffic Regulations for Dublin Airport (EIDW AD), states:

> *'iii. Flight crew are responsible for wing tip clearance and are reminded of the importance of maintaining a careful lookout at all times, regardless of location and visibility conditions.*
>
> *iv. ATC may require aircraft to manoeuvre in close proximity to other aircraft. Avoidance of other aircraft is the responsibility of the flight crew involved. If doubt exists as to whether an aircraft can be passed safely, the flight crew should stop, advise ATC, and request alternative instructions if available*.'

1.6 Manual of Air Traffic Services

The Dublin ATC Manual of Air Traffic Services (MATS), Volume 3 (Version 31, issued 29 March 2018), Aerodrome states the following:

'Section 8.4.3, Taxi Instructions:

> *For complicated taxi instructions, controllers shall issue progressive taxi instructions dividing the message into segments, placing clearances and instructions in sequential order, to avoid the possibility of pilot misunderstanding.'*

'Section 13.9.3, Taxi instructions when queuing:

> *A number of taxi restrictions on the manoeuvring area are detailed in AIP Ireland. However, the queuing scenario when aircraft are routeing to one or more holding points was not envisaged when the AIP restrictions were being drawn up.*
>
> *Note: Queuing at Dublin airport is considered to be where two or more aircraft are in line (or lines), routeing in the same direction, waiting in sequence to proceed along, or turn onto or off a taxiway. Queuing occurs on the manoeuvring area and can describe aircraft routeing to or from the runway.'*

Section 13.9.6, shows converging taxiways to the west of Pier 4 for RWY 28/34 departures. The MATS illustrates that 'Caution' should be exercised by ATC in this particular scenario. This is very similar to what occurred in this event.

1.7 Consideration of Jet Blast

The Boeing 737 Flight Crew Training Manual states: '*Avoid following other aircraft too closely. Jet blast is a major cause of foreign object damage.*' This also applies when stopping behind another aircraft as the leading aircraft will have to apply greater than idle thrust to commence moving. If the leading aircraft is stopped on an incline, as is the case on TWY E1, greater thrust will be required to commence taxi with increased spacing required for jet blast mitigation. Two aircraft, EI-DER and EI-EAV which were holding in sequence behind EI-DVG, both stopped with approximately the same distance from the preceding aircraft to allow for the effects of jet blast.

1.8 Subsequent Actions

1.8.1 Air Traffic Services

Dublin Air Traffic Services (ATS) carried out an internal investigation following this event. It was recommended, *inter alia*, that a Safety Reminder Notice be issued to Controllers to highlight the safety issues associated with operations involving aircraft operating in the hotspot areas of Link 1, E1 and B1 with particular regard to avoiding wing-tip collisions. It was also recommended that the facts of this event be included as a module in the next Tower Refresher Training Course. The Investigation was informed that these safety recommendations were implemented.

The Investigation asked the IAA ANSP to examine the feasibility of ensuring, whenever possible, that aircraft manoeuvring in close proximity to each other are operating on the same radio frequency. The IAA ANSP felt that devising such a procedure would be counterproductive and could lead to greater safety issues. The following was provided to the Investigation by way of background:

> *'Given the physical layout of the apron and taxiway/runway structure, it is common for aircraft to have to operate in close proximity to each other while being on separate frequencies. The manoeuvring area is divided up into Areas of Responsibility (AOR), controlled by separate controllers. It is therefore necessary and unavoidable for aircraft to be on different frequencies when operating close to the boundaries of adjacent AORs or crossing from one to another.*

When an aircraft passes from one AOR to the next it is necessary, in terms of efficient and expeditious traffic movement, for the aircraft to be passed from one controller to the next in sufficient time for it to change frequency and receive further clearance before it reaches the boundary of the next AOR.

Standardised routes and coordination allow aircraft to operate in and between AORs and also facilitate aircraft to be transferred without undue delay when crossing AORs. This has a positive impact on the efficient and expeditious movement of aircraft. It also reduces the chances of frequency congestion.

