





From	To	Speech Transcription	Time
RAD	Hawk (A)	[Hawk (A) C/S] that traffic is west-northwest of you, one zero miles tracking south indicating 5500	12:25.53
Hawk (A)	RAD	[Hawk (A) C/S] looking we are climbing for a expedite at 12000 feet	12:26.01
RAD	Hawk (A)	[Hawk (A) C/S]	12:26.09
RAD	Hawk (B)	[Hawk (B) C/S] previous traffic left 9 o'clock 4 miles tracking south indicating 12000 feet	12:26.49
Hawk (B)	RAD	[Hawk (B) C/S]	12:26.55
RAD	Hawk (A)	[Hawk (A) C/S] that traffic is err north 1 mile maneuvering no height information	12:27.26
Hawk (B)	Hawk (A)	[Hawk (A) C/S] from [Hawk (B) C/S] I'm on your right 2 o'clock maneuvering away	12:27.31
RAD	Hawk (B)	[Hawk (B) C/S] you still visual with [Hawk (A) C/S]?	12:27.41
Hawk (B)	RAD	No, he is now heading north away	12:27.44
Hawk (A)	?	[Mistaken C/S] I think that is probably an AIRPROX	12:27.51
Hawk (A)	?	[Hawk (A) C/S] that's probably an AIRPROX	12:27.53
Hawk (A)	Hawk (B)	[Hawk (B) C/S] on freq confirm you can see me, I cannot see you, I'm heading north at 4000 feet	12:27.55
Hawk (B)	Hawk (A)	I'm not visual now but I saw you err deconflicting heading north from [Hawk (B) C/S]	12:28.02
RAD	Hawk (A)	You are err both deconflicted from each other now, [Hawk (A) C/S] [Hawk (B) C/S] is in your err south west 4 miles tracking west indicating 5000 feet descending	12:28.11
Hawk (A)	RAD	[Hawk (A) C/S] looking not visual this time maintaining north at 5000 feet	12:28.20
RAD	Hawk (A)	[Hawk (A) C/S]	12:28.25
Hawk (B)	RAD	Err Radar [Hawk (B) C/S] can you confirm I'm to operate in GH central	12:28.35
RAD	Hawk (B)	[Hawk (B) C/S] you are fraged to operate in GH Central but it's class G airspace, you can have more than one singleton operating in that area, it's not sterilized for you	12:28.39
Hawk (B)	RAD	Roger [Hawk (B) C/S] visual with [Hawk (A) C/S]	12:28.49
Hawk (A)	RAD	[Hawk (A) C/S] transiting back to GH north at 5000 feet, we will talk about it on the ground	12:28.54
Hawk (A)	RAD	Radar [Hawk (A) C/S] transiting back to err Mona to stud 5	12:29.45
RAD	Hawk (A)	[Hawk (A) C/S] that's err copied can you just confirm who was it that called AIRPROX on freq	12:29.52
Hawk (A)	RAD	[Hawk (A) C/S] that was me assessed visually	12:29.54
RAD	Hawk (A)	[Hawk (A) C/S] roger thank you, continue with Approach stud 5	12:29.57
Hawk (A)	RAD	Stud 5 [Hawk (A) C/S]	12:29.59
Hawk (B)	RAD	Radar [Hawk (B) C/S] for visual recovery	12:30.11
RAD	Hawk (B)	[Hawk (B) C/S] freecall Approach stud 5 for a visual recovery	12:30.13

## Analysis and Investigation

### Military ATM

The incident occurred on 2 Sep 14 at 1230, in North Wales between two Hawks. Both pilots were under a Traffic Service with the Valley Radar Controller.

At 1225:14 (Figure 1), the controller transmitted, "[Hawk (B) C/S] roger there is currently one other callsign working in the GH area currently in the southern half of North travelling to Central. It's a single Hawk callsign [Hawk (A) C/S]" Hawk (B) pilot requested the height and the controller responded with, "Currently indicating 6000 feet in your left 10 o'clock 8 miles manoeuvring." Hawk (A) pilot then started high energy manoeuvres, including a steep descent, and the Mode C dropped off the radar replay in the descent; the Hawk (B) pilot reported visual at 1225:35.

