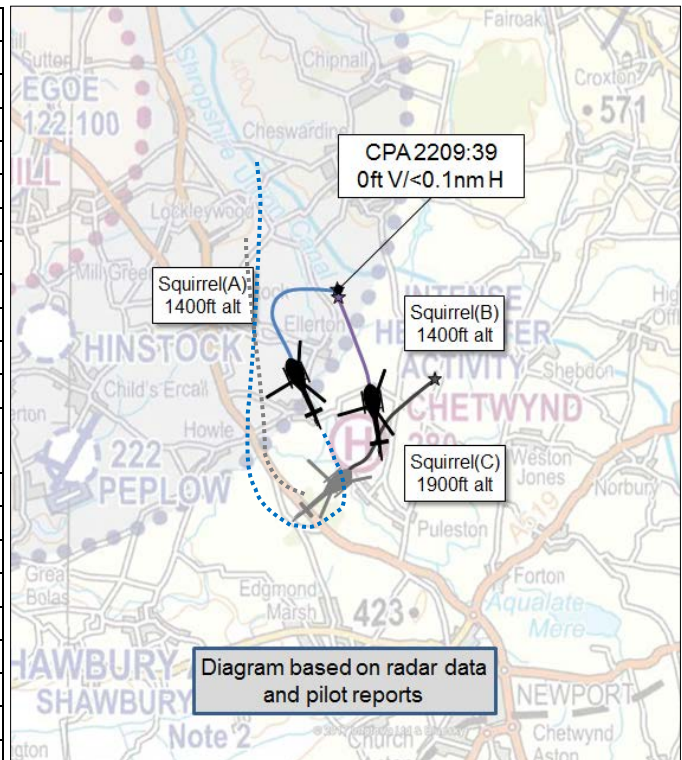


AIRPROX REPORT No 2017143

Date: 05 Jul 2017 Time: 2215Z Position: 5250N 00225W Location: 1.5nm North Chetwynd RLG

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Squirrel(A)	Squirrel(B)
Operator	HQ Air (Trg)	HQ Air (Trg)
Airspace	Chetwynd RLG	Chetwynd RLG
Class	G	G
Rules	VFR	VFR
Service	Basic	Basic
Provider	Shawbury	Shawbury
Altitude/FL	1400ft	1400ft
Transponder	On/C, S	State/Modes
Reported		
Colours	Black, Yellow	Black, Yellow
Lighting	Position, Anti Col	Nav, Strobe
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	1000ft	1000ft
Altimeter	QFE (1009hPa)	QFE (1008hPa)
Heading	110°	350°
Speed	90kt	90kt
ACAS/TAS	TAS	TAS
Alert	TA	TA
Separation		
Reported	150ft V/NK H	<100ft V/0ft H
Recorded	0ft V/<0.1nm H	



THE SQUIRREL(A) PILOT reports that he was demonstrating to his student a join at Chetwynd for night circuit consolidation. The landing direction was 350° with a RH circuit. Because 2 other aircraft were already in the circuit at Chetwynd, his initial intention was to hold to the North, but Squirrel(C) stated he was departing in 2 minutes. He decided to complete an overhead join (deadside) at 1500ft on the Shawbury QFE initially routing to the West of Chetwynd before completing a left-hand turn to position deadside on a track of 350 deg. As the instructor, he was seated in the left-hand seat and was the handling pilot at the time. On reaching the overhead, his mental picture was that Squirrel(C) had departed Chetwynd to the NE, whilst the second aircraft, Squirrel(B), was visible on the night-T. Squirrel(B) pilot called departing the night-T, and Squirrel(A) pilot transmitted that he would descend deadside and extend upwind in order to position his aircraft downwind behind Squirrel(B) after Squirrel(B) pilot had started his downwind turn. At this time, he became aware of an aircraft in his 10 o'clock position which triggered a TAS audio warning which he cancelled. He believed this aircraft to be Squirrel(C) that had departed from the Chetwynd overhead on a southerly heading at 1700ft. Having continued on heading for what he considered to be sufficient time for Squirrel(B) to commence his turn downwind, he asked the student in the right-hand seat if he was visual. His recollection is that the student confirmed visual with the aircraft that was now downwind [Squirrel(B)]. Because of this, he commenced a right-hand turn to join the circuit downwind. Approximately 120° around the turn (heading 110°) he became visual with the port (red) and rear (white) position lights of Squirrel(B) who was slightly below his aircraft in the 2 o'clock position. As it was apparent that there was a rate of closure, he turned the aircraft to the left away from the other aircraft and re-established communications with Squirrel(B) who stated he had also taken avoiding action. The sortie was terminated and the aircraft was flown back to base without further incident.

He assessed the risk of collision as 'High'.

