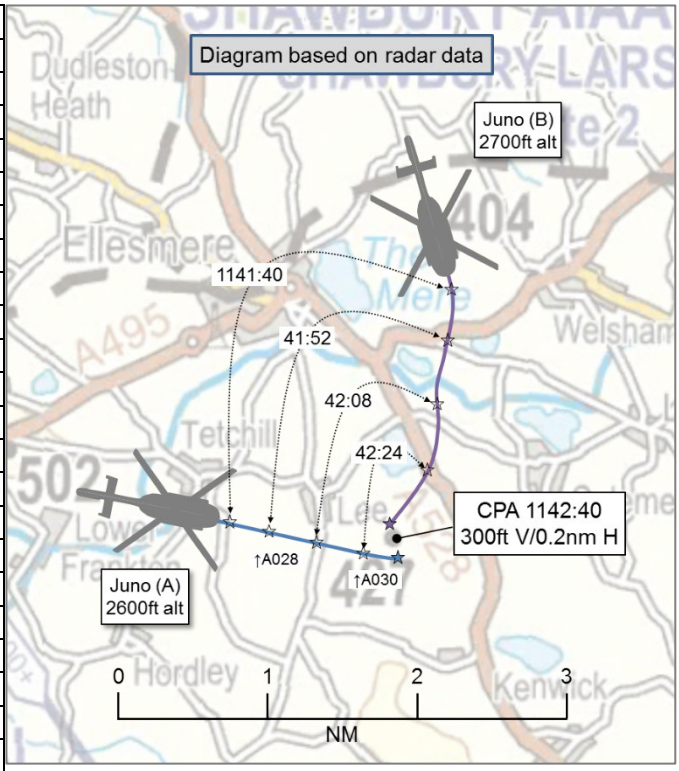
AIRPROX REPORT No 2019278

Date: 13 Sep 2019 Time: 1143Z Position: 5253N 00252W Location: 9nm NW of Shawbury

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Juno (A)	Juno (B)
Operator	HQ Air (Trg)	HQ Air (Trg)
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Basic	Traffic
Provider	Shawbury	Shawbury App
Altitude/FL	F024	F021
Transponder	A, C, S	A, C, S
Reported		
Colours	Black/yellow	Black/yellow
Lighting	Strobes, tail, nav	Strobes, tail, nav
Conditions	VMC	VMC
Visibility	30km	30km
Altitude/FL	2800ft	2500ft
Altimeter	QNH (1036hPa)	
Heading	100°	
Speed	90kt	
ACAS/TAS	TCAS I	TCAS I
Alert	TA	Unknown
Separation		
Reported	0ft V/400m H	Not Reported
Recorded	300ft V/0.2nm H	



THE JUNO (A) PILOT reports was flying as No 2 in a formation of 2 Juno helicopters at low-level approximately 10nm West of Shawbury when they executed a formation inadvertent IMC abort for training purposes; this plan had been pre-noted to ATC before departure. Both aircraft climbed at 65kts with the QNH of 1036hPa set; the pilot of the lead aircraft climbing to 3300ft amsl while maintaining a heading of 100°, the pilot of the No 2 aircraft climbing to 2800ft amsl while turning right to maintain 130° for 2 mins prior to returning to a heading of 100°. During the abort procedure, the lead pilot instructed the formation to switch to the Shawbury Approach frequency and informed ATC of the situation and that a call from the second aircraft would follow. The Shawbury Approach controller instructed the lead pilot to set 1027hPa QFE and stop climb at a height of 2500ft, agreed a Traffic Service and directed the pilot to turn right onto 180°. The pilot of [Juno (A)] had stopped his climb at 2800ft amsl and now both aircraft were at the same level and on a converging track. The crews of both aircraft were visual with each other throughout and ATC informed the lead pilot of a contact in his 2 o'clock with height unknown, to which he responded "that's my playmate". The lead pilot requested a change of heading of at least 20°, whereupon ATC directed the lead pilot to turn right 20° onto a heading of 200°. The aircraft were still uncomfortably close so [Juno (A)] pilot elected to climb by 200ft to ensure adequate separation and called Airprox over the R/T. He was unsure of the distance involved, but considered it to be too close for 2 helicopters now working as singletons to recover IFR, albeit he – as the pilot of the No 2 aircraft – had not yet been able to make his initial call after the lead pilot had pre-noted it. Subsequently he made his call and the aircraft was provided with a Traffic Service and vectored back to Shawbury for a PAR.

The pilot assessed the risk of collision as 'Low'.