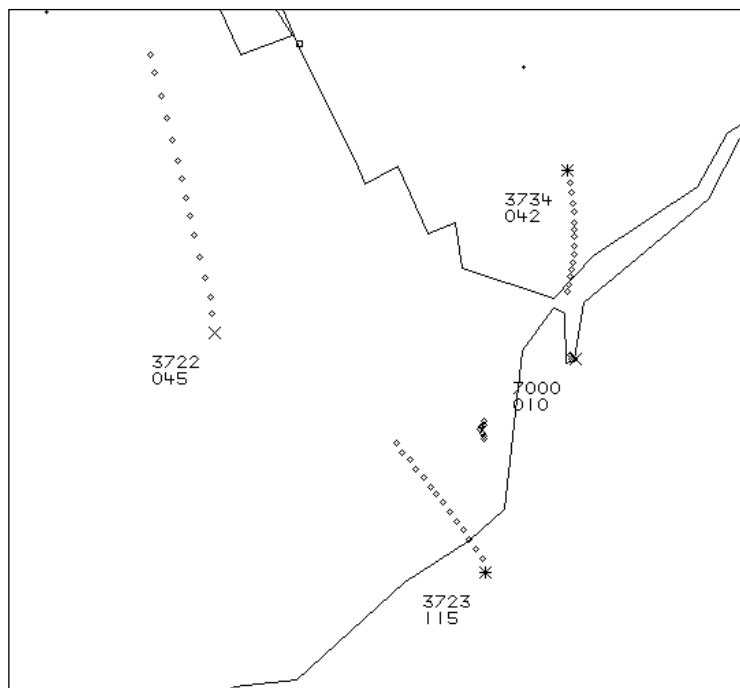


Figure 1: Traffic Information at 1225:14 (Hawk (B) squawk 3722; Hawk (A) squawk 3723)

Hawk (A) pilot requested an update and at 1225:53 (Figure 2); the controller transmitted, “[Hawk (A) C/S] *that traffic is west-northwest of you, one zero miles, tracking south, indicating 5500.*” Hawk (A) pilot responded with, “[Hawk (A) C/S] *looking, we are climbing for a expedite at 12000 feet.*”

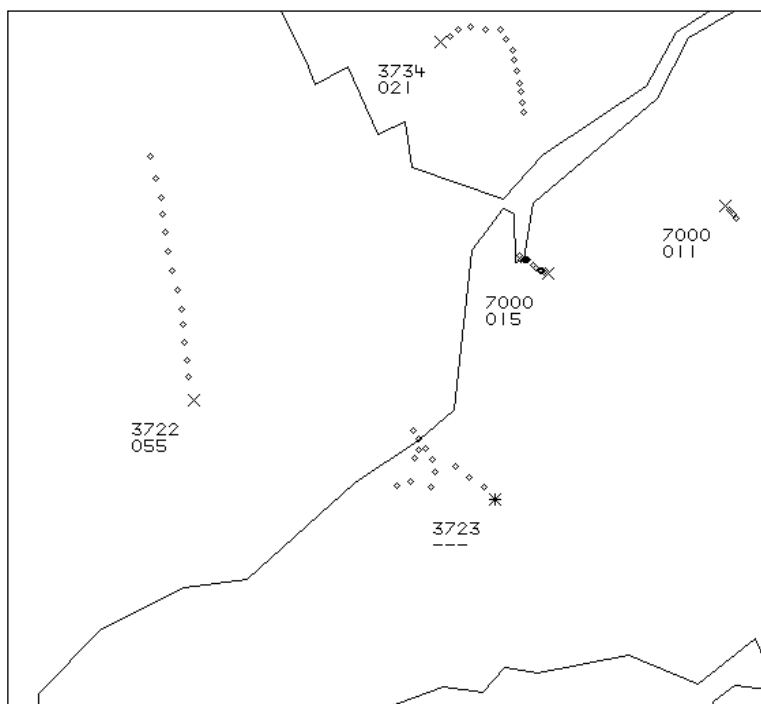


Figure 2: Updated Traffic Information at 1225:53

At 1226:49 (Figure 3), the controller briefed, “[Hawk (B) C/S] *previous traffic left 9 o'clock 4 miles tracking south indicating 12000 feet.*”

