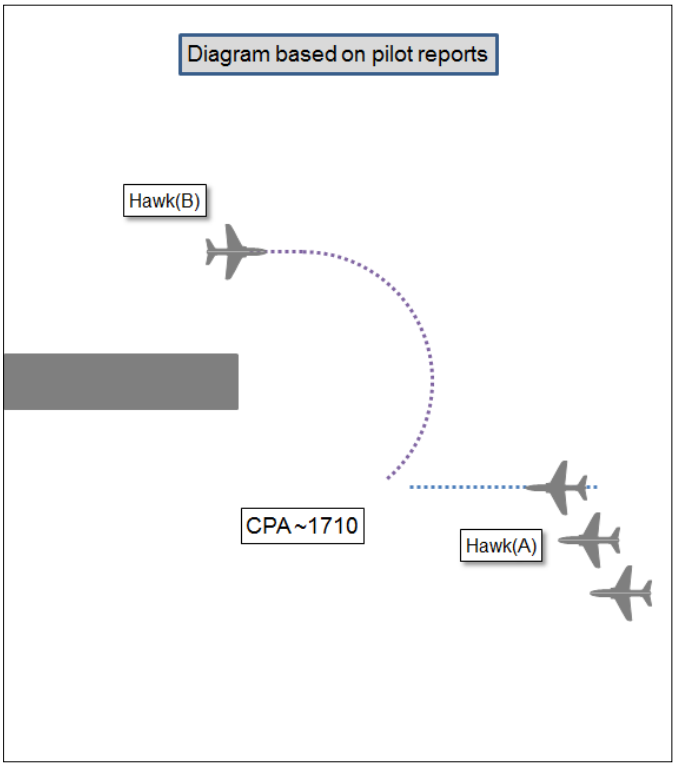
AIRPROX REPORT No 2016045

Date: 09 Mar 2016 Time: 1710Z Position: 5315N 00433W Location: RAF Valley (elev 36ft)

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Hawk T2(A)	Hawk T2(B)
Operator	HQ Air (Trg)	HQ Air (Trg)
Airspace	Valley ATZ	Valley ATZ
Class	G	G
Rules	VFR	VFR
Service	Aerodrome	Aerodrome
Provider	Valley	Valley
Altitude/FL	NK	NK
Transponder	Standby	A, C, S
Reported		
Colours	Black	Black
Lighting	Red HISL, nav, landing	White HISL, nav, landing
Conditions	VMC	VMC
Visibility	NK	>10km
Altitude/FL	1000ft	NK
Altimeter	QFE (1008hPa)	QFE (1008hPa)
Heading	315°	220°
Speed	360kt	NK
ACAS/TAS	TCAS II at Stby	TCAS II
Alert	None	TA
Separation		
Reported	NK	~150ft
Recorded	NK[1]	



THE HAWK(A) PILOT reports that he was the Authorising Officer and front-seat non-handling pilot of the No2 aircraft in a 3-aircraft formation recovering to Valley after an Air Combat sortie. The aircraft were in echelon-left formation at 1000ft, positioning for a right-hand break inside initials. As they approached the circuit, he was aware of one aircraft called 'downwind' by ATC but, due to his position in the formation, was unable to acquire it visually. The formation lead aircraft suddenly moved purposefully down and towards the No2 aircraft, making the student pilot in the rear seat pull up and away from him. This action revealed a Hawk T2 in plan form that the reporting pilot immediately thought was an aircraft that was going around from a finals turn at what he perceived to be a similar height to the formation. The No3 aircraft broke downwards and away from the formation and the formation, aircraft all made subsequent individual visual recoveries. The Hawk (A) pilot noted that the other Hawk was at an unusual height in that it was not where they would have expected it to be from a final turn position, and that this may have been a possible contributory factor in the late sighting by the formation leader.

He assessed the risk of collision as 'Medium'.

