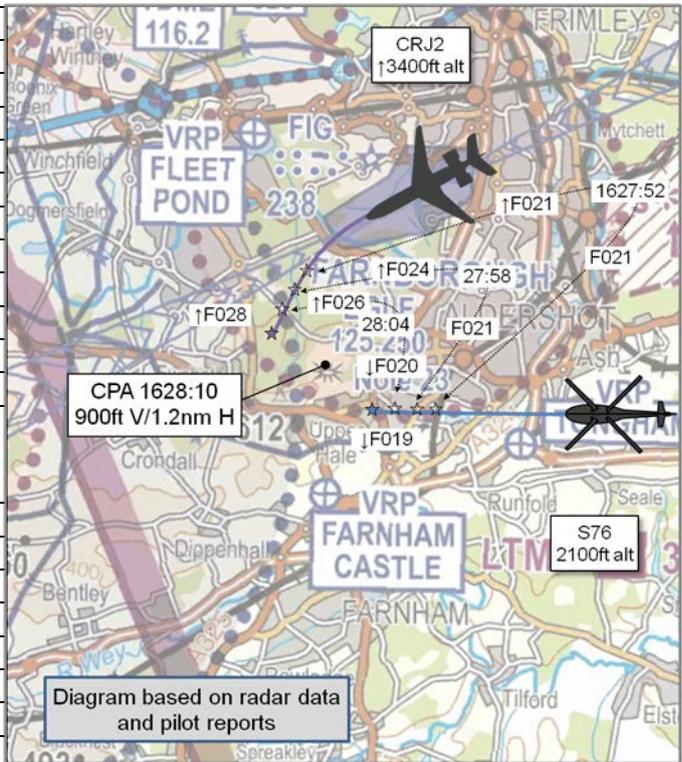


AIRPROX REPORT No 2016260

Date: 08 Dec 2016 Time: 1628Z (Twilight) Position: 5114N 00049W Location: 3nm SW Farnborough

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	S76	CRJ2
Operator	Civ Comm	Civ Comm
Airspace	London FIR	London FIR
Class	G	G
Rules	IFR	IFR
Service	Traffic	Deconfliction
Provider	Odiham	Farnborough
Altitude/FL	1900ft	2800ft
Transponder	A,C,S	A,C,S
Reported		
Colours	White	Yellow
Lighting	HISL, Strobe, Anti-collision, nav, searchlight	Strobes, beacon, nav, landing
Conditions	IMC	IMC
Visibility	In cloud	NK
Altitude/FL	1800ft	NK
Altimeter	QNH (1025hPa)	NK
Heading	265°	NK
Speed	140kt	NK
ACAS/TAS	TCAS I	TCAS II
Alert	None	None
Separation		
Reported	Not seen	Not seen
Recorded	900ft V/1.2nm H	



THE SIKORSKY S76 PILOT reports that he was in receipt of a Traffic Service from RAF Odiham taking radar vectors for the ILS to RW27 at Odiham. Once established on the localiser, he was handed to the Odiham Talkdown frequency for the approach. At approximately 6nm to I-ODH, the crew of the S76 noticed an aircraft on TCAS climbing in their 3 o'clock position, much lower at the time (approximately 1500ft below). The crew questioned Odiham Talkdown about the aircraft's intentions. Odiham stated that it was a Farnborough departure and that its pilot was 'visual' with the S76. They were IMC at the time and the cloud tops were at around 2500ft. The Farnborough departure remained outside 2nm (according to their TCAS) and the crew monitored its track as it passed through their level in front of them. No Traffic Information or avoiding action was given to them throughout the incident.

He assessed the risk of collision as 'Low'.

THE CANADAIR REGIONAL JET CRJ2 PILOT reports that he received no visual contact with the other aircraft; no indication on TCAS, and no communication with ATC about the Airprox. Consequently, he was unable to complete a full report.

THE ODIHAM RADAR DIRECTOR reports that, during a training session, he was the instructor to a U/T who had accrued 46 hours of live training. Towards the end of what had been a consistent, IFR-heavy session, the S76 pilot was handed over from Farnborough LARS W at approximately ODI 360 12.5nm under a Traffic Service. The pilot made contact and was provided with vectors for the ILS RW27 at Odiham. A second aircraft was handed over from Boscombe Down as the S76 had reached the overhead tracking south. These were the only two aircraft on frequency throughout the incident. Shortly after the S76 pilot was provided with a downwind vector, Farnborough Radar called stating

that they had two departures that were going to be ready shortly, and asked if Odiham could extend the S76 downwind to accommodate the first. This was acknowledged as this was unlikely to cause any delay to their aircraft given its current location. As the S76 pilot continued downwind, now abeam the 6nm point for a RW27 approach, a 'conflictor' was spotted north of Farnborough squawking 0450 and indicating 2400ft [not the CRJ2]. The traffic was called to the S76 pilot once it was through the Farnborough ATZ, to which the pilot reported visual but entering cloud. A vector away from the conflictor was provided to ensure safe separation was maintained. This took the S76 through the centreline and was now approximately 1nm north-east of the 10nm point for RW27. Whilst this was happening, the first Farnborough aircraft had departed, well ahead of their traffic. The S76 pilot was then vectored back onto the ILS from the north on a heading of 250°. The S76 was 'hooked' on the PAR console, identified and handed over to the PAR controller to conduct an ILS monitor for the approach; this is standard procedure at RAF Odiham. As the S76 approached 5.5nm with the PAR controller, Farnborough called stating that their second aircraft was now rolling [the CRJ2]. Given that this would have put the aircraft into direct conflict with the S76 the U/T correctly asked if the Farnborough traffic was taking 'reduced visual separation', a procedure employed between the two units to allow for expedition during good weather. The Farnborough controller replied 'I assume so'. Given the MET conditions, it seemed very unlikely that the Farnborough traffic was able to see theirs from the ground (part of the procedure) but Traffic Information was passed to the S76 pilot as 'taking reduced visual separation'. The S76 pilot stated that he was in thick cloud and as such it was very unlikely that he was visible to the Farnborough traffic. The Farnborough traffic was now showing on radar and climbed quickly but still came within approx. 500ft/0.5nm of the S76. Because the S76 was being monitored on PAR and no risk of conflict was evident on either display, the approach was continued and the S76 pilot landed safely. If the approach had been broken off and a Missed Approach executed, separation would have been reduced and safety likely compromised.

He perceived the severity of the incident as 'Low'.

THE FARNBOROUGH AERODROME CONTROLLER reports that the Odiham pattern was active with traffic on long final for RW27. The CRJ2 pilot was ready for departure at holding point 'A1' with standard southerly departure instructions. He believed that he could get the departure away ahead of the Odiham traffic as they were giving their departure a gap, and called Radar for release. He was given release and cleared the pilot for take-off. He noticed that the CRJ2 pilot was lining up very slowly and that the Odiham traffic was continuing westbound on final approach. He called Radar to point out the potential confliction. The release was not cancelled so he suggested continuing the departure's climb to 3400ft as the Odiham traffic was indicating 2100ft. Radar agreed and said that they would speak to Odiham. The CRJ2 was now rolling. On the understanding that Radar and Odiham had coordinated a resolution he passed Traffic Information to the CRJ2 pilot on the Odiham traffic and instructed the climb to 3400ft. He then transferred the CRJ2 pilot to Radar.

THE OUT-GOING FARNBOROUGH APPROACH RADAR CONTROLLER reports that the outbound CRJ2 was released from RW24 with standard 'Hazel' departure instructions. There were two aircraft in the Odiham pattern for instrument approaches to RW27. At the time of the CRJ2's release the first of the instrument pattern aircraft, the S76, squawking 3650, was south-east of the Farnborough ATZ by around 2nm and was only just establishing on the approach at Odiham with around 11nm to run. Odiham were aware of the departure and that it would be departing ahead of the S76. At this point he was handing over the Approach position when Tower called. The controller stated that the pilot had been cleared for take off, but was 'taking his time'. He checked to see where the S76's squawk was, it was still south-east of the Farnborough ATZ, having around 7nm to run. He co-ordinated with the Tower to climb the outbound CRJ2 to 3400ft, to over fly the Odiham pattern at 2100ft. He also stated that he would inform Odiham about this. The controller taking the position agreed with this and he handed over control.

THE ON-COMING FARNBOROUGH APPROACH RADAR CONTROLLER reports that, at handover on the radar position, the outgoing controller had released the CRJ2 and had had a telephone call with the Aerodrome controller because the pilot had not departed. They had decided to continue

climb to 3400ft against the S76 inbound to Odiham. He made the call to Odiham Approach to say that the outbound was climbing to 3400ft because he had not departed when the release had been given. The aircraft then took longer to depart and was given further climb by the Aerodrome controller as per the agreed co-ordination with the outgoing Radar controller. When the CRJ2 pilot came on frequency, they were above the S76 and continued their flight.

