

AIRPROX REPORT No 2014209

Date/Time: 23 Oct 2014 1123Z

Position: 5100N 00237W
(Yeovilton Visual Circuit)

Airspace: Yeovilton ATZ (Class: G)

Aircraft 1 Aircraft 2

Type: Hawk T2 Wildcat

Operator: HQ Air (Trg) RN

Alt/FL: NK 400ft
QFE (1009hPa) QFE (1009hPa)

Conditions: VMC VMC

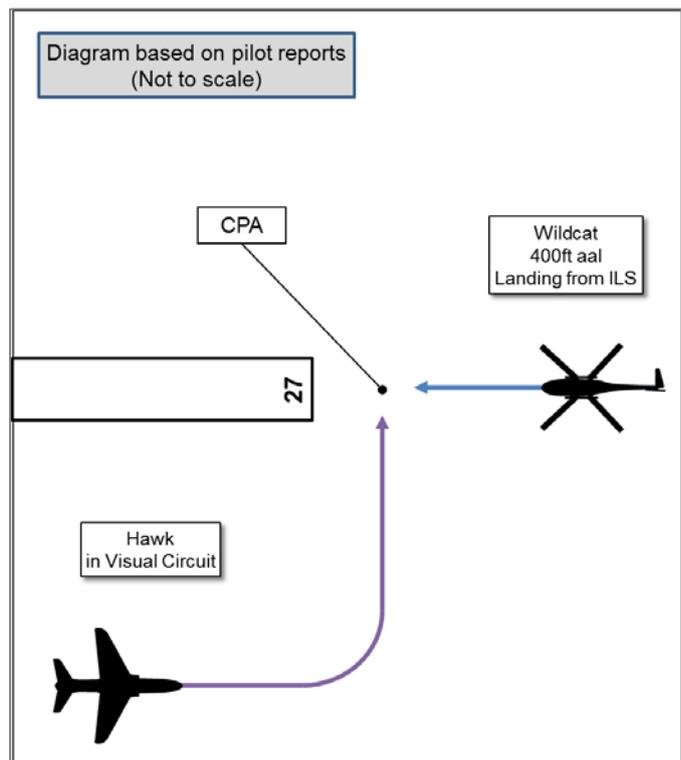
Visibility: 10km 15km

Reported Separation:

0ft V/200ft H 50ft V/NK H

Recorded Separation:

NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT reports flying a black aircraft, at 157kt, under VFR in VMC, with navigation, strobe, landing and conspicuity lights illuminated and squawking transponder Modes 3/A, C and S and TCAS fitted. The sortie was a convex¹ sortie for an ab-initio student, which was to include general handling and circuit practice; due to poor weather at RAF Valley, the crew planned to use RNAS Yeovilton for the visual circuit work. On joining the visual circuit, ATC instructed the crew to 'squawk standby' and they also selected the TCAS to standby mode. The student was not familiar with Yeovilton; it was 'a testing environment' for consolidation work due to the busy circuit, with both rotary and fixed-wing traffic, instrument traffic and multiple runway operations with both RW22 and RW27 in use. Following their downwind call to Tower, they were informed that there were 'two ahead'; however, the Hawk pilot assumed that the aircraft which was No1 was ahead of the other Hawk which he could see directly in front of him, and that it was therefore not a factor. The student commenced the final turn and, although the Hawk instructor was aware of another aircraft making an instrument approach, he did not perceive it to be a problem. The student delayed the 'final gear down' call because his checks became protracted, and Tower made a transmission to another aircraft on the ground, and so the student's 'final' call was made as they approached 500ft. As they descended through 400ft, Tower responded to the 'final' call with an instruction to 'go around'; the Hawk crew complied immediately. At the same time both the instructor and the student saw the Wildcat on their right-hand side in close proximity; the Wildcat was taking avoiding action. The instructor took control of the Hawk and landed from the subsequent circuit.

He assessed the risk of collision as 'High'.