The area around Link 1 is a complex area where arriving traffic mixes with departing traffic, sometimes in the same queue, where in the ANSP's opinion it is impractical for all aircraft in the area to be on the same frequency. Should all aircraft in this area be on the same frequency it would lead to excessive and complicated coordination between the AMC and SMC controllers leading to frequency congestion and significant workload increases for the controllers.'

1.8.2 Operator of EI-EBW

The Operator of EI-EBW informed the Investigation that all events that occur are reviewed in its annual safety briefings to flight crews. This Operator also includes a presentation on Ground Collisions as part of this programme. No notices specific to this event were issued to flight crew at the time.

2. ANALYSIS

In this event there was a risk of a ground collision due to a number of factors:

- the absence of sequencing instructions to EI-EBW
- aircraft on different frequencies while manoeuvring in close proximity
- sequencing not queried by EI-EBW when in doubt

EI-DER was sequenced to follow *'company'* traffic to the TWY E1 holding point. The Commander continued to taxi and stopped the aircraft on Link 1 with space to allow for jet blast. The A-SMGCS radar recording showed that EI-EAV allowed similar spacing behind EI-DER as the Commander of EI-DER allowed behind EI-DVG.

The SMC had handed EI-DER over to the AMC on the Tower frequency and cleared EI-EBW to proceed to the hold on TWY E1, but did not feel it necessary to qualify his instruction. The SMC assumed that EI-EBW would join the queue in sequence and did not realise that EI-EBW was able to pass in front of EI-DER.

Had the SMC issued sequence information, or if EI-EBW had been transferred earlier to the Tower frequency, the incident could have been avoided. The SMC did issue a sequencing instruction to EI-EAV joining the queue from TWY B1 behind EI-DER in that EI-EAV was to give way to EI-EBW coming from TWY F2.

Such instructions are intended to reduce the potential for confusion and accordingly, the Investigation therefore makes the following Safety Recommendation:

> **Safety Recommendation No. 1**
> The Irish Aviation Authority should amend its procedures at Dublin Airport to include mandatory sequencing instructions where aircraft are in a queuing situation and are joining from more than one Taxiway. (**IRLD2019001**)

As EI-EBW approached Link 1, the Commander discussed with his Co-pilot how near EI-DER seemed to be to their cleared taxi route. While he was about to query the situation, he stated that he heard traffic being instructed to give way, this instruction was for EI-EAV leaving TWY B1 and not EI-DER which he was about to pass. While the Commander deemed there to be sufficient space to pass, the fact that he expressed concern regarding wingtip clearance suggests that a more prudent approach would have been to query the sequence with ATC and/or hold position.

The Commander of EI-DER had moved onto Link 1, in sequence for TWY E1. The space that was left behind EI-DVG was to allow for jet blast but was sufficient for EI-EBW to manoeuvre and stop. The Commander of EI-DER judged there to be a serious risk of collision such that the Commander transmitted directly to the approaching aircraft to stop followed by a transmission to the AMC on the Tower frequency. Instructions for EI-EBW to stop could not have been heard by the Commander of EI-EBW as he was still operating with the SMC on Ground frequency and had not yet been instructed to contact Tower frequency.

The IAA ANSP outlined that given the physical layout of the apron and taxiway/runway structure, it is common for aircraft to have to operate in close proximity to each other while being on separate frequencies. The manoeuvring area at EIDW is divided up into Areas of Responsibility (AOR), controlled by separate controllers and it is necessary and unavoidable for aircraft to be on different frequencies when operating close to the boundaries of adjacent AORs or crossing from one to another. The Investigation agrees that the area around Link 1 is a complex area, and that it is impractical for all aircraft in the area to be on the same frequency.