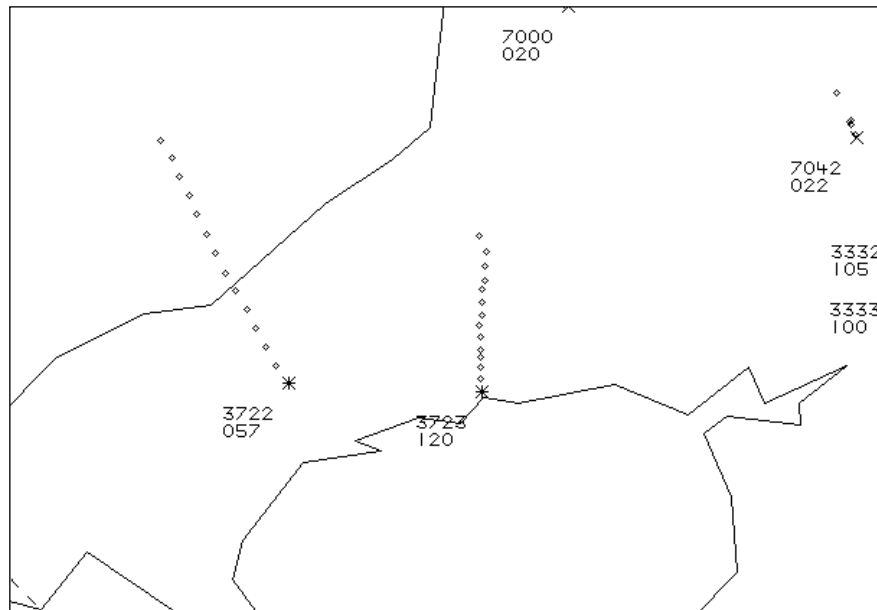


Figure 3: Traffic Information at 1226:49.

At 1227:21 (Figure 4), the aircraft were on a closing geometry.

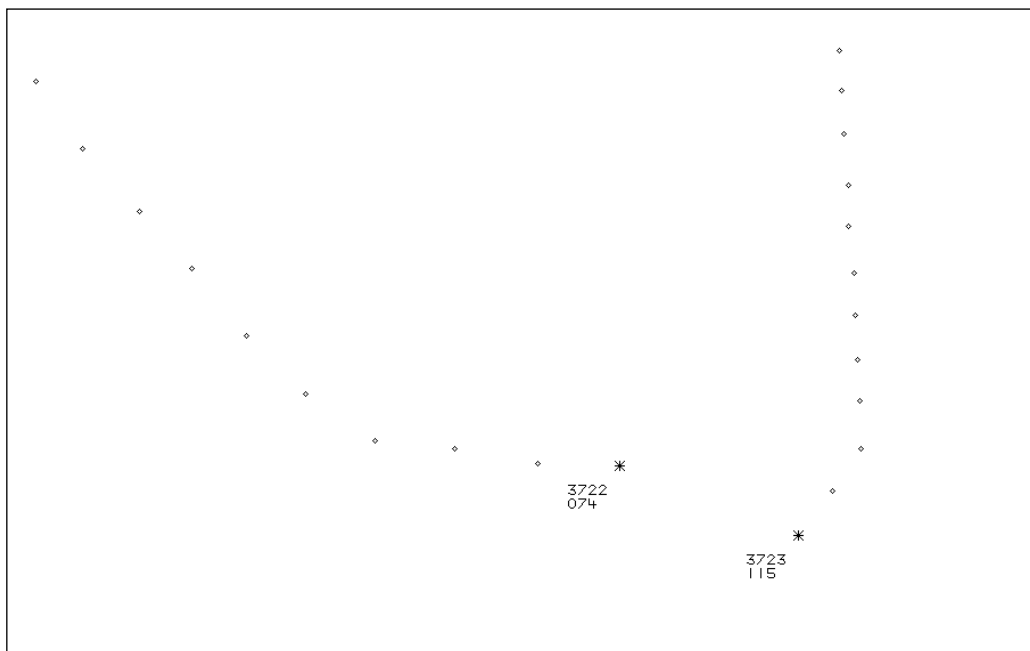


Figure 4: Geometry at 1227:21.