THE HAWK(B) PILOT reports flying from the back seat demonstrating a 'visual run-in and break'. During the break, there was a lot of joining circuit R/T traffic. As he rolled out downwind he was aware he could not see the joining traffic and in his efforts to acquire them visually, he allowed the aircraft to climb to about 1100ft. As he turned in on finals, he was aware he had low situational awareness on the joining traffic, and that his demonstration was now unacceptable from an instructional point of view. He knew there were two formations joining, one understood to be at 8nm due to air traffic calls but he missed the call on the other traffic. He was extremely uncomfortable so elected to overshoot

[1] The circuit pattern traffic was operating below the base of area radar cover and the RAF Valley radar is not recorded.

and began climbing to be above any joining traffic. During the overshoot he rolled wings level to check the dead wing and the joining traffic, which was much closer than he anticipated and had already started a break to avoid a perceived collision with him. Two aircraft went underneath him and one climbed above. He was sandwiched between the formation elements so elected to do nothing, making a call of 'visual' on the radio. The pilot stated that, in hindsight, he should have been less worried about the joining traffic, which would have allowed him to fly more accurately. He could then have continued the finals turn, safe in the knowledge that the joining aircraft had responsibility to avoid the circuit traffic.

He assessed the risk of collision as 'Medium'.

THE VALLEY TOWER CONTROLLER reports that the 3-ship Hawk formation called to join the circuit as Hawk(B) was downwind to touch-and-go and a further 2-ship Hawk formation were at 8nm on a trail-PAR. Hawk(B) was cleared to touch-and-go but broke off the approach calling 'going around circuit height'. This was immediately followed by a late initial call from the 3-ship formation, who were then passed Hawk(B)'s position. Simultaneously, as the traffic position was passed, the 3-ship formation broke away, taking avoiding action against Hawk(B). One went high in the circuit, remaining on Tower frequency, while the other 2 aircraft broke out of the circuit and free-called Approach. Once clear of the 3-ship formation, Hawk(B) also departed the circuit with Approach. The controller noted that during this period the Tower VHF frequency had failed resulting in both Tower and Radar sharing a single frequency to manage LARS and VHF Departures. Although distracted by this it did not prevent the controller from responding to the 3-ship formation on either the join or initial call.

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

THE VALLEY SUPERVISOR reports this incident occurred during a medium period of traffic levels at RAF Valley. Hawk(B) had been in the visual circuit for some time and the 3-ship formation were recovering on a standard visual join. The Tower controller informed him that the 3-ship formation had been observed to take avoiding action against Hawk(B) as they joined through initial. After the formation, elements had split and departed the circuit all aircraft then recovered with no further issues. The information passed by the Tower controller was accurate and timely although the 'initial' call made by the 3-ship formation was well within the initial point, resulting in circuit positions being passed at a later point than would be common. On review of the tape transcript, this may have been due to the first call of 'initial' being clipped by Hawk(B)'s 'going around' call.

Factual Background

The weather at Valley was recorded as follows:

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METAR EGOV 091650Z 35019KT 9999 FEW028 08/00 Q1009 BLU NOSIG=
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A transcript of the Valley Tower frequency was provided, as follows:

From	To	Speech Transcription	Time
Hawk No1	Tower	[Formation C/S]	17:08:59
Hawk(A)	Tower	Two	17:09:00
Hawk No3	Tower	Three	17:09:00
Hawk No1	Tower	Valley Tower [Formation C/S] join	17:09:01
Tower	Hawk formation	[Formation C/S], Valley Tower, join, runway three-one right hand, Q F E one-zero-zero-eight, one in	17:09:04
Hawk No1	Tower	Join, three-one right hand, one-zero-zero-eight, [Formation C/S]	17:09:08
Hawk(B)	Tower	[C/S], late call, break, touch and go	17:09:13
Tower	Hawk(B)	[C/S]	17:09:17