THE JUNO (B) PILOT reports that he was conducting a low-level instructional sortie in LFA 9. This sortie culminates in a practise IMC abort and instrument recovery back to RAF Shawbury. Prior to the sortie he had called ATC and confirmed with the supervisor that they were ready and able to deal with both aircraft aborting at the planned time. At the time of the abort, his aircraft was in the lead and he

climbed out of low-level and made an initial call to ATC. He stated that the formation had aborted and requested a Traffic Service with vectors to the PAR and, in time, he was instructed to adjust his height to 2500ft on the QFE. Part of the abort exercise was to look at the spacing achieved by the abort procedure, and he and the crew had 'eyes-on' [Juno (A)] throughout the exercise because of this. However, he was aware that the pilot of [Juno (A)] had not spoken to ATC, possibly because there was other instrument traffic on the frequency. He was instructed to turn onto a heading and told of traffic in his 12 o'clock, no height information. He advised ATC that the traffic was the other formation element and they responded that he should pass just behind. He then advised ATC that he would require a further turn of 20° to pass behind [Juno (A)] and the controller gave him a further turn. It was at this point that the pilot of [Juno (A)] called an Airprox and climbed.

The pilot assessed the risk of collision as 'Low'.

THE SHAWBURY APPROACH CONTROLLER reports he was controlling the Approach frequency only and had 2 tracks in the radar training circuit when a formation called inadvertent IMC and requested a radar recovery. The normal procedure with formation splits at Shawbury is that the aircraft self-split and contact ATC individually for recovery. The first track contacted him with details and intentions; the controller identified the track and began to vector it to join the radar training circuit. He passed Traffic Information on a contact that had no height information (possibly due to being on SSR and in an area of poor radar cover to the NW of Sleap) and, as he remembers, around 2-3nm away in the 2 o'clock position. The pilot replied that this was his playmate and that the other aircraft was at the same height as his own aircraft. The controller asked the pilot of [Juno (B)] if his current heading would avoid and he replied that it would not and requested to turn right 20° to avoid; the controller issued the 20° turn. He then returned to another of his tracks in the radar training circuit to issue an instruction. Immediately after this he heard a pilot call Airprox and, when asked to pass the message, the pilot of the other aircraft in the formation [Juno (A)] called to say that the controller had vectored the lead Juno at him. The controller told him that this turn was on the request of the other pilot.

The controller perceived the severity of the incident as 'Low'.

THE SHAWBURY SUPERVISOR reports the workload was very low and therefore he was carrying out other Supervisor tasks and did not witness the event. He was informed by the RA controller that a pilot had called an Airprox on frequency. The RA controller informed him what had happened and that the pilot, after reporting the Airprox, passed no further information. The Supervisor spoke with the pilot and discussed the differences between IFR and VFR, particularly under a Traffic Service and the rules and procedures that are followed in accordance with CAP 774 with regard to aircraft under a Traffic Service.

Factual Background

The weather at Shawbury was recorded as follows:

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METAR EGOS 131150Z 35005KT 9999 FEW032 17/09 Q1036 NOSIG RMK BLU BLU=
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Analysis and Investigation

Military ATM

Both Juno aircraft were part of the same formation conducting an instrument flying training sortie, which included a simulated IMC low-level abort. This procedure had the lead aircraft, Juno 2 at this juncture, maintaining heading whilst climbing to altitude 3300ft and the second aircraft turning onto a diverging heading (30°) for 2 mins before turning back onto track whilst climbing to altitude 2800ft. This manoeuvre was initiated north-west of RAF Shawbury in an area of known and published poor radar performance.

Once established in the climb, the pilot of Juno (B) contacted Shawbury Approach, agreed a Traffic Service and requested vectors for a PAR. As part of the sequencing for the PAR, the Shawbury Approach Controller instructed the Juno (B) pilot to level off at height 2500ft and turned the aircraft onto a heading of 190°. The pressure difference (QNH 1036hPa, QFE 1027hPa) meant that both

aircraft were at a similar level and Juno (B) was now heading towards Juno (A). Notwithstanding both pilots were visual with each other's aircraft throughout the event and neither considered there to be a risk of collision, the pilot of Juno (A) considered that the turn issued to the pilot of Juno (B) had eroded separation to a level that was 'too close for IFR aircraft.'

Figures 1-4 show the positions of both Junos at relevant times in the lead-up to, and during, the Airprox. The screenshots are taken from a replay using NATS radars, which are not utilised by RAF Shawbury, therefore are not representative of the picture available to the controllers.