An update was provided at 1227:26 (Figure 5), as, “[Hawk (A) C/S] that traffic is err north 1 mile manoeuvring no height information.”

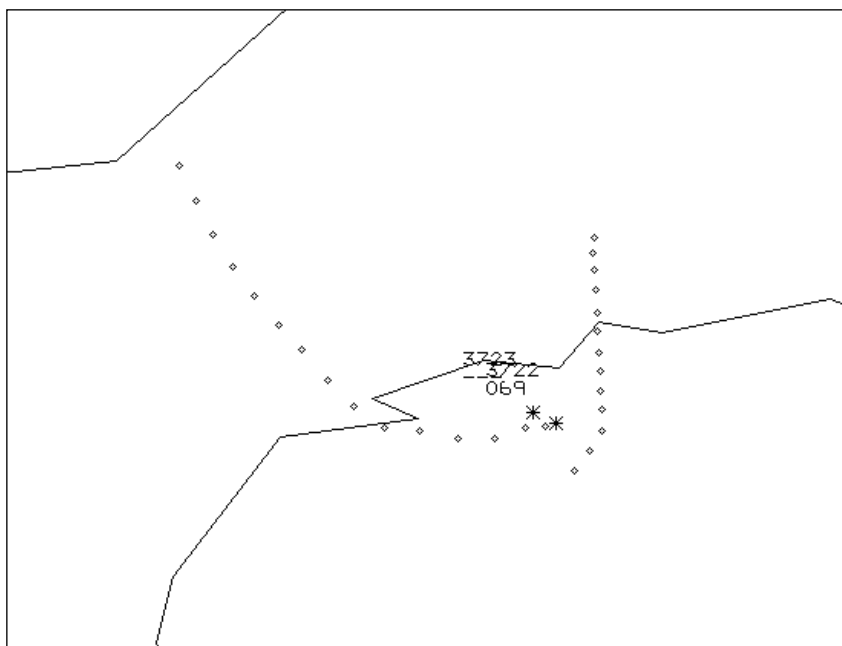


Figure 5: Traffic update at 1227:26

Hawk (B) pilot transmitted at 1227:32 (Figure 6), “[Hawk (A) C/S] from [Hawk (B) C/S] I’m on your right 2 o’clock manoeuvring away.” The CPA was difficult to establish because the Hawk (A) Mode C return disappeared from radar; the closest horizontal separation on radar was 0.5nm, between 1227:28 and 1227:44.

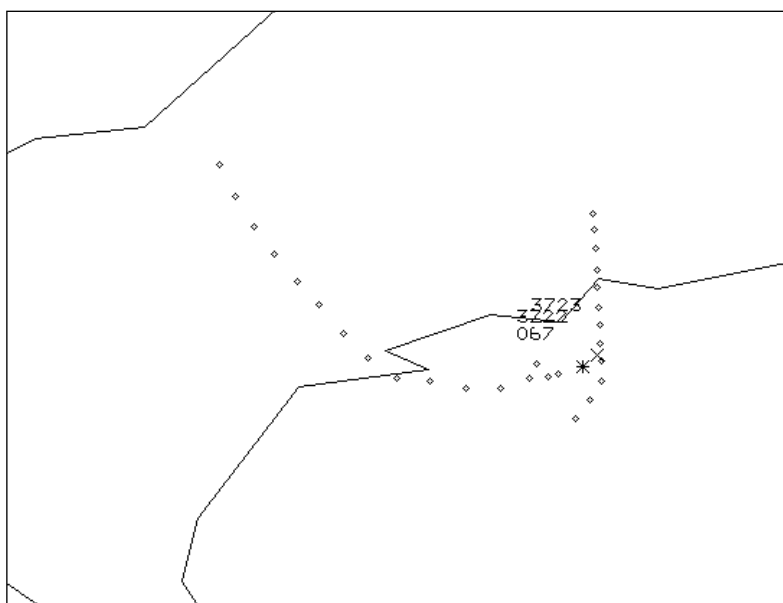


Figure 6: 1227:32 at approximate CPA

The Valley Radar Controller provided Traffic Information and updates, as per the provision of a Traffic Service. The controller was bandboxing frequencies (Valley Radar UHF, LARS/Zone VHF and Rotary Wing Low Level) and the dedicated GH console was closed, due to lunch-breaks and a low intensity flying programme. The controller had a medium-to-high workload but maintained information to the Hawk pilots, despite several landline calls and lengthy transmissions on the LARS VHF frequency.