THE WILDCAT PILOT reports flying a grey aircraft with upper and lower strobe and steady, bright navigation lights illuminated, and squawking transponder Modes 3/A, C and S; TCAS was not fitted. He was sitting in the left-hand seat, operating as the instructor and aircraft commander; the right-hand seat was occupied by a 'conversion student', who was the handling pilot during the approach, and who was using an IF hood to simulate IMC. They were descending on an ILS approach to RW27, in receipt of a Traffic Service from the Talkdown Controller, when they received Traffic Information on two Hawks operating in the left-hand visual circuit. The Wildcat instructor could see both Hawks and, as the helicopter crew were given clearance to land on RW27, they were passed

¹ Conversion Exercise: part of a training programme to convert a pilot from one aircraft type to another

further Traffic Information that the first Hawk was going around; the instructor watched as it went around at circuit height. The Wildcat crew continued their approach on the ILS while the second Hawk continued to track downwind. The instructor saw the second Hawk begin a left-hand turn and appeared to be descending, so he monitored it to ensure that it remained at a safe distance; it 'very quickly' became clear that the Hawk's trajectory placed it on a collision course with the Wildcat and so the instructor immediately took control from the conversion student and applied significant aft cyclic and collective to achieve a rapid climb and deceleration. They saw the Hawk pass under the nose of the helicopter at a minimum range of approximately 50ft during the avoiding action. The instructor reported an Airprox on radio and continued to land.

He assessed the risk of collision as 'Very High'.

THE TOWER CONTROLLER reports acting as an OJTI² for a trainee, with two Hawks in the visual circuit, two Wildcats on Talkdown, two more Hawks at the RW27 holding-point waiting for departure, and several other rotary-wing aircraft carrying out VFR arrivals and departures. The first Hawk in the circuit reported downwind to touch-and-go and was informed "one ahead" because the Wildcat was ahead on an ILS approach to land. The second Hawk [the Airprox Hawk] reported downwind and was informed "two ahead". The Wildcat was given clearance to land at a range of three miles, and the pilot of the first Hawk instigated his own go-around. The crew of the second Hawk then asked for an update on the Wildcat and, using the Hi-Brite, the Tower Controller told them that it was at two miles. At this point the crew of another Wildcat requested departure from Point Zulu, and after confirming that they intended to depart VFR to the south, Tower cleared them to take-off. The crew of the second Hawk then 'called finals' and Tower instructed them to go-around. The Tower controller then saw the second Hawk cross from right-to-left (from his perspective) ahead of the Wildcat on ILS, and the Wildcat made an immediate avoiding-action climb.

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

THE PAR CONTROLLER reports that the Wildcat was conducting an ILS to RW27 and, at 2.5nm, the crew were issued with a clearance to 'Land Runway 27 with two in Hawks', and the helicopter crew acknowledged. When the Wildcat was at 1.5nm from touchdown Tower reported 'One Hawk going around at circuit height' and this Traffic Information was passed to the Wildcat crew, who reported visual with the Hawk. When the helicopter reached 1nm from touchdown, the PAR controller saw its radar return climb well above the glide-path and the pilot reported an Airprox with the Hawk in the visual circuit; the controller could not see the Hawk on the PAR screen.

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

THE RADAR SUPERVISOR reports that whilst observing the Wildcat's ILS approach being monitored by the PAR controller he glanced out of the radar room window, which looks out onto the RW27 approach lane. He saw the Wildcat approaching the airfield and watched as a Hawk went-around at circuit height. He then saw the second Hawk turn inbound, and immediately asked the PAR Controller if the Wildcat had been given a positive clearance. PAR confirmed that it had and, shortly afterwards, the Wildcat could be seen to climb sharply; its crew subsequently informed the PAR Controller that they wished to report an Airprox. The Radar Supervisor reports that there was not sufficient time to query the intentions of the Hawk crew, or to offer the Wildcat crew avoiding-action after the Hawk turned inbound.

Factual Background

The weather at Yeovilton at 1050 was recorded as:

METAR EGDY 231050Z 21012KT 9999 FEW012 SCT020 BKN070 15/13 Q1019 WHT BECMG 9999 SCT012 GRN

² On-the-job Training Instructor

Analysis and Investigation

Military ATM

Due to the low heights involved, the incident was not recorded on area radar. A section of the tape transcripts is shown below:

From	To	Speech Transcription	Time
PAR	Wildcat	[Wildcat C/S] final clearance delayed, continue approach.	1120:23
PAR Asst	Tower	I L S 3 miles runway 27 <i>{Broadcast on Tower Frequency}</i>	1120:26
Tower	PAR Asst	Radar [Wildcat C/S] cleared to land runway 27 circuit correction 2 in Hawks	1120:28
Hawk	Tower	[Hawk C/S] downwind touch and go.	1120:36
Tower	Hawk	[Hawk C/S] two ahead, surface wind 220, 11 knots.	1120:38
PAR	Wildcat	[Wildcat C/S] cleared to land runway 27, two Hawks in.	1120:39
Wildcat	PAR	Cleared to land [Wildcat C/S].	1120:43
Hawk (Non-airprox)	Tower	[Hawk C/S] going around.	1120:44
Recon	Tower	[Recon C/S] taxi point east, spot 13, channel 2.	1120:49
Wildcat (Non-airprox)	Tower	Tower [Wildcat C/S] ready for departure. <i>{aircraft is held and departure details confirmed}</i>	1120:58
PAR	Wildcat	[Wildcat C/S] there is one Hawk going around at circuit height.	1121:01
Wildcat	PAR	Visual.	1121:05
Hawk	Tower	[Hawk C/S] finals gear down.	1121:26
Tower	Hawk	[Hawk C/S] go around.	1121:31
Hawk	Tower	Going around [Hawk C/S].	1121:34
Wildcat	PAR	[Wildcat C/S] Airprox with a Hawk, finals 27.	1121:43

The Talkdown controller conducted the QFE check for the ILS and clearance to land was provided with Traffic Information of '2 Hawks in'. The Talkdown controller then amplified at 1129:44 that one Hawk was going around; this was the non-Airprox Hawk in the visual circuit. The Wildcat then climbed and reported an Airprox with a Hawk; due to the narrow beam and precision of PAR, the Airprox-Hawk did not appear on the controller's screen. The Radar Supervisor had spotted the Wildcat visually, from the Approach Room window, and had confirmed with the PAR controller that they had received a positive clearance.

The Tower controller was under training in a high and demanding workload environment, with 8 aircraft on frequency and the visual circuit was at its full capacity with 4 aircraft. At the downwind call, the Hawk had been correctly passed Traffic Information on '2 ahead', which were the other Hawk and the Wildcat. The other Hawk had called going-around and then the Tower controller was called by two rotary callsigns for taxi and departure. Upon receiving the 'finals' call from the Airprox Hawk, the controller issued the instruction to 'go around' within five seconds. At the point of the go-around instruction, the Tower control team reported that the Hawk passed right to left, ahead of the Wildcat, causing the avoiding action climb. The Tower controller had made good use of Hi-Brite to inform the visual circuit traffic of the position of the IF traffic. In the circumstances, ATC had expected the Hawk to extend downwind to cater for the Wildcat on finals.

The Wildcat pilot was on an ILS approach in VMC and this enabled visual acquisition of the both Hawks. The instructor had maintained a good lookout and witnessed the first Hawk go-around at circuit height and the second Hawk turn left and descend onto finals. The instructor was able to monitor the student and the Hawk to the point that he was able to take control of the aircraft and instigate avoiding action.

The Hawk pilot was also instructing, in a busy circuit in an unfamiliar environment. The Hawk pilot had made a late decision to fly at Yeovilton when the weather at Valley had deteriorated. The

workload for instructor and student was high and the aircraft was instructed to 'squawk standby' placing TCAS in standby mode. The instructor was informed of the '2 ahead' and had assumed that the other aircraft was in front of the Hawk ahead and was not a factor. Sighting a Wildcat on the ground may have also led to the perception in the Hawk cockpit that the radar traffic had landed. The finals call was protracted because of delayed checks by the student and RT by another aircraft on frequency. The finals call was estimated at 500 feet and the go-around was issued at 400 feet, as the Hawk crew became visual with the Wildcat, on the right, taking avoiding action.

The barriers to an incident in the visual circuit would normally be Traffic Information, lookout and sound integration procedures. The role of TCAS as a barrier in a visual circuit was also considered in the unit investigation; by squawking standby, the Hawk pilot had placed TCAS on standby mode in the visual circuit. The ADC passed accurate Traffic Information about circuit/IFR traffic and the PAR controller provided correct clearances amplified with Traffic Information. The Wildcat was visual with both jets at range and the instructor maintained visual with the Airprox Hawk on finals; ultimately, the Wildcat instructor's visual acquisition allowed for avoiding action to prevent the risk of collision. Had normal circuit procedures been followed, a finals call would have resulted in a 'go around' at circuit height or a 'continue' with verbal confirmation of visual contact with the Wildcat. The Hawk crew were dealing with an unfamiliar environment that was busy, particularly with numerous RT calls; the protracted checks and belief that the instrument traffic was not a factor, increased workload in the cockpit and added to the perception that the crew were clear of the Wildcat.

The occurrence reports were open and detailed and this led to a comprehensive Occurrence Safety Investigation at the unit. The in-depth investigation led to a deeper understanding of the contributory factors and a number of recommendations.