Having initiated a low-level abort, the pilot of Juno (B) established a Traffic Service with Shawbury Approach, who instructed him to fly at height 2500ft. Separation between the formation elements was 1.7nm and 200ft at this point.

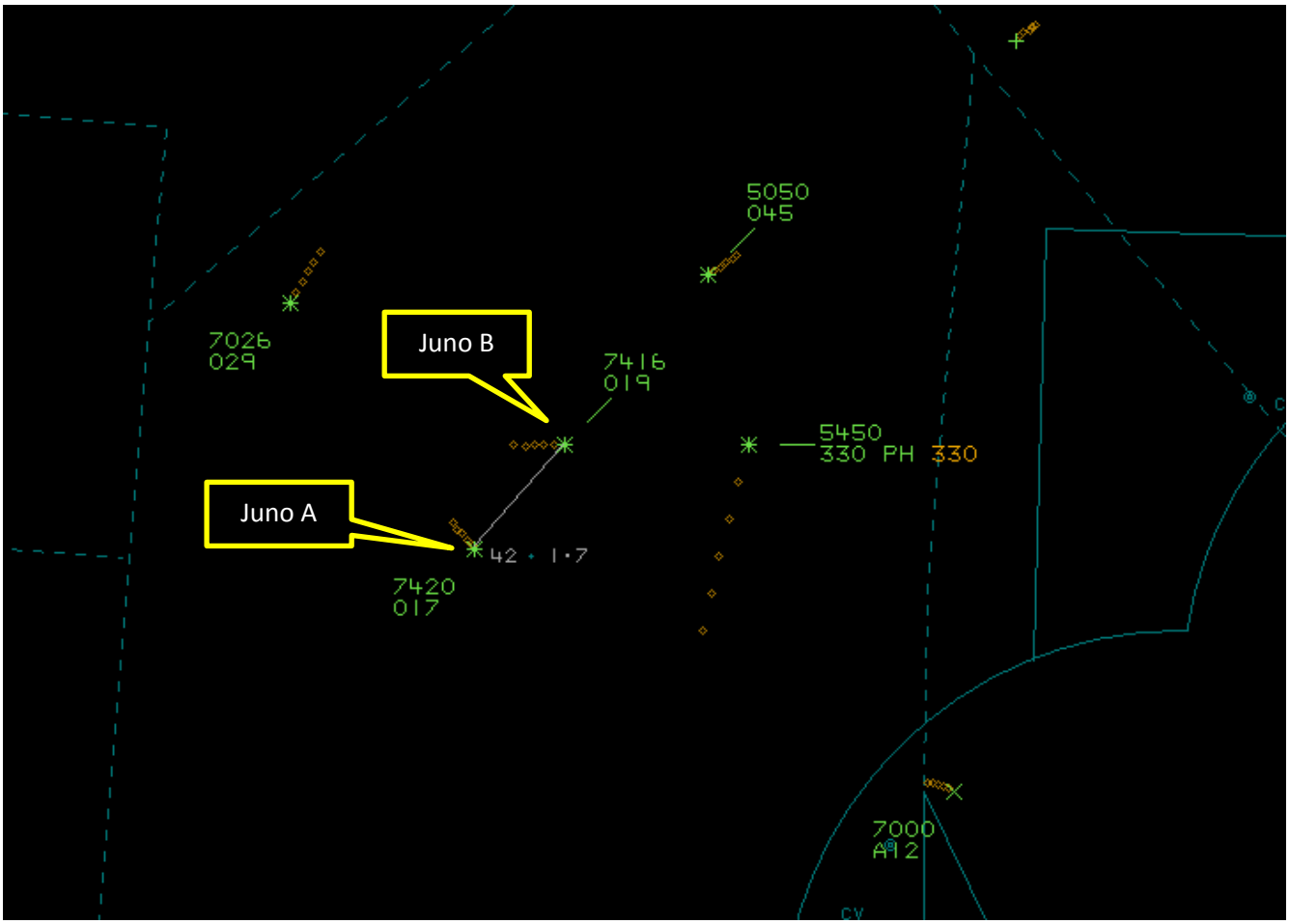

Figure 1 – 1141:04

Having ascertained that the pilot of Juno (B) required a PAR, the Shawbury Approach Controller instructed him to turn onto a heading of 190°. The unit investigation established that, at this point, Juno (A) was not displaying on radar (possibly due to the area of known poor radar performance) and its pilot was not speaking to Shawbury Approach. Therefore, the Shawbury Approach Controller did not have situational awareness on the position of Juno (B). Separation at this point had increased to 2.3nm and 200ft.