Neither aircraft were fitted with ACAS or TAS and both pilots were made aware of the other aircraft from Traffic Information. The appropriate type of service was selected for the conditions and requests for updates and information from the occurrence reports demonstrated that the pilots were factoring in the position of the other aircraft when selecting airspace and when to

conduct high energy manoeuvres. Following information, at 1226:49, that Hawk (A) was in Hawk (B) pilot's 9 o'clock position, tracking south, the pilot subsequently routed left, to the east, closing the geometry. Hawk (A) pilot was informed of the position and altitude of Hawk (B) and responded with 'looking' at 1226:01; Hawk (A) pilot felt that there was enough separation to descend to a similar altitude and turned onto a north-westerly track, closing the geometry.

The normal barriers to an Airprox would be ACAS/TAS, 'see-and-avoid', radar-derived Traffic Information and deconfliction procedures. ACAS/TAS was an absent barrier; information was passed from ATC and updates were passed as the controller workload allowed. The pilots were aware of their lookout responsibilities, they were entitled to be in the GH corridor as singletons and they made efforts to maintain SA of the other aircraft's position. The partial/absent barriers combined with the limitations of 'see-and-avoid' contributed to a loss of satisfactory separation. The relatively small Hawk present challenges for pilots to 'see-and-avoid'; the black colour scheme should provide contrast with the background sky on a VMC day but not necessarily with the ground. Additionally, the small size of a Hawk, the limitations of scan and field of view in high energy manoeuvres, and the high workload helped contribute to a late sighting and potential loss of situational awareness.

### **UKAB Secretariat**

Both pilots shared an equal responsibility for collision avoidance and not to fly into such proximity as to create a danger of collision<sup>3</sup>. If the incident geometry is considered as converging then the Hawk pilot on the left was required to give way to the other Hawk<sup>4</sup>. If the incident geometry is considered as head-on then both pilots were required to turn to the right<sup>5</sup>, notwithstanding their responsibility to avoid collision.

## **Comments**

### **HQ Air Command**

This incident hinges around the transmission of Traffic Information to Hawk (B) pilot at 1226:49, where the pilot was informed that Hawk (A) was in his '... left 9 o'clock at 4 miles ...'. Following receipt of this information, the pilot of Hawk (B) then turned left and was probably trying to visually acquire Hawk (A) on the inside of the turn. Hawk (A) was, in fact, in Hawk (B) pilot's left 10.30 as the pilot of Hawk (B) commenced his turn and thus the pilot of Hawk (B) unintentionally set up a closing flight path on Hawk (A). The transmission of Traffic Information to the pilot of Hawk (A) at 1227:26 would have cued both pilots' eyes into the correct volume of airspace. Traffic Information was passed shortly after that by the pilot of Hawk (B), who announced his relative position to Hawk (A) and manoeuvred away. This highlights the importance of timely and *accurate* Traffic Information as a barrier to MAC, as well as vigilant lookout. It is also highly likely that had either aircraft been equipped with ACAS or TAS then pilot SA with respect to relative positions would have been greatly improved.

## **Summary**

An Airprox was reported when two Hawk T1s flew into proximity at 1227 on Tuesday 2<sup>nd</sup> September 2014. Both pilots were operating under VFR in VMC and both were in receipt of a Traffic Service from Valley Radar.

<sup>3</sup> Rules of the Air 2007 (as amended), Rule 8 (Avoiding aerial collisions).

<sup>4</sup> *ibid.*, Rule 9 (Converging).

<sup>5</sup> *ibid.*, Rule 10 (Approaching head-on).

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available consisted of reports from the pilots of both aircraft, a transcript of the relevant RT frequency, radar video recordings, a report from the air traffic controller involved and reports from the appropriate ATC and operating authorities.