The area where this incident took place is designated as an Aerodrome Hot Spot on Aerodrome charts and has been the location of two previous collisions involving traffic occupying TWY A and TWY F1 (as it was then aligned). On both of these occasions aircraft wingtips came in contact with another aircraft. The manoeuvring scenarios in the previous cases were different from this subject event. However, the fact remains that judging the clearance of wingtips from the flight deck can be misleading and collisions can, and do, occur. In this particular case a collision did not occur but safety margins were seriously eroded.

3. CONCLUSIONS

3.1 Findings

1. The SMC and AMC had a common understanding of the sequence of traffic to depart on RWY 28 via TWY E1.

2. The initial taxi clearance of EI-DER to E1 was amended to allow EI-DVG to proceed ahead as it had to meet a slot restriction.

3. EI-DER, which had just entered Link 1, was subsequently cleared to proceed to TWY E1 and instructed to change to Tower frequency.

4. EI-DER was second in the queue for departure and was holding at the bend of Link 1 with significant space between it and the preceding aircraft.

5. EI-EBW proceeded in accordance with its ATC clearance.

6. No sequence instructions were given by the AMC to EI-EBW.

7. EI-EAV joined the queue on TWY B1 and was instructed by the SMC to give way to EI-EBW.

8. EI-EAV left a similar spacing for jet blast behind EI-DER as that aircraft left behind EI-DVG.

9. The Commander of EI-EBW stated that he was about to query if he should go ahead of EI-DER, but on overhearing an instruction for EI-EAV to give way, mistook it as an instruction for EI-DER to give way, and continued in front of EI-DER.

10. Transmissions by the Commander of EI-DER and the AMC for EI-EBW to stop were not heard as that aircraft was still on Ground frequency and had not yet been transferred to the AMC.

11. The SMC did not feel it necessary to give sequencing instructions to EI-EBW as he considered that EI-DER would have moved closer to EI-DVG before stopping.

12. The AMC did not expect EI-EBW to pass in front of EI-DER which only came on his frequency once it had passed EI-DER.

3.2 Probable Cause

Taxiing in close proximity to a stationary aircraft without confirming sequence in queue.

3.3 Contributory Cause(s)

1. No sequence instructions were given to EI-EBW.

2. Aircraft manoeuvring in close proximity but operating on two different communication frequencies.

3. An ATC instruction for EI-EAV to give way was misunderstood by EI-EBW to refer to EI-DER.

4. SAFETY RECOMMENDATIONS

No.	It is Recommended that:	Recommendation Ref.
1.	The Irish Aviation Authority should amend its procedures at Dublin Airport to include mandatory sequencing instructions where aircraft are in a queuing situation and are joining from more than one Taxiway.	**IRLD2019001**