UKAB Secretariat

Notwithstanding any ATC clearance, the aircraft commanders and handling pilots were required to take all possible measures to ensure that their aircraft did not collide with other aircraft and were not flown in such proximity to other aircraft as to create a danger of collision.³

The Yeovilton Tower controller had communicated the order of landing to the Hawk crew and they were required to comply with that order by sequencing behind the Wildcat, who's pilot was on final approach to land.⁴

Occurrence Investigation

The Hawk crew were conducting an instructional sortie which involved a land-away at RNAS Yeovilton; this was due to poor weather conditions at Valley and was a late notice change of plan. The Hawk was being flown by a student pilot and an instructor.

On the way to Yeovilton the student was already having difficulties with the sortie and required more instruction than usual, and was assessed as 'behind the aircraft' at this point by the instructor. They conducted a PAR join to RW27; the PAR was not completed successfully.

There was a moderate amount of traffic operating around the airfield at this time. However, as Valley is quieter, this amount of traffic was seen as busy by the Hawk crew. This caused an increase in workload for the trainee pilot in addition to flying in an unfamiliar location.

The student had been unable to identify what went wrong with the PAR, which led the crew to continue discussing it while the Hawk joined the visual circuit. After calling 'Downwind, Touch and

³ MAA Regulatory Article 2307(1), Rules of the Air, Avoiding Aerial Collisions

⁴ MAA Regulatory Article 2307(1), Rules of the Air, Aircraft Landing

Go', the student laboured over the checks, which resulted in a late "Short final, gear down" call; the crew elected to go around.

A Wildcat [not the Airprox helicopter] was at 4nm on an ILS to RW27 at the time of the Hawk's first circuit. While the Wildcat continued its approach, the tower continued to communicate its range as 3nm, then 'cleared to land'. During this time the student Hawk pilot was talking excessively, and missed some of the communications on the frequency. The student had lost some situational awareness at this point, and the instructor was focusing on the student's difficulties in operating the aircraft; the student had to ask twice for the range of the ILS traffic. The Hawk crew reported downwind for a touch-and-go on their second circuit and were informed the Wildcat was at 2nm; the student reported visual with it then extended downwind behind to maintain visual contact with the other Hawk and the Wildcat.

At 11:19:19 a second Wildcat [the Airprox helicopter], was reported at 5nm to RW27, and was also conducting an ILS. The first Wildcat had vacated the runway to the north. The non-Airprox Hawk crew reported downwind for a touch-and-go and were informed that there was one ahead, and they elected to go around at circuit height.

During this time the Airprox Hawk crew had continued their circuit after extending downwind behind the 1st Wildcat; the student was still labouring over the checks. Both crew members confirmed they were aware of the Wildcat making its approach; however, there was no confirmation of a visual sighting. The student transmitted 'downwind touch-and-go' and was told there were two aircraft ahead. The student again found it difficult to complete the checks during the downwind leg, and was flying an untidy circuit (as seen on the HUD recording). The instructor was, again, focused on what he assessed as a struggling pilot. This caused both crew members to lose situational awareness at this point, with both later reporting that they had assumed that the Wildcat had already landed. The amount of talk on the Hawk's Cockpit Voice Recorder was excessive during this period, whilst a lot of information was being passed on the Tower frequency in relation to the airfield traffic.

A third Wildcat was now departing from Point Zulu, and the Tower Control team was focused on the route of departure, and all stated they were watching the departure from Zulu, and were expecting the Hawk to go-around or extend behind the Airprox Wildcat, which had just been given clearance to land at 3nm.

The Hawk student was still struggling with the sortie, and failed to complete the checks and call finals by the end of the downwind leg. Both members of the Hawk crew had lost situational-awareness and believed they had a clear approach to RW27. They had already begun their approach, but their 'final' call was further delayed by waiting for a clear break on the Tower frequency. The Hawk crew then descended to 380ft after calling finals. At this point it was too late for the tower to react because the Hawk was too far into its approach.

The Wildcat was being flown by a pilot who was equipped with a Hood for Instrument Flying. An instructor was in the left-hand seat of the helicopter and was instructing the other pilot. The instructor confirmed visual with, and having situational awareness of, all the traffic in the visual circuit, and was watching the two Hawks making their downwind leg towards him. The instructor confirmed that the first Hawk approached and went around at circuit height above him; he then watched The second Hawk turn-in and begin to descend. The Wildcat instructor became aware that something wasn't right about the flight path of the Hawk, and they began to focus on what the Hawk was doing. The Hawk continued to turn-in, and descend, and began to fly towards the Wildcat. The instructor had to take control of the helicopter, and took evasive action to avoid the Hawk. This resulted in the Wildcat avoiding a collision with the Hawk, which flew directly underneath.