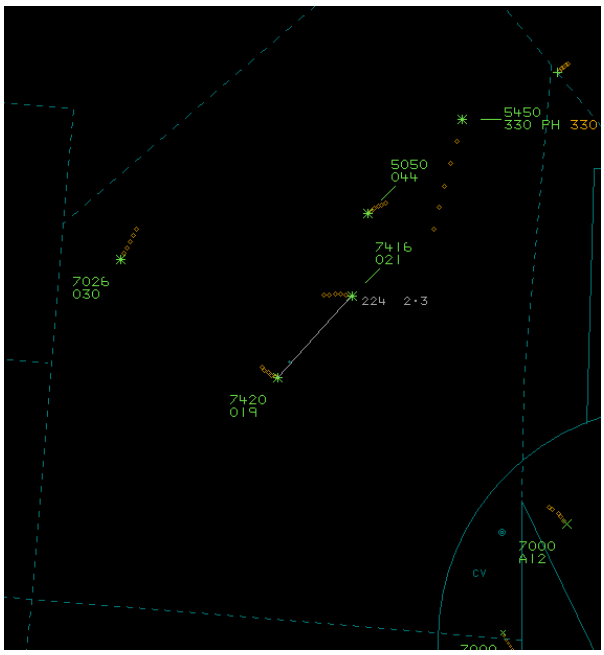

Figure 2 – 1141:17

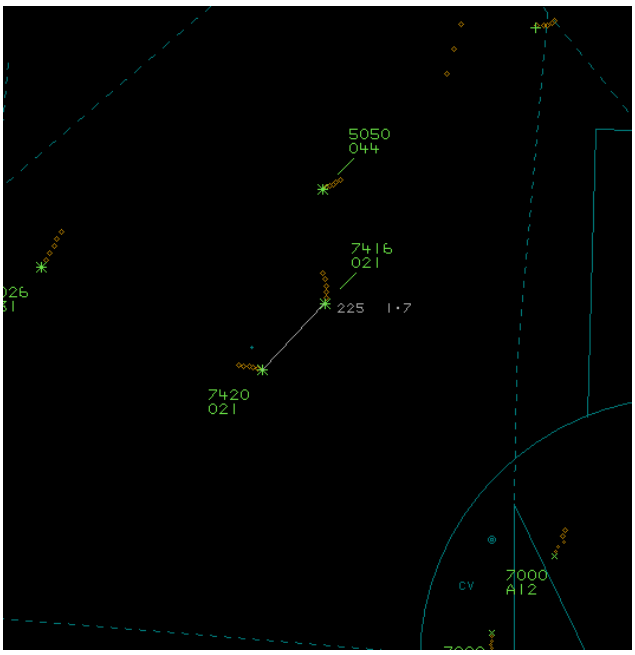

Figure 3 -1141:52

Following this turn, the Shawbury Approach Controller issued a series of instructions to the pilot of another aircraft being vectored for final approach. At the conclusion of this R/T exchange the controller then issued Traffic Information to the Juno (B) pilot on Juno (A), and reported that there was no height information. The pilot of Juno (B) confirmed that the other aircraft was Juno (A) and that they were at the same height. Separation at this point was 1.7nm with no vertical separation.

Following the information that both aircraft were at the same height (although visual), the Shawbury Approach Controller then asked the Juno (B) pilot if the current heading would keep him clear and the Juno (B) pilot requested a further right turn of 20°, which was approved by the controller. Approximately 30 secs after this turn, CPA occurred and was measured at 0.3nm and 300ft.