Factual Background

The weather at Farnborough was recorded as follows:

EGLF 081620Z 22009KT 9999 BKN008 12/11 Q1025=

Sunset time was 1552, ECT 1634.

CAP 774¹ states that under a Deconfliction Service:

'A controller shall provide traffic information, accompanied with a heading and/or level aimed at achieving a planned deconfliction minima against all observed aircraft in Class G airspace.'

The deconfliction minima against unco-ordinated traffic are: 5 NM laterally (subject to surveillance capability and regulatory approval); or 3,000 ft vertically and, unless the SSR code indicates that the Mode C data has been verified, the surveillance returns, however presented, should not merge. (Note: Mode C can be assumed to have been verified if it is associated with a deemed validated Mode A code.'

The deconfliction minima against aircraft that are being provided with an ATS by the same controller, or that have been subject to co-ordination, are: 3 NM laterally (subject to surveillance capability and regulatory approval); or 1,000 ft vertically.'

Analysis and Investigation

CAA ATSI

ATSI had access to the reports from the pilots of both aircraft, reports from the three Air Traffic Controllers involved at Farnborough and the Odiham controller. The area radar recording and associated RTF recordings were reviewed and the three Farnborough controllers were interviewed. Screenshots produced in the report are provided using the area radar recordings. Levels indicated are in altitude.

The S76 pilot was operating IFR on a training detail to Odiham and was established inbound to Odiham on the ILS for RW27. The S76 pilot was in receipt of a Traffic Service from Odiham Approach. The CRJ2 pilot was departing from Farnborough on an IFR flight and was in receipt of a Deconfliction Service.

At 1605:40 the S76 pilot called Farnborough LARS West and a Traffic Service was agreed. The intentions to fly a radar-vectored ILS approach to RW27 at Odiham were obtained from the pilot.

At 1607:10 the Farnborough controller initiated co-ordination with Odiham with respect to the S76 and its inbound details. The S76 (SSR code 0430) was approximately 25nm north of Odiham at this point (Figure 1), and, taking into account other traffic that Farnborough was working at the time, an agreement was made to route the S76 via the overhead at Odiham (in order to remain

¹ Chapter 4.

clear of the Farnborough traffic). The S76 would be released to Odiham prior to the reaching the Odiham overhead.

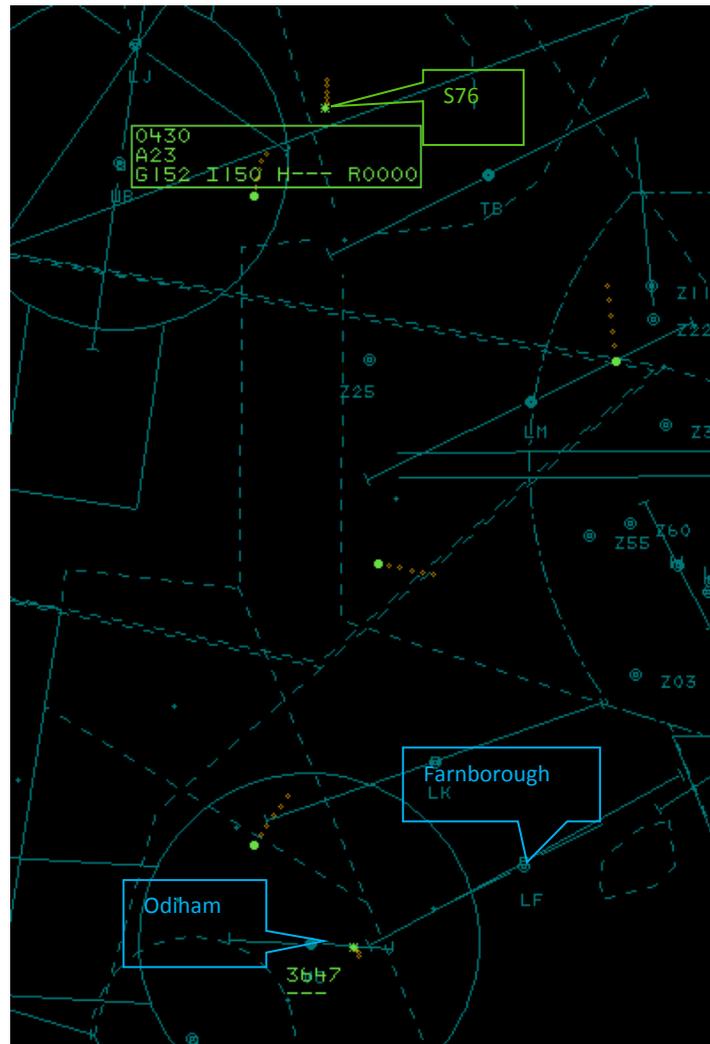


Figure 1 (1607:10).

At 1608:30 the S76 pilot asked the Farnborough controller if a more direct routing to the south-east would be possible. The Farnborough controller explained the co-ordination that had just taken place and informed the pilot that routing would be via the overhead at Odiham.

At 1612:22 Farnborough issued the pre-coordinated Odiham SSR code of 3650 to the S76 pilot, and a transfer of communication to Odiham followed.

At 1616:25 the Farnborough Aerodrome controller called the Farnborough Radar controller to pre-note two departures, the second of which was the CRJ2.

At 1618:45 (Figure 2) the Farnborough Radar controller called the Odiham controller to discuss the pending departures from Farnborough. The Farnborough controller said they could see the Odiham pattern was active with an aircraft with code 3651 as well as the S76 which they already knew about. The Odiham controller explained that the 3651 code was a Chinook, which was also for an approach to RW27. The Farnborough controller arranged to call the Odiham controller back and indicated that they may be able to get ahead with the first of their departures (which was due to route to the north).

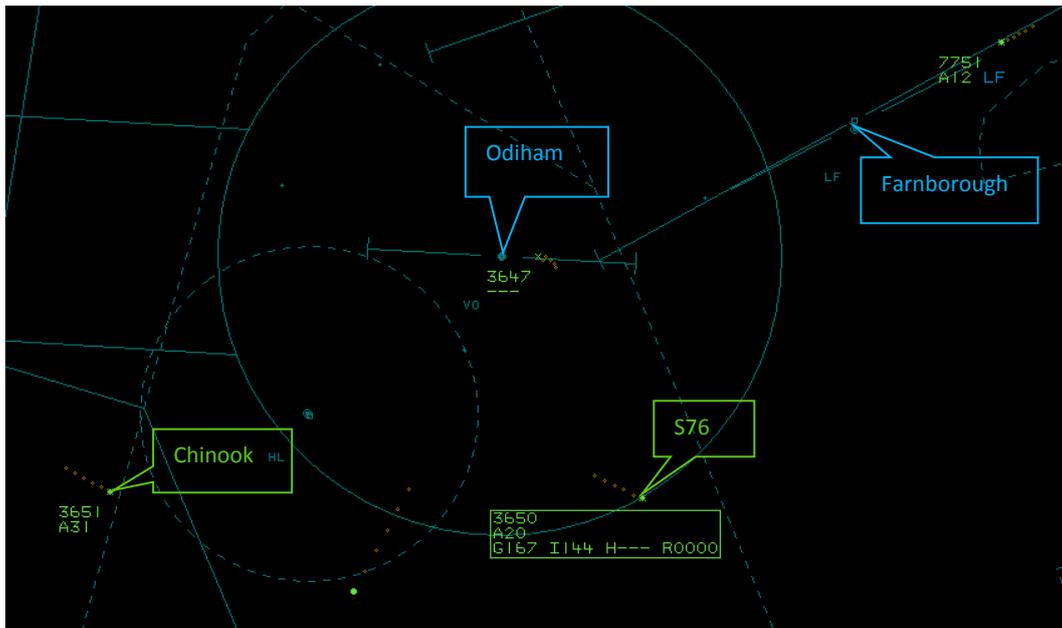


Figure 2 (1618:45).

At 1620:42 (Figure 3), Farnborough called Odiham and coordinated further traffic (code 0430) which might affect the Odiham ILS traffic. An arrangement was made whereby Odiham would extend the S76 downwind both to avoid the 0430 code and to enable Farnborough to depart traffic to the north (routing via Compton (CPT)) ahead of the S76 (code 3650).