In considering the pilots' actions, the Board noted that the pilot of Hawk (B) was undertaking his first solo on type and that this may have affected his capacity somewhat. Notwithstanding, the degree of dual instructional and synthetic training available to pilots at Valley prior to their first solo sortie was such that this would likely not of itself present a significant factor. Members quickly agreed that although the pilot of Hawk (B) had seen Hawk (A) at range he subsequently lost visual contact and that neither pilot had subsequently seen the other until CPA. Both pilots were passed Traffic Information as they approached each other but it was unfortunate that the timing of this compared to the highly dynamic nature of the aircrafts' manoeuvring meant that it probably contributed to an erroneous mental model of the geometry. Hawk (B) pilot was initially told that Hawk (A) was 'currently indicating 6000 feet in your left 10 o'clock, 8 miles, maneuvering, to which he replied that he was visual. Hawk (A) pilot was sufficiently concerned by the proximity of Hawk (B) that he requested an update of its position about 15sec later, to which he was told 'traffic [Hawk (B)] is west-northwest of you, one zero miles tracking south indicating 5500'. Members agreed this probably resulted in him believing Hawk (B) would pass west abeam his position and would not be a factor for his maximum-rate turn exercise. As it happened, Hawk (B) pilot's track was just east of south, and he turned further left on to a southwesterly track shortly after the Traffic Information to Hawk (A) pilot. As a result, Hawk (B) was actually tracking more towards Hawk (A) and therefore reducing the separation. Traffic Information was passed to Hawk (B) pilot about a minute later, but this unfortunately reported Hawk (A) as being left 9 o'clock to him when he was further forward in the left 1030 position. Members felt that the Hawk (B) pilot probably then lowered his left wing whilst looking to the left 9 o'clock, which resulted in him turning gently left, further reducing separation. At this point, Hawk (A) pilot, on hearing that he was in Hawk (B)'s left 9 o'clock would probably have had his mental model of Hawk (B) passing west abeam reinforced, albeit at reduced range. Hawk (A) pilot was then given further Traffic Information on Hawk (B) 40sec later, 'north 1 mile maneuvering no height information', by which time it was too late to take action to affect separation. Members agreed that the pilots' mental models were such that they believed themselves to be further separated than they were; because neither pilot was visual with the other aircraft until at or near CPA, the Board agreed that the root cause of the Airprox was a non-sighting by both pilots.

Considering the controller's actions, members agreed that it was unfortunate that one of the Traffic Information calls was not accurate (left 9 o'clock rather than left 1030), but they noted the likely highly dynamic nature of the aircraft tracks and the fact that Hawk (B) pilot had previously called visual with Hawk (A) so the controller could therefore reasonably expect him to take avoiding action himself. Hawk (B) pilot did not communicate that he had subsequently lost visual on Hawk (A), and the dynamic manoeuvring, along with the incorrect Traffic Information, allowed Hawk (A) pilot to form an incorrect mental model of the geometry. In the event, both pilots reported separation at CPA which was supported by the radar recording and which would, in the normal course of events, be considered as non-risk bearing. However, members were keenly aware of the high closing speeds and the high-g maximum-performance descending turn of Hawk (A). This high-energy dynamic situation was such that the time available to take avoiding action before collision was significantly reduced. After some discussion, members agreed by a majority that chance had played a major part in events.

Members noted that Valley had gone to considerable effort to design safe yet flexible airspace within which to achieve its training task but commented that, in the absence of TAS/TCAS in the aircraft involved, this Airprox demonstrated that the ultimate mitigation against mid-air collision in Class G airspace was, and would remain, good situational awareness and an effective lookout. Notwithstanding, some members were concerned that Valley's delineation of airspace into GH areas might be a cause for concern in itself due to the funneling effect that resulted at times. But they recognized that there were also benefits in deconflicting Valley aircraft, and commented that good communication was the key to ensuring that pilots knew who was where in the GH areas.



**PART C: ASSESSMENT OF CAUSE AND RISK**

Cause: Effectively a non-sighting by both pilots.

Degree of Risk: A.

ERC Score<sup>6</sup>: 100.

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<sup>6</sup> Although the Event Risk Classification (ERC) trial had been formally terminated for future development at the time of the Board, for data continuity and consistency purposes, Director UKAB and the UKAB Secretariat provided a shadow assessment of ERC.