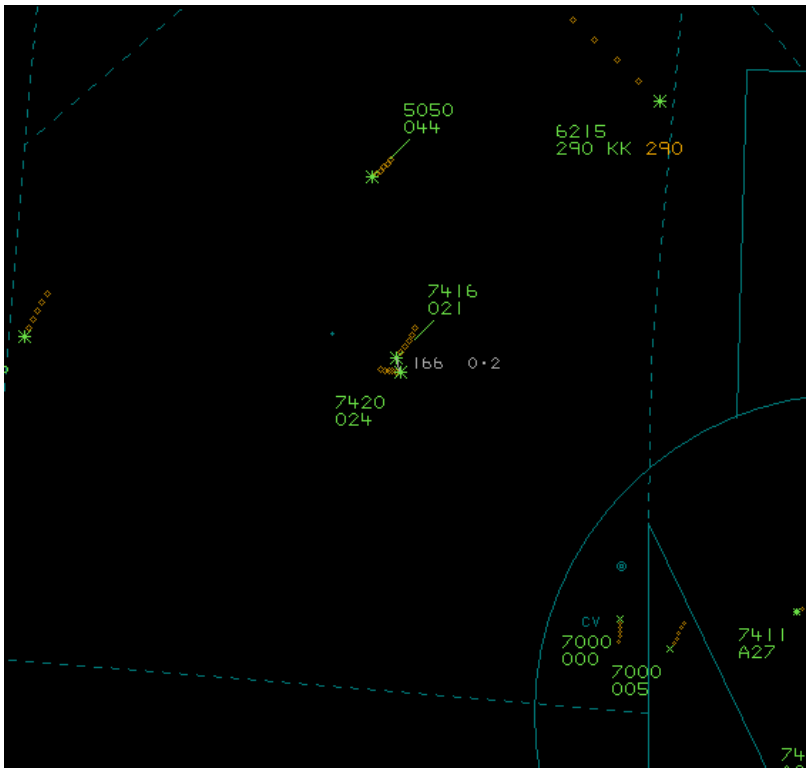

Figure 4 – CPA

It is unfortunate that the pilots of the two aircraft conducted their low-level aborts in an area of poor radar performance and that the Juno (A) pilot delayed his R/T call, meaning that the Shawbury Approach Controller had no situational awareness on Juno (A). The Shawbury Approach Controller correctly identified and vectored Juno (B) for a PAR approach into what they believed was clear airspace. Once Juno (A) began to show on radar, appropriate Traffic Information was passed to the Juno (B) pilot, along with an additional turn to remain clear of Juno (A). The Shawbury Approach Controller therefore discharged their duties correctly.

UKAB Secretariat

The Juno (A) and Juno (B) pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.[1] If the incident geometry is considered as converging then the Juno (B) pilot was required to give way to Juno (A).[2]

Occurrence Investigation

The investigation centred upon interviews with the pilots and controllers involved with the incident, consultation with Defence Helicopter Flying School (DHFS) Standards personnel, examination of aircraft derived data, the ATC transcript, RAF Shawbury Defence Aerodrome Manual (DAM) and DHFS training materials. An accurate reconstruction of the aircraft positions was possible and the OSI Team estimated that the aircraft passed within 0.34nm of each other, with Juno (A) making an evasive climb of approximately 200ft.

Low-level aborts, both single and as a formation, are taught and practised in both synthetic and real environments as part of the DHFS syllabus. Examination of the RAF Shawbury DAM revealed that Shawbury has 2 notified areas where radar services are deemed to be limited owing to poor radar performance or ground masking; 300°-350° radials, 7-15nm up to 3000ft and 140°-170° radials, 10-20nm up to 3000ft. Examination of aircraft data showed that the low-level abort was initiated in the north-westerly area and the OSI Team considered it likely that this had delayed the controller's radar acquisition and identification of both members of the formation. The two instructor pilots had passed a verbal "pre-note" to ATC, stating that they were planning to perform a low-level formation abort to the north-west of Shawbury at approximately 1130; these details were not received by the controller. The ATC Supervisor that received the telephone notification passed the message to his relief to be passed forward to the Approach controller. The relief Supervisor subsequently passed limited information on to the controller. The OSI Team considered it likely that this chain of communication had diluted the level of detail received by the controller such that he held little more information beyond that there was due to be a low-level formation abort event at some point. The ATC Supervisor that took the telephone pre-note did not consider highlighting the area of poor radar performance to the instructor pilots; he could not recall if this was because the level of detail in the pre-note conversation did not trigger the planned area for the abort versus radar performance as an issue, or if he just considered that the instructor pilot would "know this anyway, because it was in the Flying Order Book". Other Shawbury ATC Supervisors consulted also considered it unlikely that they would highlight a planned event in an area of poor radar coverage because they also considered that the aircrew would already know this from the DAM. The OSI Team was informed that, previously and for a short period, the area of poor radar performance had ceased to be an issue due to the introduction of a Wide Area Multilateration (WAM) system. WAM, however, had recently been removed from use due to reliability issues and therefore the areas of poor radar performance had become relevant once more (see Figure 5 below).