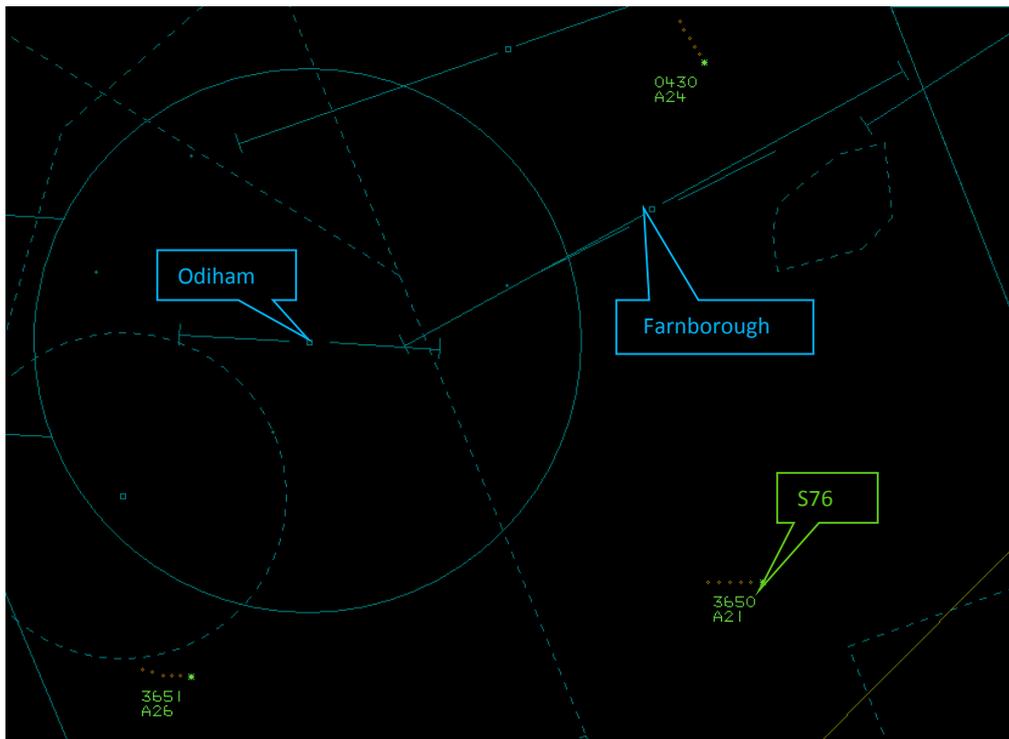


Figure 3 (1620:42).

At 1621:16 the first of the Farnborough departures was released by the Farnborough Radar controller whilst engaged in telephone coordination with Farnborough Tower.

At 1622:46, the CRJ2 pilot reported ready for departure to the Farnborough Aerodrome controller. The controller advised the CRJ2 pilot there may be a short delay as they were waiting for a release from approach due to traffic south of the field.

At 1624:36, the Farnborough Aerodrome controller advised the Farnborough Radar assistant, during a call to them, that the CRJ2 was “lined up and ready for departure”.

At 1624:55 (Figure 4), the Farnborough Radar controller called the Odiham supervisor and advised them that they had a ‘HAZEL’ departure, ready for departure, and would they be able to depart this traffic ahead of the S76. The Odiham supervisor confirmed that if Farnborough were able to depart before the S76 then this would be OK. The Farnborough controller replied: “Roger, I’ll go now, I’ll be well ahead”.

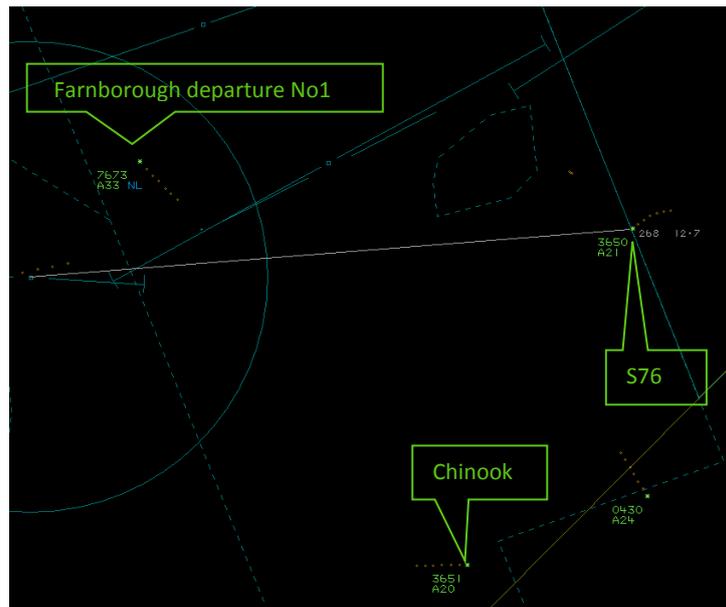


Figure 4 (1624:55).

At 1625:12 the Farnborough Radar controller called the Aerodrome controller and released the CRJ2 for departure. At 1625:20 the CRJ2 pilot was cleared for take-off by the Farnborough Aerodrome controller.

At 1626:00 a controller handover was commenced in the Farnborough Radar position. During this handover, at 1626:20 (Figure 5) the Aerodrome controller called the Radar controller to advise that the CRJ2 was being very slow to depart. After a pause, the Aerodrome controller asked the Radar controller for further climb and the (outgoing) Radar controller offered 3400ft. The S76 was on a 9.6nm final for RW27 at Odiham at this time.

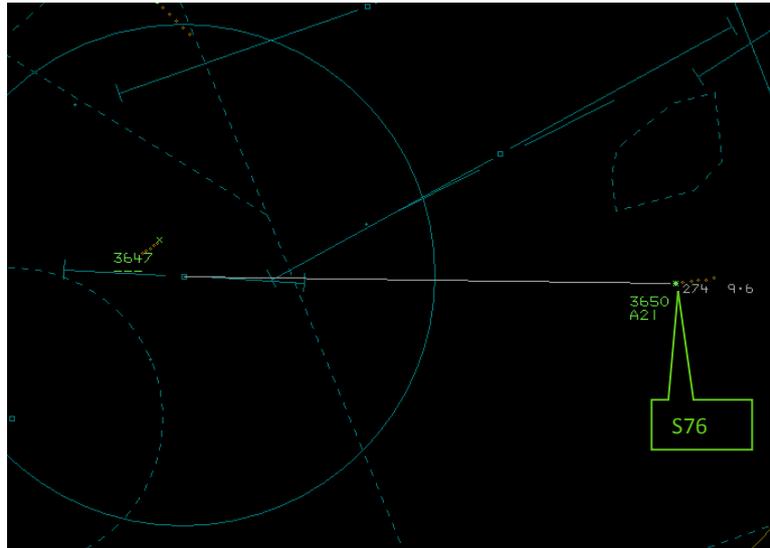


Figure 5 (1626:20).

At 1627:00 (Figure 6) the new Farnborough Radar controller called Odiham to advise them that the next departure would be climbing to 3400ft towards the south. The Odiham controller asked if 'Visual separation' was being applied to which the Farnborough controller replied "*I'm assuming so...*"

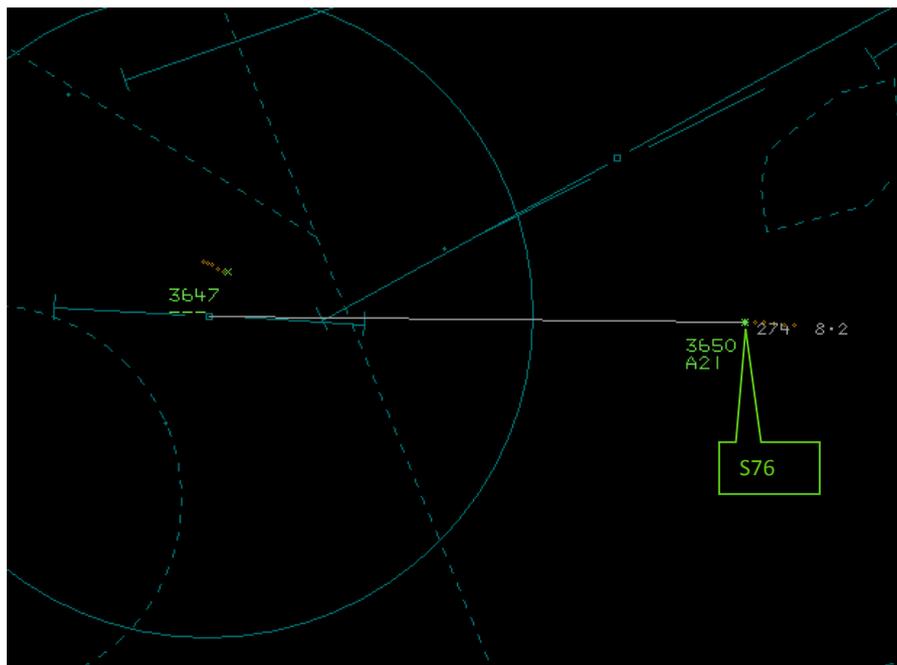


Figure 6 (1627:00).