Comments

HQ Air Command

This incident shows that individual situational awareness can vary greatly. The crew of the Airprox Hawk believed that they were clear of the instrument traffic and so commenced their final approach; the crew of the Airprox Wildcat were visual with both Hawks in the circuit and assumed that the Airprox Hawk would go around at circuit height (as the previous Hawk had done); the Tower Controller assumed that the Airprox Hawk would either extend downwind for the instrument traffic (as it had done on a previous circuit) or go around. Additionally, the team in the VCR⁵ allowed their collective attention to be drawn to a rotary VFR departure at a critical moment. Ultimately, differing perceptions of the same situation led to this Airprox; fortunately the instructor in the Airprox Wildcat was visual with the conflicting traffic throughout and took avoiding action, albeit quite late.

Summary

An Airprox was reported between a Hawk, which was flying in the visual circuit in communication with the Yeovilton Tower, and a Wildcat, which was completing an ILS to land on RW27 in communication with Yeovilton Talkdown. Both aircraft were being operated on instructional sorties, with high workloads, in VMC; the Wildcat student was flying whilst wearing a hood to simulate IMC. Both pilots had been passed Traffic Information on the other aircraft, the Wildcat crew had been cleared to land on RW27 and the Hawk crew had been informed that the Wildcat was No1 to land.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both aircraft, transcripts of the relevant RT frequencies, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board noted that the Hawk T2 was fitted with a TCAS system, which could have alerted the pilots to the developing conflict and offered resolution advice. Members wondered why they had been instructed to turn their SSR (and thus TCAS) off and were informed that, until recently, no Yeovilton based aircraft had been TCAS equipped so it was normal practice for Mode C to be turned off in the visual circuit in order to reduce clutter on the ATC radar screens; this policy has since been changed to allow TCAS to be effective in the Yeovilton visual circuit.

The Board then discussed the role of the Tower Controller; the controller's workload had been high but, nonetheless, members agreed that he had passed timely Traffic Information and sent the Hawk crew around as soon as he had had the opportunity. Given the traffic levels the Board agreed that the Tower Controller could not have done more to prevent the conflict.

Turning to the Hawk crew, the Board noted that they had been given Traffic Information on the Wildcat when they were downwind. Members were initially surprised that the instructor had allowed the student to turn finals and opined that he could have taken control and initiated a go-around at this point. However, following discussion, members thought it likely that the instructor had misjudged the speed differential between the Hawk and the Wildcat, and that he had associated the Traffic Information with another Wildcat he had seen taxiing off the runway, so he had not perceived a threat in allowing the student to continue. Indeed, having already had more than one unsatisfactory approach, it was likely that the instructor was endeavouring to allow the student a successful landing at this point. It was clear to the Board that neither of the Airprox Hawk pilots had correctly assimilated the Traffic Information and had lost full situational awareness. There was then considerable discussion about the human factors elements which could have lead to this loss of situational awareness. It was noted that the student pilot had been struggling and, despite assertions that RAF Valley had an open and honest culture, he had perhaps felt that declaring himself fatigued would

⁵ Visual Control Room – the Tower.

have been seen as a sign of weakness during flying training. Given that students are always likely to feel under pressure to achieve, and that an instructor will always have to work harder to develop and manage a struggling student, the Board felt that it may have been wiser to have delayed this sortie rather than commit an already struggling student to visiting a busy airfield that neither he nor his instructor were familiar with and which was operating mixed fast-jet and helicopter traffic.

This incident was clearly the culmination of a complicated sequence of events. The Board noted that a full occurrence investigation had been carried out, and agreed that the cause of the Airprox was that the Hawk crew had lost Situational Awareness of the Wildcat's position and had turned into conflict with it. In considering the degree of risk, there was some debate about whether this was Category A (because the separation had been so close), or if it had been Category B (because the Wildcat pilot's actions had prevented the situation worsening). In the end, the Board noted that the Wildcat pilot had kept the Hawk in sight throughout its final turn and, despite being surprised by the closing trajectory, he had been able to take late but effective avoiding action. As a result, the Board decided that the degree of risk associated with this Airprox was Category B.

PART C: ASSESSMENT OF CAUSE AND RISK

<u>Cause:</u>	The Hawk crew lost Situational Awareness of the Wildcat's position and turned into conflict with it.
<u>Degree of Risk:</u>	B.
<u>ERC Score</u> ⁶ :	20.

⁶ 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.