The controller was not familiar with all of the detail of the low-level formation abort SOP and, therefore, he was unaware that his instruction to the pilot of Juno (B) to level and turn, in response to the pilot's request for a PAR, effectively curtailed his SOP abort, hence the pilot of Juno (B) did not complete the full climb to Safety Altitude +500ft while maintaining heading. The controller was also unaware of the planned separation in both height and azimuth achieved by the process and the direction of separation of Juno (A). By requesting that the pilot of Juno (B) level on the QFE,

[1] MAA RA 2307 paragraphs 1 and 2.
[2] MAA RA 2307 paragraph 12.

while unaware that Juno (A) was climbing to 2800ft on the QNH (with 9hPa difference), Juno (B) was inadvertently levelled almost co-altitude with Juno (A), whose pilot had completed the planned SOP low-level formation abort.

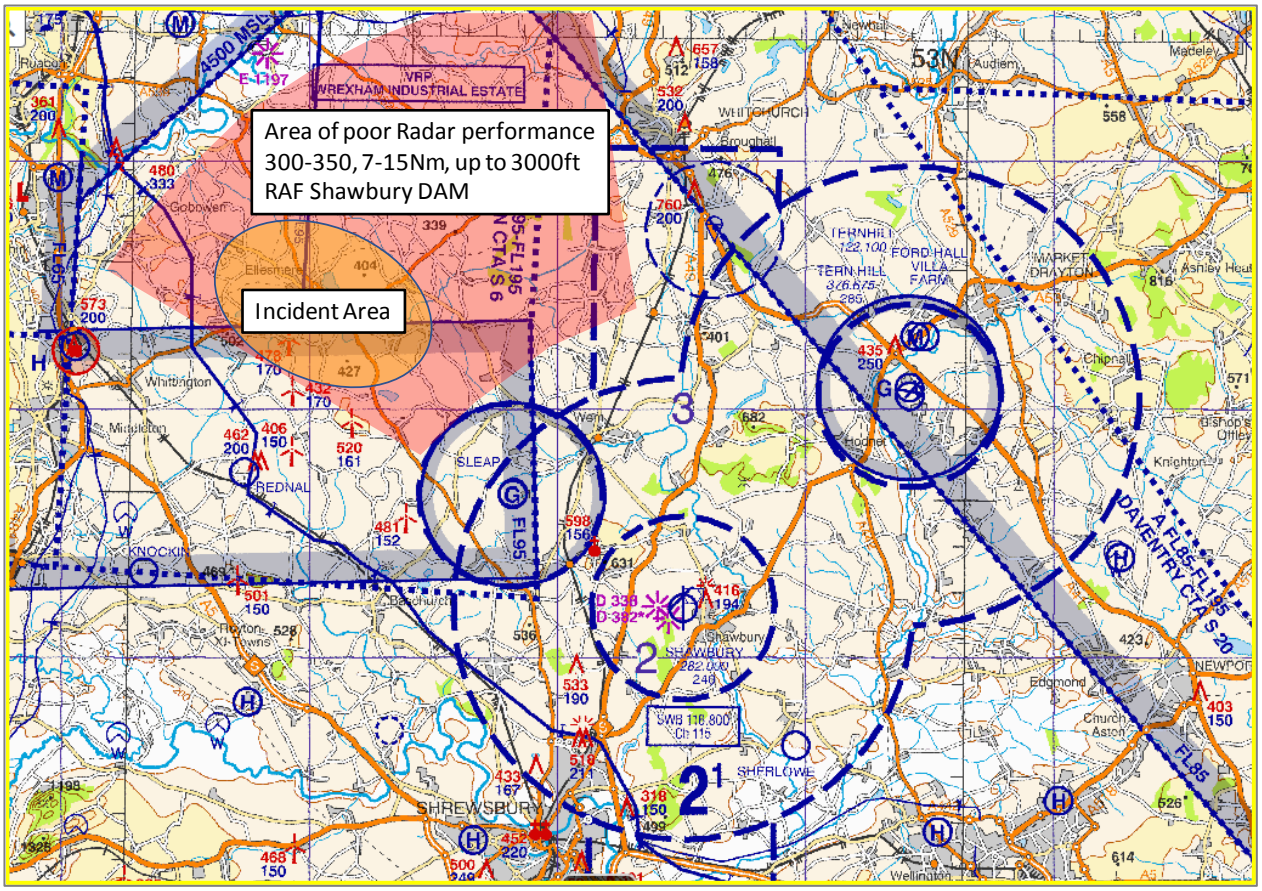

Figure 5 – Area of known poor radar coverage at RAF Shawbury

All recommendations accepted were done so in order to ensure that safe separation between aircraft conducting a formation IMC abort are maintained, in accordance with the terms of ATC Service requested and applied. They should also support a procedure that is conducted both safely and expeditiously and that all involved have a greater understanding of both the procedure, its intent and the workload of all involved. A key element to achieving this is communication; the recommendations accepted should ensure that a greater level of communication and a tighter relationship between ATC and aircrew is fostered.