At 1627:20 the Farnborough Aerodrome controller issued Traffic Information to the CRJ2 pilot about the S76, together with the climb instruction to 3400ft. The CRJ2 pilot was then instructed to contact Farnborough Radar.

At 1627:50 (Figure 7) the CRJ2 pilot first called the Farnborough Radar controller. The controller acknowledged the call and asked him to "*squawk ident*" in order to identify the aircraft.

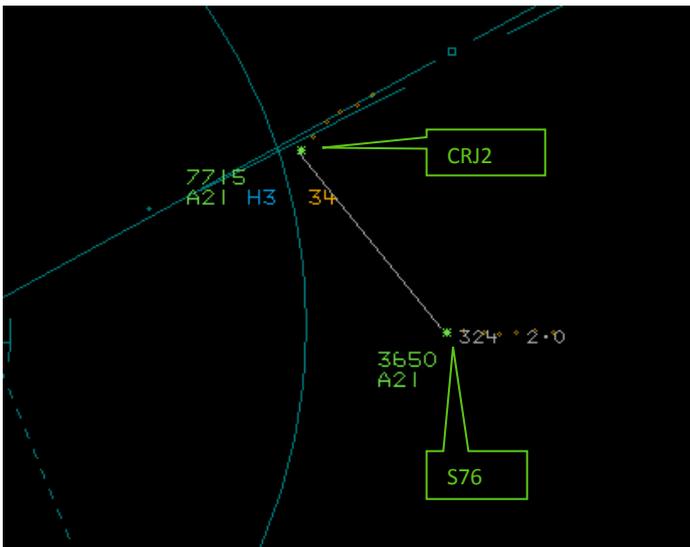


Figure 7 (1627:50)

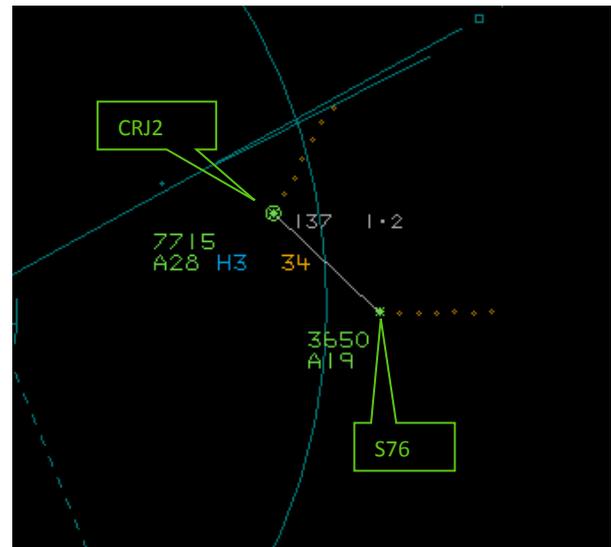


Figure 8 (1628:11).

At 1628:11 (Figure 8), CPA occurred with the CRJ2 and S76 separated by 1.2nm horizontally and 900ft vertically. The 'ident' function had just started to display.

At 1628:18 the controller identified the CRJ2, provided a Deconfliction Service and advised the pilot of Traffic Information "*In your nine o'clock by quarter of a mile, left to right 1000ft below*".

Farnborough Airport and Odiham both lie outside controlled airspace, and as such there are no separation minima applicable during the provision of their respective radar services. However, the 'deconfliction minima' of 3nm and 1000ft should be applied between known aircraft whenever a Deconfliction Service is provided, subject to coordination having been effected.

Given the units' relative proximity, there is a Letter of Agreement between Odiham and Farnborough detailing the provision of services from the respective units, and the procedures that are agreed between them. The runway selection at the time of the occurrence (RW24 at Farnborough, RW27 at Odiham) is deemed the preferred runway choice at both airfields.

Traffic in the Odiham RTC for RW27 is controlled at 2100ft (Farnborough QNH) by Odiham Approach Radar. The final approach centreline for this approach is slightly offset to the right and passes through the Farnborough ATZ. All relevant coordination was carried out by Odiham with respect to their RTC traffic.

The CRJ2 was subject to a departure instruction that involved routing via HAZEL and SAM. The initial part of the instruction states that after passing 1200ft the departure is to turn onto a heading of 220° (whilst climbing initially to 2400ft). There are no Standard Instrument Departures or 'clearances' as the aircraft are operating in Class G airspace.

At interview the (outgoing) Farnborough radar controller stated that at the time of the request for release, they considered the S76 was far enough to the east to facilitate a good degree of deconfliction. However, the departure did not get airborne as early as anticipated and when the Aerodrome controller initiated the call to inform them of the slow departure, they began to formulate an alternative plan. The Aerodrome controller's suggestion of further climb gave an option which was taken up. This call from the Tower occurred during the handover to the next radar controller. The outgoing Farnborough Radar controller, also stated that although mindful of the S76 inbound, they had been a little surprised by its groundspeed. Most traffic in the RTC at Odiham is Chinook type traffic which fly slower on approach than the S76, therefore there had

been a slight difference in the speed (radar indicates between 20 and 30kt) which had not been taken into account.

Reduced separation may be employed between Farnborough departures and Odiham instrument traffic provided each aircraft is visible to the Farnborough Aerodrome controller, or the pilots of each aircraft report they can continuously sight the other aircraft and maintain their own separation. Under such circumstances Farnborough shall inform Odiham that this procedure is being employed together with the callsign or SSR code of their traffic. A stipulation that the phrase "Farnborough departure maintaining visual separation" should also be used, and if this is not done, Odiham are to consider such a departure a confliction and initiate avoiding action.

At interview the Farnborough Aerodrome controller was aware of the S76 inbound to Odiham because it had been referred to during previous coordination with the Radar controller, and was also visible on the Aerodrome Traffic Monitor (ATM) in the Visual Control Room. The controller stated that a visual departure can be utilised but in these circumstances, the cloud base precluded this option. The controller further stated that as they monitored the S76 on the ATM, and with the apparent slowness of the CRJ2 to depart, they became concerned that the situation was going to need another solution to resolve, and was expecting a call from the Radar controller.

When the Aerodrome controller initiated the call to Farnborough Radar, the CRJ2 had just begun to roll, which is why they offered the continuous climb suggestion to the Radar controller. Although there remained an option to cancel the take-off clearance, local instructions highlight the potential risk to 'modern jet aircraft', and therefore on balance, the controller considered that, as the departure was building speed and there was no imminent danger to the aircraft, a departure was the safer option.

The 220° heading that is applied to the southbound instrument departure instruction ensures that Farnborough departures remain outside of (or at least only enter slightly) the Odiham MATZ. A more significant entry into the Odiham MATZ would require co-ordination between Farnborough and Odiham and, whilst this can be carried out, the basic departure instruction affords a degree of freedom to the Farnborough procedure, and thus reduces the workload for the Farnborough controller. The procedure for a visual departure (ultimately routing to the south) would cancel the requirement for the 220° heading (which is applied to the instrument departure instruction), with the visual departure continuing on a runway heading. In practice, when this is applied, further climb, usually above 3000ft, is also issued to enable the departure to out-climb the Odiham inbound.

At interview, the incoming Radar controller stated that, whilst taking over the Radar position and associated traffic, they had made an assumption that, given that a climb to 3400ft was being applied, a visual departure had been organised (and indeed stated this with the Odiham controller when challenged). Although the cloud-base was known to the controller, he commented that it may have been clear to the south, and faced with the evidence of the release when they took over they made that assumption.

When the departure first called and began to turn to the south, (onto the 220° heading), the controller realised that it was following the standard departure instruction. As the CRJ2 was climbing so well, by the time the aircraft was officially identified the deconfliction minima had been achieved. The controller stated that although aware of the confliction from the moment the CRJ2 pilot turned left, they could see that the most effective form of avoiding action was already taking place, due to the climb rate of the CRJ2.

In their written report, the Odiham controller stated that although they were aware that the S76 was IMC, they considered that no risk of collision existed and that allowing the approach to continue was preferable to initiating a missed approach in the circumstances.