View Safety Recommendations for Report 2019-001

- END -

Appendix A

Transcript of Dublin Ground (121.800 MHz) on 19 May 2018

Time:	Station:	Transmission:
06.36:47	SMC	'[EI-DER] *how long before you taxi'*
06.36:52	EI-DER	*'We'll be ready in thirty seconds* [EI-DER]'
06.36:54	SMC	*'Roger when ready taxi Bravo one hold short Link one'*
06.36:57	EI-DER	*'When ready Bravo one hold short Link 1* [EI-DER]'
06.37:34	EI-DVG	'[EI-DVG] *taxi'*
06.37:38	SMC	'[EI-DVG] *taxi Link two Foxtrot one hold short Link one'*
06.37:45	EI-DVG	*'Link two Fox one hold short Link one* [EI-DVG]'
06.40:24	SMC	'[EI-DER] *taxi Echo one hold short runway three-four two-eight, monitor Tower one one eight decimal six bye bye'*
06.40:30	EI-DER	*'Taxi Echo one to hold short three-four and two-eight and monitor Tower eighteen six* [EI-DER] *bye'*
06.40:50	SMC	*'Actually* [EI-DER] *hold short of Link 1 please'*
06.41:15	SMC	*'*[EI-DVG]'
06.41:17	EI-DVG	*'Go ahead'*
06.41:18	SMC	'[EI-DER] *on your left there on a different frequency, he's holding now to let you out in front, taxi Echo 1 hold short runway three-four two-eight'*
06.41:25	EI-DVG	*'Echo 1 hold short three-four two-eight understood company on our left holding* [EI-DVG]'
06.42:05	EI-EBW	*'Hello* [EI-EBW] *for taxi from apron two'*
06.42:11	SMC	'[EI-EBW] *taxi left turn on the Foxtrots and hold short Link two'*
06.42:16	EI-EBW	*'Left Foxtrots hold short Link two* [EI-EBW]'
06.43:12	EI-DVG	'[EI-DVG] *to Tower please'*
06.43:15	SMC	'[EI-DVG] *one one eight decimal six bye bye'*
06.43:18	EI-DVG	'[EI-DVG] *bye'*
06.44:46	SMC	'[EI-EBW] *continue taxiing Foxtrot one, Echo one, hold short runway three-four, two-eight'*
06.44:53	EI-EBW	*'Foxtrot one, Echo one, hold short three-four, two-eight [EI-EBW]'*
06.45:48	SMC	'[EI-EAV] *give way to the Ryanair from the right and after that traffic taxi Echo one hold short runway three-four two-eight*
06.45:56	EI-EAV	*'After the Ryanair taxi Echo one hold short three-four two-eight* [EI-EAV]'
06.46:00	EIN46B	*'Shamrock 46B taxi'*
06.46:02	SMC	*'Shamrock 46B eh, hold position please'*
06.46:07	EIN46B	*'Hold position 46B'*
06.46:28		[**approximate time of ground event**]
06.47:04	SMC	'[EI-EBW] *monitor tower one one eight decimal six bye bye'*
06.47:08	EI-EBW	*'One one eight six* [EI-EBW] *bye'*

Appendix B

Transcript of Dublin Tower (118.600 MHz) on 19 May 2018

Time:	Station:	Transmission:
06.41:05	AMC	'[EI-DER] *hold short of Link one'*
06.41:08	EI-DER	*'Hold short of eh, Link one* [EI-DER] *eh, we're past the line for Bravo one Link one now'*
06.41:18	AMC	'[EI-DER] *roger hold position there'*
06.41:21	EI-DER	*'Okay'*
06.41:42	AMC	'[EI-DER] *there's company traffic on your right going to taxi out past you there, eh, knows about you being past the point there, has a slot time going to go ahead'*
06.41:51	EI-DER	*'Okay no problem* [EI-DER]'
06.43:13	AMC	'[EI-DER] *you can continue taxi now onto Echo one, hold short three-four and two-eight'*
06.43:17	EI-DER	*'Continue Echo one hold short three-four two-eight* [EI-DER]'
06.46:16	EI-DER	'[EI-EBW] *hold position there please'*
06.46:20	EI-DER	*'Tower* [EI-DER] *the […] doesn't have clearance in front of us'*
06.46:28	AMC	'[EI-EBW] *hold position'*
06.46:28		[**approximate time of ground event**]
06.46:35	AMC	*'Eh, that aircraft isn't on my frequency yet but standby'*
06.47:41	EI-DER	'[EI-DER] *confirm we're cleared all the way to Echo one?'*
06.47:44	AMC	'[EI-DER] *apologies for that there was some confusion on the ground frequency beside me there the* […] *has gone ahead, my apologies you'll be next out behind him'*
06.47:52	EI-DER	*'That's no problem and just to be clear the* […] *only just had wingtip clearance to go in front of us there'*
06.47:57	AMC	*'Roger that's copied'*

In accordance with Annex 13 to the Convention on International Civil Aviation, Regulation (EU) No 996/2010, and Statutory Instrument No. 460 of 2009, Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulation, 2009, the sole purpose of this investigation is to prevent aviation accidents and serious incidents. It is not the purpose of any such investigation and the associated investigation report to apportion blame or liability.

A safety recommendation shall in no case create a presumption of blame or liability for an occurrence.

Produced by the Air Accident Investigation Unit

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