Recommendations from the Unit Investigation

1. Publicise this incident, across RAF Shawbury, as a case study. Detail to highlight, but not be limited to: Low-level Formation; Abort SOPs; ATC equipment limitations, and; CAP774.

2. All DHFS QHIs are to conduct a visit to ATC on arrival and thereafter no less than once a year. All trainees are to conduct a visit to ATC before commencement of the IF Syllabus.

3. The re-introduction of WAM at RAF Shawbury at the earliest appropriate opportunity.

4. A review of the DHFS Ground School Syllabus to ensure that suitable time and teaching is given for understanding the rules and conditions of ATSOCAS [UKAB note: now known as UK Flight Information Services].

5. Abort SOPs to be reviewed and adjusted as required with selection of ATC Service protocols/decisions to form an element of the review.

Comments

HQ Air Command

This Airprox serves as a reminder that agreed procedures for achieving safe separation between co-operating aircraft can only completely succeed if followed to their full conclusion. Also, that these procedures can be quickly and inadvertently undone by someone with good intentions, but without full SA. It is regrettable that the low-level abort was conducted in an area of poor radar performance. Due to a convoluted chain of communication, the Shawbury controller had no prior awareness that a low-level abort would take place. Similarly, an opportunity to appraise the Juno crews of complications which could result due to the area selected was probably missed. It is fortunate that both aircraft were VMC and each pilot was visual with the other aircraft throughout. Once each pilot identified that a possible confliction was developing, they both made timely manoeuvres to increase their separation.

The thorough Occurrence Safety Investigation resulted in six recommendations being implemented to reduce the risk of a similar occurrence in the future. Co-ordination and the exchange of information between aircrew and ATC at Shawbury stands to improve as a result. For future low-level abort exercises, it has been agreed that Juno crews are to request a Deconfliction Service once safely established in the climb, downgrading to a Traffic Service if the conditions are suitable, to efficiently and safely complete their sortie aims. The re-introduction of WAM at Shawbury remains a high priority.

Summary

An Airprox was reported when two Junos flew into proximity 9nm NW of Shawbury at 1143hrs on Friday 13th September 2019. Both pilots were operating under VFR in VMC, the Juno (A) pilot in receipt of a Basic Service and the Juno (B) pilot in receipt of a Traffic Service, both from Shawbury Approach.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from the pilots of both aircraft, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities. Relevant contributory factors mentioned during the Board's discussions are highlighted within the text in bold, with the numbers referring to the Contributory Factors table displayed in Part C.

Board members first considered the actions of the Juno (A) pilot and wondered if he could have been more proactive in resolving the conflict as events unfolded, because he had seen Juno (A) level-off and turn towards his aircraft. However, it was agreed that, in VMC, the pilot would have wanted to complete the training objective of a low-level abort and would not have allowed separation to become vastly reduced; his climb of 200ft as Juno (B) came closer and generated a TCAS TA (**CF10**) had established sufficient vertical separation, albeit the manoeuvre had been completed somewhat later than would have been ideal.

Turning to the actions of the pilot of Juno (B), Board members considered that he had probably assumed that, having been identified by the Shawbury controller, both aircraft in the formation had been showing on the controller's radar screen. Effectively in the lead at this point, Juno (B) pilot had a responsibility to ensure the safety of his formation as they conducted their abort, and part of this responsibility was to ensure that ATC had full details of their intentions. In this respect, it was felt that the initial call from the pilot to the controller should have included more detail on the relative positions of the 2 aircraft and their target altitudes in the climb (**CF7**); this would have assisted the controller's SA when issuing instructions to the Juno (B) pilot. Members then discussed the point at which the Juno (B) pilot had taken the controller's instructions, and wondered if the flight conditions (VMC) had influenced his decision-making process. The pilot had curtailed his standard low-level abort procedure (**CF5**) and responded to the controller's instructions to level-off and turn, thus relinquishing the deconfliction plan within the standard abort procedure (**CF6**) because he had been visual with the other aircraft throughout the manoeuvre. The Board concluded that the pilot of Juno (B) had accurate SA on the position of Juno (A) but,

regardless, followed the controller's instructions to level-off and turn even though he knew that it would put him into conflict with the other member of his formation (**CF8**). Once established on heading, the pilot had seen that he was tracking towards Juno (A) and had asked for an additional turn. However, members felt that this turn was insufficient to generate adequate lateral separation to fulfil his collision avoidance responsibilities and prevent the Airprox (**CF11**).