An Airprox was reported by the pilot of a S76 helicopter when he became concerned about the proximity of a CRJ2 that had departed from Farnborough. Although technically, by the time that the Deconfliction Service was being provided, the required deconfliction minima had been met, the expectation is that departing aircraft such as the CRJ2 from Farnborough, would be afforded the minima from take-off. Although this is not always possible due to the late appearance of unknown traffic after a departure has taken off, in this occurrence, the other traffic was known. Therefore deconfliction minima was not assured when no restriction was placed on the release approval for the CRJ2.

A combination of factors including: the late departure of the CRJ2; being engaged in the process of handing over of control; and an assumption that the Aerodrome controller would advise of any late departure, led the Farnborough Radar controller to delay taking positive action to stop the departure of the CRJ2. When the last opportunity to save the situation was presented, the outgoing Radar controller elected to adopt a suggestion from the Aerodrome controller, who was not the executive controller. An avoiding action turn to the west may have kept the aircraft further apart, although coordination with Odiham would have had to have been effected.

The oncoming Radar controller did not challenge the situation, possibly because they made the false assumption that a visual departure was taking place. The Aerodrome controller did not inform the (outgoing) Radar controller early enough of the lack of movement of the CRJ2. Effectively, all three controllers made assumptions that another controller would take action to some degree, or that a solution had been put in place.

The climb rate of the departing CRJ2, combined with the S76 commencing descent on the ILS quickly resolved the confliction.

ATSI recommended that Farnborough review the procedures with regard to the dynamic scenario that led to this occurrence. Specifically, consideration should be given to establishing criteria whereby, outbound aircraft from Farnborough cannot depart once inbound traffic to Odiham have reached a certain range from touchdown.

ATSI further recommended that this occurrence be used to highlight the importance of challenging colleagues and not making assumptions. The executive role of the Approach Radar controller, as decision maker, should be reinforced.

Military ATM

An Airprox occurred 5nm east of RAF Odiham, between an S76 and a CRJ2. The S76 pilot was on frequency with Odiham Precision Approach (PA) but receiving a Traffic Service (TS) from Odiham Approach and the CRJ2 pilot was receiving a service from Farnborough Approach.

Portions of the tape transcripts between the Odiham Approach controller and the S76 pilot are below. [Also included are transmissions with a Chinook pilot not involved in the Airprox.]:

From	To	Speech Transcription	Time	Remarks
ODI RA	S76	[S76 C/S] turn left heading 3-6-0 degrees	16:22:01	
S76	ODI RA	Left 3-6-0 degrees, [S76 C/S]	16:22:04	
ODI RA	S76	[S76 C/S] traffic north-west five miles, tracking south-east, indicating 300 feet above.	16:22:47	
S76	ODI RA	Traffic not sighted, [S76 C/S]	16:22:53	
S76	ODI RA	Traffic sighted now, [S76 C/S]	16:23:01	
ODI RA	S76	[S76 C/S] are you happy to turn against it?	16:23:04	

From	To	Speech Transcription	Time	Remarks
S76	ODI RA	Negative [S76 C/S], we're just entering India-Mike-Charlie, [S76 C/S]	16:23:08	
ODI RA	S76	[S76 C/S] in that case I'll bring you north of the centre line and bring you back in	16:23:14	
S76	ODI RA	That's copied, [S76 C/S]	16:23:18	
ODI RA	Chinook	[Chinook C/S] cockpit checks report complete	16:23:32	
Chinook	ODI RA	[Chinook C/S] is checks complete	16:23:36	
ODI RA	Chinook	[Chinook C/S]	16:23:41	
ODI RA	S76	[S76 C/S] now clear of previously called traffic. Turn left heading 2-4-0 degrees, report localiser established.	16:23:49	
S76	ODI RA	Clear of traffic, turn left 2-4-0 degrees and will call localiser established, [S76 C/S]	16:23:56	
ODI RA	Chinook	[Chinook C/S] traffic left 10 o'clock 7 miles crossing left-right ahead indicating 400 feet above	16:24:12	
Chinook	ODI RA	[Chinook C/S] looking	16:24:20	
Chinook	ODI RA	[Chinook C/S] visual	16:24:51	
ODI RA	Chinook	[Chinook C/S]	16:24:54	
ODI Sup	Farnborough (FBO) RA	Odiham Sup...Hi	16:24:56	
FBO RA	ODI Sup	Hello Farnborough; I've got a Hazel departure lined up, runway 2-4. Are you happy for me to go ahead of your 3-6-5-0? [S76]	16:24:57	
ODI Sup	FBO RA	Uh, affirm it's establishing ILS now, so if you could go now	16:25:02	
FBO RA	ODI Sup	Roger, I'll go now and be well ahead	16:25:05	
ODI Sup	FBO RA	Rog, Odiham Sup.	16:25:07	
S76	ODI RA	And [S76 C/S] localiser established, ILS 2-7	16:25:38	
ODI RA	S76	[S76 C/S]	16:25:45	
ODI PAR	ODI RA	Talkdown free contact 10 miles; when established 1-2-3 decimal 3	16:25:46	Intercom
ODI RA	S76	[S76 C/S] for ILS monitor contact Odiham talkdown 1-2-3 decimal 3	16:25:51	
S76	ODI RA	Talkdown 1-2-3 decimal 3, [S76 C/S]	16:25:56	
ODI RA	Chinook	[Chinook C/S] turn left heading 3-6-0 degrees	16:26:07	
ODI PAR	ODI RA	Do we know his POB? [S76 C/S], do we know his POB?	16:26:10	
Chinook	ODI RA	Left 3-6-0 [Chinook C/S]	16:26:10	
Chinook	ODI RA	[Chinook C/S] steady north	16:26:49	
ODI RA	Chinook	[Chinook C/S]	16:26:53	
ODI PAR	S76	[S76 C/S] Odiham Talkdown	16:26:55	
S76	ODI PAR	[S76 C/S] localiser established ILS 2-7	16:26:59	
ODI RA	FBO RA	Odiham Approach	16:26:56	
FBO RA	ODI RA	It's Farnborough radar my departure towards the south is, um, slowly moving but will be climbing to 3400 feet	16:26:57	
ODI PAR	S76	[S76 C/S], Odiham Talkdown, identified, read back QNH	16:27:01	
ODI RA	FBO RA	Climbing 3400; confirm he will be taking visual separation until	16:27:03	

From	To	Speech Transcription	Time	Remarks
		then?		
S76	ODI PAR	QNH 1-0-2-5 set [S76 C/S]	16:27:06	
FBO RA	ODI RA	Um, I presume so, yeah. Ok thanks for your help	16:27:06	
ODI PAR	S76	[S76 C/S] report glide path descending, gear down, confirm POB	16:27:08	
ODI RA	FBO RA	Odiham approach	16:27:09	
S76	ODI PAR	2 POB and wilco, [S76 C/S]	16:27:12	
S76	ODI PAR	Talkdown, err, [S76 C/S] there's, err, there appears to be traffic, err, climbing out, err, in our 2 o'clock; can you confirm, is that from Farnborough?	16:27:38	
ODI PAR	S76	[S76 C/S] affirm that is Farnborough traffic	16:27:46	
ODI PAR	ODI RA	Is that Farnborough traffic visual with you?	16:27:48	
S76	ODI PAR	Can you confirm whether that's co-ordinated [S76 C/S]?	16:27:51	
ODI PAR	S76	[S76 C/S] he's taking reduced separation. He's visual with you.	16:27:53	
S76	ODI PAR	He's not, we're in a cloud, [S76 C/S]	16:27:57	
ODI PAR	ODI RA	He saying he's in a cloud, there's no chance that aircraft is visual with him	16:28:01	
ODI PAR	S76	[S76 C/S]	16:28:04	
ODI PAR		Err, 5 miles, [S76 C/S]	16:28:09	
ODI PAR	S76	[S76 C/S] traffic is right 1 o'clock, estimated 300 feet above you	16:28:19	
S76	ODI PAR	Copied [S76 C/S], thank you	16:28:25	
ODI PAR	ODI ADC	Tower. Talkdown. [S76 C/S] to land, yeah. 2 POB	16:28:25	
ODI ADC	ODI PAR	Standby for Jackson	16:28:38	Radar clearance line
ODI PAR	ODI ADC	Roger, standing by Jackson	16:28:39	
ODI PAR	S76	[S76 C/S] confirm gear down?	16:28:45	
S76	ODI PAR	Negative, [S76 C/S]	16:28:50	
ODI PAR	ODI ADC	3 miles, final clearance delayed, continue approach...copied	16:29:10	Radar clearance line
S76	ODI PAR	Continue approach copied, and gear is now down, [S76 C/S]	16:29:16	
ODI PAR	ODI ADC	[S76 C/S]. Err, two and a quarter miles, [S76 C/S] to land	16:29:19	
ODI ADC	ODI PAR	[S76 C/S] cleared to land, one in south side	16:29:24	Radar clearance line
ODI PAR	S76	[S76 C/S] cleared to land, one in south side, acknowledge	16:29:26	
S76	ODI PAR	Cleared to land copied [S76 C/S]	16:29:30	
ODI PAR	S76	Surface wind 2-4-0, 0-7 knots	16:29:32	
ODI PAR	S76	Approaching decision altitude	16:30:09	
ODI PAR	ODI RA	<i>Unintelligible</i> ...Farnborough said he was taking visual separation...Jesus...No he's still with me...I'd be surprised if he's visual, ya know.	16:30:17	
ODI PAR	S76	Passing decision altitude	16:30:39	