From	To	Speech Transcription	Time
Talkdown (Radar Clearance Line)	Tower	[Other formation C/S], approaching eight miles, land trails	17:09:19
Tower	Broadcast	Pair of Hawks, eight miles, land, trails	17:09:24
Hawk(B)	Tower	[C/S] going around ???????? *{Unintelligible, stepped on. Possibly Hawk(B) stating "… at circuit height" whilst Hawk formation call "Initials"?}*	17:09:42
Tower	Hawk(B)	[C/S] roger	17:09:48
Tower	Hawk formation	[C/S] errr	17:09:51
Hawk No1	Tower	[Formation C/S] late initial	17:09:53
Tower	Hawk formation	[C/S] roger one just *{long pause}* turning onto deadside, surface wind three-six-zero nineteen	17:09:55
Hawk No3	Broadcast	Three's out, left, low	17:10:02
Hawk(B)	Broadcast	[C/S]'s visual, I'm turning back out to initial, *{long pause}* clear of everyone	17:10:05
Tower	Hawk(B)	[C/S] *{long pause}* [C/S] continue with Approach stud five	17:10:11

Analysis and Investigation

Military ATM

An Airprox occurred on 9 Mar 16 at 1710, at RAF Valley between two Hawk T2 aircraft. Both aircraft were under an Aerodrome Service with the Valley Aerodrome Controller. Due to the heights involved, the incident was not captured on radar replay. The Closest Point of Approach (CPA) could not be determined without a radar replay; Hawk(A) did not report a CPA and the other pilot reported 150 feet for horizontal/vertical separation.

The following orders apply at RAF Valley:

> **'Controllers Training Guide**
> The Valley standard visual circuit is flown at 1000 feet QFE. The standard Initials join is at 4 DME, 1 NM on deadside between 1000 and 2000 feet QFE. Controllers are taught that, "to ensure adequate separation, pilots are to identify all cct traffic before arriving on the deadside.'
>
> **'Flying Order Book (FOB)**
> Aircraft are normally to join through Initial at 1000 feet QFE. (B04, 2).
> Visual joining ac are responsible for sequencing into the visual circuit and are responsible for ensuring sufficient and safe separation from other traffic. (B04, 3).
> Aircraft commanders should maintain their recovery squawk on joining and within the visual circuit. (B03, 14)
> The instruction 'g*o around'* means that pilots are to discontinue their approach immediately and climb to 1000 ft QFE, turning onto the deadside. (B08, 12).
> When giving a clearance in the visual circuit, Tower is to add pertinent information on any other traffic in order to assist aircrew SA. (B08, 13).'

Hawk(B) had turned onto finals with lowered situational awareness on the joining 3-ship. The pilot was aware of the radar traffic at 8 miles but missed the call on the 3-ship (it is likely that both pilots transmitted simultaneously resulting in a later than usual Initials call). Hawk(B) was uncomfortable with the situation and elected to overshoot and climb above the joining traffic (although the visual circuit traffic would be below or co-height with Initials joiners). As Hawk(B) rolled wings level, the joining traffic was much closer than expected, with Hawk(A) breaking to avoid collision. Two Hawks went underneath Hawk(B) and the other Hawk climbed above; Hawk(B) elected to do nothing as he was 'sandwiched' and just called 'visual' on the RT.

The 3-ship formation were positioning for a right-break in echelon-left formation at 1000ft. The formation were aware of Hawk(B) already in the visual circuit but the reporting pilot (the authorising officer of the formation), was not visual with Hawk(B). The late sighting from the formation lead was reported to be as a result of Hawk(B) going around at an unusual height in a position that they did not expect.