Overall, the Board considered that, although acknowledging the need to allow students to learn from their own mistakes, given the events had taken place in VMC during an instructional sortie, there had also been missed opportunities for the instructors in both Juno aircraft to interject sooner to prevent the Airprox (**CF9**).

Members then discussed the actions of the Shawbury Approach controller, and heard from a military controller advisor that the Wide Area Multilateration system that had been in use at Shawbury had been removed. Thus, the area of known and promulgated poor radar coverage had been reintroduced (**CF1**), and this is where the event had taken place. The Board wondered why the controller had issued instructions to the pilot of Juno (B) before he had had radar contact on Juno (A) and a controller member proffered that this may have been done because the controller had identified an opportunity to feed Juno (B) into a convenient gap in the radar training circuit where 2 other aircraft were already established. The Board also lamented the fact that the pre-briefed message regarding the planned low-level abort had not been passed to the controller on console at the time of the event, and that this lack of information to the controller may have denied him the opportunity to consider how he would handle the formation on initial contact; in this respect, the military controller advisor also informed the Board that there were no specific low-level abort procedure orders for controllers at Shawbury. As it was, the controller had gained only generic SA on the presence of Juno (A) from Juno (B) pilot's initial call because he had not yet acquired radar contact (**CF2**). Although the controller's level-off and turn instruction had placed Juno (B) at the same level as, and heading towards Juno (A) (**CF4**), the lack of radar contact on Juno (A) had meant that the controller could not have known at the time that the 2 aircraft were then in conflict (**CF3**).

In considering the collision risk, members noted that both pilots were visual with each other's aircraft throughout the low-level abort procedure and subsequent radar vectoring. Nonetheless, members agreed that there were a number of missed opportunities that could have prevented the aircraft from coming into conflict and that the weaknesses in the MAC barriers had thankfully been revealed in VMC. Although the collision risk had been removed from the outset, members felt that the safety of the inadvertent IMC low-level abort procedure had been degraded and, consequently, attributed a Risk Category C to this event.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2019278		
CF	**Factor**	**Description**	**Amplification**
	Ground Elements		
	• Manning and Equipment		
1	Organisational	• Aerodrome and ATM Equipment	Inadequate or unavailable equipment
	• Situational Awareness and Action		
2	Contextual	• Situational Awareness and Sensory Events	Generic, late, no or incorrect Situational Awareness
3	Human Factors	• Conflict Detection - Not Detected	
4	Human Factors	• Inappropriate Clearance	Controller instructions contributed to the conflict
	Flight Elements		
	• Regulations, Processes, Procedures and Compliance		
5		• Any other event	Did not fully complete the low-level abort procedure
	• Tactical Planning and Execution		
6	Human Factors	• Action Performed Incorrectly	Incorrect or ineffective execution
7	Human Factors	• Accuracy of Communication	Ineffective communication of intentions
	• Situational Awareness of the Conflicting Aircraft and Action		
8	Human Factors	• Lack of Action	Pilot flew close enough to cause concern despite Situational Awareness
9	Human Factors	• Mentoring	Sub-Optimal
	• Electronic Warning System Operation and Compliance		
10	Contextual	• ACAS/TCAS TA	TCAS TA / CWS indication
	• See and Avoid		
11	Human Factors	• Lack of Action	Pilot flew close enough to cause the other pilot concern

Degree of Risk: C

Safety Barrier Assessment[3]

In assessing the effectiveness of the safety barriers associated with this incident, the Board concluded that the key factors had been that:

Ground Elements:

Manning and Equipment were assessed as **partially effective** because the Juno pilots conducted their low-level abort exercise in an area of known poor radar coverage.

Situational Awareness of the Confliction and Action were assessed as **partially effective** because the Shawbury Approach controller was informed by the pilot of Juno (B) on initial contact that there were 2 aircraft in the formation but the controller only had radar contact on one of the aircraft and therefore could not identify the conflict.

[3] The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the UKAB Website.

Flight Elements:

Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the pilot of Juno (B) did not fully complete his low-level abort procedure prior to taking instructions from the Shawbury Approach controller.

Tactical Planning and Execution was assessed as **partially effective** because the Juno (B) pilot did not fully complete the pre-briefed inadvertent IMC low-level abort procedure and did not provide the controller with a fulsome brief as to the 2 aircrafts' relative positions and intentions.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because the pilot of Juno (B) followed the Shawbury Approach controller's turn instructions even though he was aware that this turn would place him into conflict with Juno (A).