From	To	Speech Transcription	Time	Remarks
S76	ODI PAR	And [S76 C/S] is visual to land	16:30:43	
ODI PAR	S76	[S76 C/S] continue with Odiham tower 1-1-9 decimal 2-2-5	16:30:46	
S76	ODI PAR	To tower, 1-1-9-2-2-5, [S76 C/S]. Thank you	16:30:49	

Figures 9-13 depict the positions of the S76 and the CRJ2 at pertinent times, such as when information was passed or instructions given. The radar replays are taken from the Pease Pottage radar feed, which is the SSR feed utilised by RAF Odiham.

At 16:22:47 (Figure 9), the Odiham Approach controller passed Traffic Information to the S76 pilot on traffic north-west, range 5nm, tracking south-east, indicating 300ft above. The S76 pilot reported initially that they were not visual, then visual with the traffic. When asked if they were happy to turn inbound against the traffic, the pilot responded in the negative due to entering IMC.



Figure 9: Geometry at 16:22:47 (S76 3650; CRJ2 not yet airborne).

At 16:24:57 (Figure 10), the Farnborough Approach controller spoke with the Odiham Supervisor, stating that there was a HAZEL departure lined up on RW24. They asked if Odiham ATC were happy for the departure to proceed ahead of the S76. The Odiham Supervisor stated that the S76 was establishing on the ILS and that the departure should go straight away. The Farnborough Approach controller iterated that the departing traffic would go now and be well ahead of the S76.

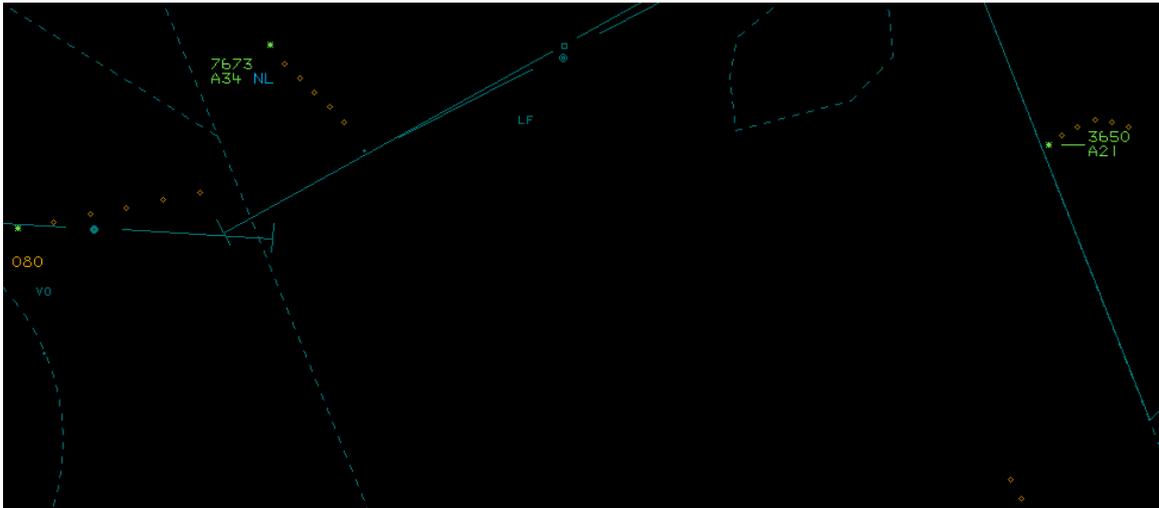


Figure 10: Geometry at 16:24:57 (S76 3650; CRJ2 ready to depart).

At 16:26:57 (Figure 11), the Farnborough Approach controller called the Odiham Approach controller and stated that the departure to the south (still not airborne) was slowly moving and would be climbing to 3400ft. The Odiham Approach controller read back the altitude and asked for confirmation that the pilot would be taking visual separation against the S76, who was by this time on the Odiham PA frequency. The Farnborough Approach controller replied that they presumed so.

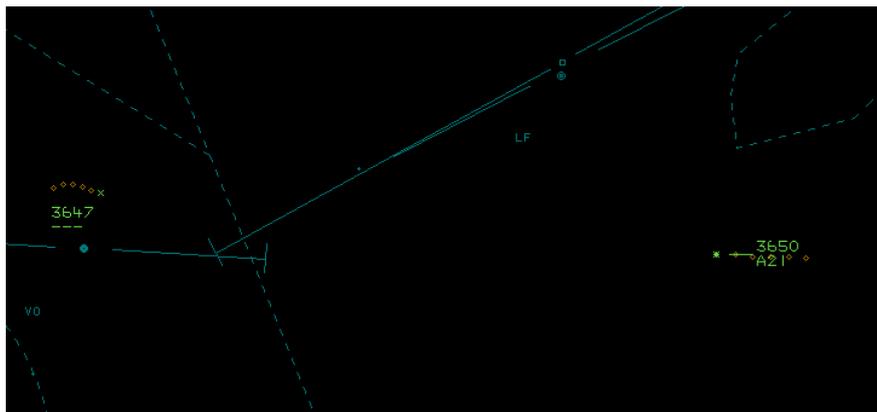


Figure 11: Geometry at 16:26:57 (S76 3650; CRJ2 rolling).

At 16:27:38 (Figure 12), the S76 pilot transmitted to the Odiham PA controller, stating that there appeared to be traffic climbing out in their 2 o'clock. The pilot asked for confirmation that it was from Farnborough. The Odiham PA controller responded that it was and then asked the Approach controller if the traffic was visual with 'you'?

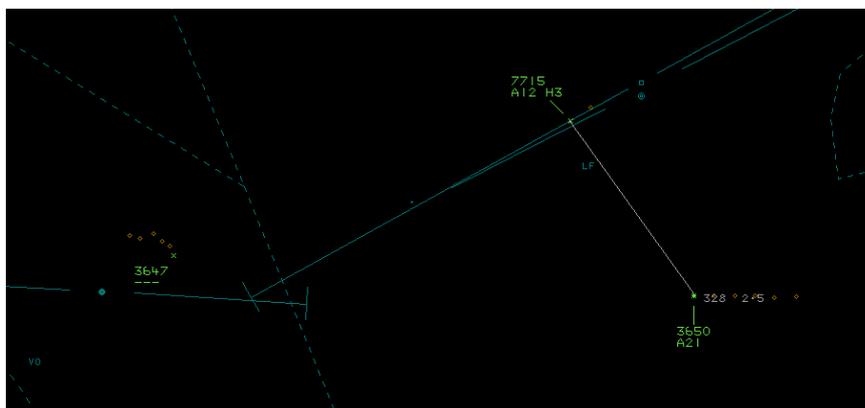


Figure 12: Geometry at 16:27:38 (S76 3650; CRJ2 7715).

At 16:27:52 (Figure 13), the S76 pilot asked whether the traffic was coordinated, to which the Odiham PA controller responded that the CRJ2 was taking 'reduced separation', and that the CRJ2 pilot was visual with the S76. The S76 pilot stated that the CRJ2 pilot was not taking visual separation because they were in cloud. At 16:28:19, the Odiham PA controller passed Traffic Information to the S76 pilot on the traffic, now in their right, 1 o'clock, estimated 300ft above.

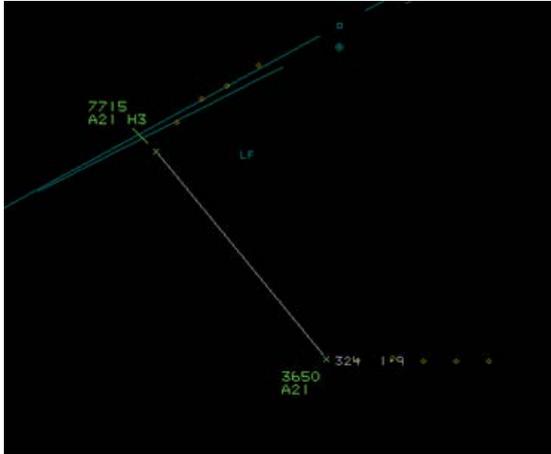


Figure 13: Geometry at 16:27:52

Figure 14: Geometry at 16:28:30
(S76 3650; CRJ2 7715).