The Aerodrome Controller recalled Hawk(B) calling 'going around at circuit height' immediately followed by a late Initials call from the 3-ship, who had previously been informed '1 in' (which was Hawk(B) on the break turning onto downwind). As the controller passed Traffic Information to the 3-ship on Hawk(B) (as its pilot broke of the approach and turned onto deadside), the formation was already taking emergency avoiding action. The Aerodrome Controller had initially approved the 3-ship join with correct RT, including information on '1 in' the visual circuit. Normally, at the Initials call, the exact position of Hawk(B) would have been passed to the 3-ship. However, the 'initial' call was late (called as 'late Initials'), and the controller passed information '1 just turning onto deadside'; this was 7 seconds prior to the formation No3 reporting that he had avoided 'left and low'. As per the FOB, the controller could have passed pertinent information to help situational awareness at any time but all mandatory calls were made in reply to aircrew RT.

It would appear that the call of 'going-around' from Hawk(B) coincided with the 'late initials' call from the 3-ship, 11 seconds after their previous attempt to call Initials. Both crews were aware of each other but did not have exact position reports or visual acquisition because the information calls designed to provide a fuller picture of aircraft position were 'stepped-on', denying updates. It would be expected that the formation joining the circuit would integrate with aircraft already in the circuit, if they were visual and had specific Traffic Information at the Initials point (at 4 miles, offset deadside by 1 nm).

Hawk(B) reported having a TCAS contact on the formation but not in the position expected; it is not known if the formation had any TCAS information on Hawk(B). The FOB directs that recovery squawks should be maintained in the visual circuit.

A further factor to consider at RAF Valley is that a 'go-around at circuit height' would position aircraft towards deadside at 1000 feet QFE with the joining formation also routing towards the deadside at heights of 1000-2000 feet QFE. As per many military circuits, procedural deconfliction or positive separation from ATC does not always exist; aircrew are trained to separate themselves and integrate with other traffic. RAF Valley are reviewing the need to provide a procedural height difference between traffic on go-arounds and the Initials Point. As with changes to any complex system, procedural deconfliction will have knock-on effects; a higher initials join may conflict with other profiles and will reduce the training and awareness imperative of crews learning to fly at a fast jet training establishment.

UKAB Secretariat

The Hawk pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard[2]. An aircraft operated on or in the vicinity of an aerodrome shall conform with or avoid the pattern of traffic formed by other aircraft in operation[3].

Occurrence Investigation

The 3-ship formation conducted a visual join through initial, with the only circuit traffic being Hawk(B) on the break to touch-and-go. As Hawk(B) was downwind, the Tower Controller received an 8 mile call from Talkdown for a trails approach. This was broadcast as normal to the rest of the circuit. As Hawk(B) turned final, he became concerned that he was not visual with the formation joining visually and initiated a go-around at circuit height. As Hawk(B) pilot broadcast his

[2] SERA.3205 Proximity.
[3] SERA.3225 Operation on and in the Vicinity of an Aerodrome.

intentions the latter half of his transmission was stepped on by the joining formation, possibly calling initial. Hawk(B) therefore did not hear the information passed by them regarding their location, and the formation did not hear that the go around was at circuit height. By the time the 3-ship formation called initial again, they were in a point of confliction with Hawk(B) going around; the formation took their own avoiding action and then re-sequenced back into the circuit.

Comments

HQ Air Command

The visual circuit can be a busy environment, particularly at a flying training establishment. It is incumbent upon the joining traffic to integrate with the traffic already established in the circuit, but it is also vital that the established traffic remain predictable and that both make accurate positional calls (assisted by ATC where necessary). Without access to the deeper investigation at the Station concerned (it has not yet returned all its findings), it appears that the joining formation was caught out by the fact that the single Hawk elected to go-around unexpectedly; this seems to be as a result of the pilot of the single Hawk being unhappy with his academic profile due to a preoccupation with visually acquiring the joining traffic. This was exacerbated by various radio calls being simultaneously transmitted, thus lowering collective SA in the pilots concerned – the formation was not updated on the single Hawk's position and the single Hawk received the formation's 'late initials' call as he commenced his go-around. The unit is considering revisions to the joining and circuit procedures to further laterally and/or vertically separate traffic already established in the circuit from joining traffic.