At 16:28:30 (Figure 14), the S76 and CRJ2 passed 0.7nm laterally and 1400ft vertically apart. The Odiham Approach Controller reported that they were instructing a controller under training and operating band-boxed as Approach and Director. There had been consistently heavy IFR traffic throughout the session, with the S76 and another pilot on frequency at the time of the occurrence. The controller reported that, when the S76 was downwind, Farnborough rang to ask if the aircraft could extend downwind to facilitate the first of two departures. This was not deemed likely to delay the S76 due to its location at the time. When the S76 was further downwind, the Approach controller reported seeing conflicting traffic, so passed Traffic Information to the S76 pilot. He was reported to have called visual, but that he was entering cloud, therefore a vector away from the conflicting traffic was issued. Once the S76 was established on the ILS and handed over to Odiham PA controller for ILS monitor, the Farnborough Approach controller called again to say that the second departure [the CRJ2] was rolling. As that was likely to put the 2 aircraft into direct conflict, the trainee Approach controller reported asking Farnborough if the departure was taking 'reduced separation', a procedure employed between the 2 units to allow for expedition during good weather. The Farnborough controller reported that they assumed so, but given the weather conditions it seemed unlikely to the Odiham Approach controller that the CRJ2 pilot would be able to see the S76 from the ground (a requirement of the procedure). He reported that the S76 pilot was informed of the CRJ2 taking 'reduced separation', to which he responded that he was in thick cloud and it was unlikely that the aircraft was visible to the CRJ2 pilot.

The Odiham PA controller did not submit their own narrative, however, it was reported that there was no risk of conflict evident in either PAR display (azimuth or elevation) therefore the ILS approach was allowed to continue.

The Odiham Supervisor reported that he was present in the Approach Control Room (ACR) at the time of the occurrence. When the S76 pilot was base leg to intercept the ILS, at approximately 12nm from touchdown, he reported taking a telephone call from Farnborough Approach asking if they could launch a HAZEL departure (climbing turn south, across the Odiham approach lane). Due to the range of the S76, this was agreed subject to separation being maintained. The Supervisor stated that he was content with the actions of both the Approach and PA controllers as

there was no imminent conflict in either element of the PAR display. He reported that initiation of the MAP would have increased² the separation already being achieved through the S76 descending and the CRJ2 climbing.

Due to the close proximity of RAF Odiham and Farnborough, a Letter of Agreement (LoA) is in place to define the procedures between RAF Odiham and Farnborough ATC that will enable safe operations. Excerpts from the LoA, detailing integration of arrivals and departures during westerly runway operations, are below:

Odiham Radar Training Circuit (RTC).

Odiham are to inform Farnborough when the Odiham RTC is active and when activity ceases. Such notifications are regarded by both units as an information call and do not in themselves imply any coordination has been effected.

In order to integrate with Farnborough's arrivals and departures, Odiham Director's traffic in the Runway 27 radar training circuit will routinely operate at or below 1600ft Odiham QFE (2100ft Farnborough QNH) when east of a line North/South through Odiham.

Traffic carrying out an ILS to Runway 27 establishes on a centreline that is offset from the Odiham extended centreline to the North, and thus transits the Farnborough ATZ. Such transit may be taken as approved by Farnborough provided:

Farnborough have been advised of the aircraft carrying out an ILS

The aircraft does not deviate right of the localiser when within the lateral limits of the ATZ, unless otherwise coordinated between Odiham and Farnborough.

When Odiham RTC aircraft are carrying out multiple approaches the caveat "including ILS approaches" may be accepted as a clearance to transit the Farnborough ATZ on subsequent ILS approaches for the notified aircraft squawk.

Odiham IFR Arrivals.

As soon as practicable, Odiham are to pass traffic information to Farnborough on all IFR inbound non-squawking aircraft.

Farnborough IFR Departures.

Prior to departure, Farnborough are to pass traffic information on all departures off RW 24 to Odiham when the Odiham RTC is active or when notified of IFR departures from Odiham.

Reduced Separation – Farnborough Departures.

In order to expedite traffic at Farnborough, 'reduced separation in the vicinity of the aerodrome', as defined in the MATS Part 1, may be used between Farnborough Departures and Odiham instrument traffic provided the Farnborough criteria has been met. The definition of 'reduced separation in the vicinity of the aerodrome' is:

"In the vicinity of aerodromes, the separation standard may be reduced if:

(a) Adequate separation can be provided by the aerodrome controller when each aircraft is continuously visible to this controller; or

² Believed to mean decreased.

- (b) *Each aircraft is continuously visible to the pilots of the aircraft concerned, and the pilots report that they can maintain their own separation, or*
- (c) *When one aircraft is following another the pilot of the succeeding aircraft reports that he has the other in sight and can maintain separation.”*

The Farnborough radar controller will identify the relevant traffic to the Farnborough Tower controller who will use the information to correlate the correct traffic on the ATM. Farnborough will inform Odiham in the event that ‘reduced separation’ is employed and state the Callsign or Squawk as appropriate that the departing aircraft has been allocated.

However, the traffic should be called and the phrase “Farnborough departure maintaining visual separation” should be used. If an aircraft is seen departing Farnborough that has not been pre-noted, it should be considered a conflict and the appropriate avoiding action taken.

The RAF Odiham Defence Aerodrome Manual (DAM), available to all airfield users, states that:

Traffic carrying out instrument approaches to Rwy 27 will pass approximately 2.5nm South of Farnborough Aerodrome at 1,500ft QFE. Radar services will be limited due to the proximity of Farnborough and possible unknown departing traffic.

Although there are no weather criteria stated in the LoA, it is stipulated that each aircraft is to be continuously visible to the pilots of the Farnborough aircraft concerned, and the pilots are to report that they can maintain their own separation. When Traffic Information was passed to the S76 pilot turning base leg, he answered that the aircraft was entering IMC; therefore, the Odiham Approach controller was aware that the conditions in the approach lane might preclude ‘reduced separation’. That said, the LoA requires an element of trust that both parties will conform to the requirements³. The pilot also elected to continue under a Traffic Service, rather than a Deconfliction Service, after becoming IMC. Under either service, responsibility for collision avoidance lies with the pilot.

Liaison between the Farnborough Approach controller and Odiham Approach controller/Supervisor took place, as per the LoA; however, the agreement was based on the position of the S76 at that time. In the 2 minutes that passed between agreement for the CRJ2 departure and the aircraft actually rolling, the S76 had progressed to a position where there would be direct conflict with the departing traffic. The Farnborough Approach controller did not volunteer information that the CRJ2 pilot was taking ‘reduced separation’, and was ambiguous when asked. The Odiham Supervisor was not aware that the S76 pilot had been under IMC.

CAP 774 details separation and Traffic Information requirements for pilots being provided with a Traffic Service using surveillance radar equipment (SRE). When being monitored using PAR, MAA RA 3291 details the actions required by the PA controller with regard to conflicting tracks. If the conflicting track is displayed in both elements (azimuth and elevation) and collision risk exists in one, Traffic Information is to be passed to the pilot if considered relevant⁴. As there was no collision risk in either element, Traffic Information was not passed by the Odiham PA controller until the traffic was queried by the S76 pilot.

The use of ‘reduced separation’ between Farnborough departures and Odiham arrivals happens frequently without incident; however, on this occasion, the relative positions of the 2 aircraft when the CRJ2 departed, combined with the weather conditions, led to a situation where the S76 pilot was concerned about safety. Since this occurrence, the S76 operators have visited Odiham ATC to increase their understanding of ATC procedures on PAR, SRE and in SSR-only operations.

³ This report was produced without access to a statement from the Farnborough Approach controller or to Farnborough tape transcripts to ascertain whether the CRJ2 pilot agreed to ‘reduced separation’.

⁴ Radar to visual joins passing overhead, circuit traffic turning ahead/behind, etc.

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The S76 and CRJ2 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard⁵. If the incident geometry was considered as converging then the S76 pilot would be required to give way to the CRJ2⁶.

Summary

An Airprox was reported when an S76 and a CRJ2 flew into proximity at 1628 on Thursday 8th December 2016. Both pilots were operating under IFR in IMC, the S76 pilot in receipt of a Traffic Service from Odiham Radar and the CRJ2 pilot in receipt of a Deconfliction Service from Farnborough Radar. Farnborough ATC coordinated the CRJ2's departure against the S76 but its departure was delayed, resulting in the aircraft coming into conflict.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from both pilots, the controllers concerned, area radar and RTF recordings and reports from the appropriate ATC and operating authorities.

The Board noted that both pilots were operating under IFR, in IMC, outside Controlled Airspace. The S76 pilot was inbound to RW24 at Odiham on a training flight and was in receipt of a Traffic Service; the CRJ2 pilot was departing from RW24 at Farnborough, under a Deconfliction Service.

The Board looked first at the ATC aspects of the Airprox. Members noted that the Farnborough Radar controller had telephoned Odiham, in accordance with the Letter of Agreement (LoA) between Farnborough and Odiham, to inform them about IFR departures from RW24, and that the CRJ2 was the second aircraft to depart, routeing to HAZEL. The Board noted that on this route an aircraft would turn onto a heading of 220° after passing 1200ft in the climb to 2400ft, and that the Odiham Supervisor had agreed that if Farnborough were able to depart the CRJ2 ahead of the S76 that would be acceptable. The Board then noted that, shortly after the CRJ2 was released, a handover of the Farnborough Radar position was commenced. During this period, one minute after the CRJ2 pilot had been cleared for take-off, the Aerodrome controller called the Radar controller to advise that the CRJ2 was being very slow to depart. The on-coming controller then telephoned Odiham to advise them that the CRJ2 was slowly moving and would be climbing to 3400ft to the south. The Odiham controller asked if visual separation was being applied, to which the Farnborough controller responded "I'm assuming so". This led some members to question how thorough the handover had been between the Farnborough controllers, and controller members commented that the oncoming controller should have positively determined what procedure the CRJ2 pilot was under during his departure. The Board opined that the handover between the Farnborough Radar controllers was not complete and effective because the on-coming controller was unaware of the separation plan involving the CRJ2 and the S76. He had made the incorrect assumption that a visual separation, by the CRJ2 pilot, was being employed. This would have meant that the CRJ2 would continue on runway heading until it climbed above the S76, rather than turn onto the 220° heading. The Board opined that he made the assumption on the basis that that he had probably realised that a standard departure to HAZEL would not have resolved the conflict between the two aircraft and he was aware that the aircraft was climbing to 3400ft, higher than the standard 2400ft as it would on a visual departure. The visual separation procedure relies on visual contact either by the Aerodrome controller having both aircraft in sight, or both pilots reporting they can maintain their own separation visually. None of this had occurred because, due to the weather conditions, the S76 was in cloud at the time. The Board considered that it was a contributory factor that the Farnborough controller did not comply with the VMC reduced separation criteria in the LoA.

⁵ SERA.3205 Proximity.

⁶ SERA.3210 Right-of-way (c)(2) Converging.

Although the Farnborough controllers had commented on the CRJ2 pilot's delay in departure, controller members noted that the CRJ2 pilot had departed within two minutes of being instructed to take off, as required. Once airborne, the Aerodrome controller had passed the CRJ2 pilot Traffic Information about the S76 before then transferring him to the Radar controller. Some members wondered whether the CRJ2 pilot, on an IFR departure, would have understood the significance of this Traffic Information given that he had not agreed to a VMC reduced separation departure. The Board noted that CPA occurred just after the CRJ2 pilot contacted Farnborough Radar and whilst the aircraft was still being identified. After identification was completed, the pilot was informed that he was being provided with a Deconfliction Service and Traffic Information was issued about the S76 in his 9 o'clock position, left to right, 1000ft below at which point it was not a factor.

The Board were disappointed that none of the Farnborough controllers took positive control of the situation prior to the CRJ2's departure. The Aerodrome controller (who had access to an Aerodrome Traffic Monitor and could see the position of the S76), had a number of options which, if taken, would have reduced or removed the possibility of a conflict between the two aircraft. He could have cleared the CRJ2 pilot for an immediate take-off; warned the radar controller earlier of the delayed departure of the CRJ2, or could have cancelled the CRJ2 pilot's take-off clearance prior to him commencing his take-off roll. Notwithstanding, his suggestion of a further climb for the departing aircraft did fortuitously resolve the potential conflict. For his part, the Radar controller, after issuing a release for the CRJ2, was responsible for ensuring that the clearance was still valid if the circumstances changed, for example as a result of a delayed departure.

The Board was informed that the local expectation is that departing aircraft are provided with the required deconfliction minima from take-off. Members then entered into a lengthy discussion about what deconfliction minima the controller should have aimed to provide between the CRJ2 and the S76. CAP 774 states that the deconfliction minima against uncoordinated traffic are 5nm laterally or 3000ft vertically. If coordination has taken place the minima are 3nm laterally or 1000ft vertically. The debate hinged on whether the Farnborough controller had actually coordinated the CRJ2's departure with Odiham or not. Certainly, Odiham had been informed about the CRJ2 departing but the use of the term 'coordination' was never used. Nor was any plan agreed, other than that the aircraft would go ahead of the S76. The Manual of Air Traffic Services Part 1⁷ states that controllers make verbal contact with the appropriate controller and, after identifying himself, open the dialogue with the words "Request Co-ordination". This phraseology was not used on this occasion, possibly because initially it was believed that the CRJ2 would be well ahead of the S76. Accordingly, the majority of the Board considered that, under the change of circumstances, official co-ordination should have resulted but it did not take place. The Radar controller only became aware that the CRJ2 pilot was following a departure to HAZEL when the CRJ2 commenced the turn onto 220°; CPA had occurred before he could take any action. The Board considered that there was a lack of effective internal and external coordination between the Farnborough and Odiham controllers regarding the departing CRJ2, and that this was a contributory factor.

Meanwhile, Odiham had positioned the S76 pilot onto final approach to the ILS RW27. The Odiham Supervisor was content with Farnborough's CRJ2 departure because Farnborough had stated it would be going well ahead of the S76. Subsequently, the Odiham Radar controller discussed the CRJ2's departure with Farnborough and received confirmation, although somewhat ambiguously, that it was departing on visual separation, albeit that the S76 pilot had commented previously that he was in IMC. On being advised that the CRJ2 pilot was taking reduced separation [visually] the S76 pilot reiterated that he was in cloud. Traffic Information was then passed in his right 1 o'clock, estimated 300ft above. Military instructions state that if the conflicting track is displayed in both elements of the PAR equipment and a collision risk exists; Traffic Information is to be passed if considered relevant. On this occasion there was no collision risk in either equipment element.

⁷ Section 1, Chapter 11, Paragraph 3.1.

The Board then turned its attention to the cause and risk of the Airprox. Although the position of the S76 was known to the Farnborough controllers, they nevertheless released the CRJ2, resulting in it conflicting with the S76. This was considered to be the cause of the Airprox. As to the risk, the Board noted that the minimum separation was 900ft vertically and 1.2nm horizontally at CPA. This was below the deconfliction minima that should have been aimed for (whether coordinated or not) and safety had therefore been reduced, although it was agreed that there had been no risk of a collision. Accordingly, the Airprox was assessed as risk Category C.

PART C: ASSESSMENT OF CAUSE, RISK AND SAFETY BARRIERS

Cause: The Farnborough controller released the CRJ2 into conflict with the S76.

Contributory Factor:

- 1) The Farnborough controller did not comply with the VMC reduced separation criteria in the LoA.
- 2) Lack of effective internal and external coordination between the Farnborough and Odiham controllers regarding the departing CRJ2.

Degree of Risk: C.

Safety Barrier Assessment⁸

The Board decided that the following key safety barriers were contributory in this Airprox:

ATS Conflict Detection and Resolution was **ineffective** because the Farnborough controllers did not act on the changing circumstances of the situation; it was only the fortuitous rate of climb of the CRJ2 that removed any possibility of a collision. Additionally, Traffic Information was not issued to the S76 pilot.

See and Avoid was **not available** and thereby **ineffective** because the aircraft were in cloud.

⁸ Modern safety management processes employ the concept of safety barriers that prevent contributory factors or human errors from developing into accidents. Based on work by EASA, CAA, MAA and UKAB, the table depicts the barriers associated with preventing mid-air-collisions. The length of each bar represents the barrier's weighting or importance (out of a total of 100%) for the type of airspace in which the Airprox occurred (i.e. Controlled Airspace or Uncontrolled Airspace). The colour of each bar represents the Board's assessment of the effectiveness of the associated barrier in this incident (either Fully Effective, Partially Effective, Ineffective, or Unassessable/Inapplicable). The chart thus illustrates which barriers were effective and how important they were in contributing to collision avoidance in this incident. The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).