Summary

An Airprox was reported when a Hawk formation and a singleton Hawk flew into proximity at about 1710 on Wednesday 9th March 2016. The pilots were operating under VFR in VMC in receipt of a military Aerodrome Control Service from RAF Valley Tower.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, 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.

Members first considered the pilots' actions. They noted that, in the normal course of events, regulations required pilots of aircraft joining to integrate with aircraft already in the visual circuit. Additionally, formation leaders were responsible for the successful integration of their formation with such circuit traffic, with instructor or authorising officer oversight when operating with student pilots. That said, members commented that this did not absolve those already in the visual circuit from their responsibilities to avoid collisions, and that hard-and-fast rules could not cater for all situations; airmanship was required to be exercised by all pilots, especially in the visual circuit, in order to ensure safe and efficient operations.

Members with fast-jet experience commented that a 3-ship echelon formation is a relatively unmanoeuvrable configuration once lined up through initials, with few options available to adjust track towards the echelon formation members. Undoubtedly, the student lead pilot would have been concentrating hard on achieving his line-up to the deadside of the runway, and the busy R/T would likely also have simultaneously reduced his capacity as he attempted to make the right calls in the right place. In this respect, members noted that the formation had joined normally through initials for the duty runway, with standard R/T. However, with one aircraft in the visual circuit and two formations joining, a critical R/T transmission had been stepped-on when Hawk(B) pilot transmitted that he was going around at circuit height whilst the joining 3-ship lead pilot transmitted that they were at initial. Crucially, with only previous knowledge that there was '1 in' and no other detail as to Hawk(B)'s position, this missed call degraded the formation's SA with the formation leader probably

searching towards short finals for Hawk(B), who was actually going-around at circuit height, whilst he retransmitted a 'late initials' call.

Some members felt that despite the R/T confusion and actions of the Hawk(B) pilot, it was solely for the joining formation to integrate with traffic already in the visual circuit; they thought that the cause of the Airprox was that the formation had not done so. Others felt that although that was the letter of the law, the Hawk(B) pilot may have allowed himself to become overly concerned with the joining formation (which had resulted in his decision to go around), and that he may have been better served by simply continuing his final turn and overshooting on the runway centreline, thereby remaining predictable and trusting in the joining formation doing so correctly on the deadside. Members discussed these differing views for some time and ultimately agreed that although the joining formation had not integrated effectively, the Hawk(B) pilot knew that the joining formation would be flying through at 1000ft on the deadside, and that a go-around at that height and position could potentially result in conflicttion. With this in mind, members agreed that both pilots had a responsibility to avoid collision in this circumstance, and that the Airprox was best described as a conflict in the visual circuit. Judging from the reported separation and dynamics of the incident, the Board agreed that a serious risk of collision had existed between Hawk(B) and the elements of the formation, and probably between the elements of the formation themselves as they broke out.

The Board then considered ATC actions and noted that the nature of the military visual circuit was such that pilots were responsible for their own sequencing. Whilst controllers had a duty of care to help prevent collision, this conflict had occurred rapidly, with little or no opportunity for effective controller input. A civilian controller member pointed out that the provision of a civilian Aerodrome Control Service was such that the formation would not have been permitted to pass abeam the final turn at circuit height on the deadside whilst another aircraft was turning finals.

The Board were heartened to be informed that RAF Valley were actively reviewing their join procedures and, as a result, demurred from making a formal safety recommendation. Members hoped that the review would lead to a system designed to 'fail-safe', including in the event of missed R/T resulting in degraded SA; in this respect, it was noted that the Valley FOB directed pilots going-around to climb to 1000ft on the deadside, and for joining traffic to do so also at 1000ft on the deadside. The Board recognised that this procedure had been accomplished successfully many thousands of times at Valley, but that this Airprox highlighted the potentially catastrophic results of not successfully doing so in the circumstances of degraded SA.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in the visual circuit.

Degree of Risk: A.