THE SQUIRREL(B) PILOT reports that he had demonstrated the joining procedure to his student, sequencing behind Squirrel(C), and had handed over control to the student to complete the circuit to the night-T. Squirrel(C) departed the landing point and established two-way communications with Squirrel(A) pilot, who was also joining to conduct circuits. Once his student had completed his circuit, Squirrel(B) pilot departed the night-T and promulgated his intention to complete a circuit to the crossed headlights landing site (LS) to yield the night-T to Squirrel(A). Squirrel(C) had at this time climbed in the overhead clear of the circuit to position for departure to the NW on a navigation route. At approximately 800ft in the 70kt climb, Squirrel(B) pilot became visual with Squirrel(A)'s aircraft lights. The student verbalised uncertainty of what Squirrel(A) was doing and he instructed the student to continue with the circuit profile, levelling at 1000ft and accelerating to 90kt, whilst he would monitor Squirrel(A). Squirrel(A) was judged to be at a distance of under 0.5nm, level with Squirrel(B) in the 11 o'clock on a parallel track; its lights were static in the windscreen. Squirrel(A) promulgated that he would follow Squirrel(B) around the circuit but Squirrel(A)'s lights then moved to the 12 o'clock and became static in the windscreen once more. He took control from the student and executed an avoiding manoeuvre, which consisted of up to 90° angle of right bank and a rapid descent. During the rolling element of the manoeuvre, he became visual with the outline of Squirrel(A)'s right-hand-side pilot's window and the yellow colouration of the upper coaming rapidly approaching at the same level in the 12 o'clock. Once the engine noise of Squirrel(A) was clear, he gently reversed the unusual position in which he had placed the aircraft and established the aircraft at a non-standard height of 500ft in the downwind portion of the Chetwynd circuit at 70kt. He conducted a handling check of the aircraft and checked the cockpit for any dangerous indications. Having become satisfied that the aircraft was undamaged, he promulgated the Airprox to the other aircraft in the circuit, and that he was returning to base, including the intended routing. Squirrel(A) followed him to base. Both aircraft landed and he rendered his aircraft U/S due to the severity of his control inputs during the incident.

He assessed the risk of collision as 'High'.

THE SQUIRREL(C) PILOT reports that he was conducting field circuits at the start of a student night navigation sortie; Squirrel(B) had just joined the circuit. He was on approach to the crossed headlights with Squirrel(B) behind him to go to the night-T (landing direction 350). He heard on the Shawbury Low-Level radio frequency that Squirrel(A) was at Market Drayton (about 6 miles North) to route to Chetwynd, and that they were informed that there were already 2 established, so they said they would hold until one of them departed. He radioed to say that he would be finished in about 2mins, so Squirrel(A) pilot called to say that he was inbound. The Shawbury Low-Level controller asked who had departed, and Squirrel(A) pilot said that it was Squirrel(C) who was about to depart and that he was inbound. As he transitioned ahead, he saw Squirrel(A) joining from the North and pass down the left side of his aircraft at 1500ft on the deadside. He turned left behind Squirrel(A) and followed it south on the deadside climbing to 1700ft with the aim of departing the overhead on track for the navigation part of the sortie. He saw Squirrel(A) turn left 180° back onto circuit direction, still on the deadside, and pass down his left again. As Squirrel(A) passed him heading north, he also turned left, behind Squirrel(A), to pass directly overhead the night-T at 1700ft heading 047°. As he passed overhead he could see Squirrel(A) in his 10 o'clock position heading north on the deadside and heard Squirrel(B) pilot call that he would transition from the night-T heading north on climb out. When Squirrel(B) pilot called lifting from the night-T for a circuit to the crossed headlights, Squirrel(A) replied that he would turn to follow Squirrel(B) around the circuit. Squirrel(C) pilot called that he was overhead at 1700ft heading NE going en-route and then changed frequency (but maintained a listening watch on the Chetwynd frequency). A few moments later he heard Squirrel(B) pilot say that he had just encountered another aircraft at low-level. He replied that he was 2 miles away at 1700ft so it wasn't him and asked if it was a Griffin; Squirrel(A) pilot replied that it was him.

THE SHAWBURY CONTROLLER reports that he was the ATCO IC as well as the ADC controller at the time. Nothing was reported on frequency and the first he heard about the incident was when he received a phone call from one of the pilots after they had landed. The pilot stated that they had an Airprox with another station-based aircraft and were going to file an Airprox.

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

Factual Background

The weather at Shawbury was recorded as follows:

METAR EGOS 052150Z 36008KT CAVOK 18/14 Q1018 BLACKBLU NOSIG

Figure 1 shows Squirrel(A) joining Chetwynd from the north, Squirrel(C) departing Chetwynd to the north and Squirrel(B) on the ground at Chetwynd.

Figure 2 shows Squirrel(A) entering the deadside at Chetwynd, Squirrel(C) has turned back towards Chetwynd to approach from the north and Squirrel(B) appears to be in the hover at Chetwynd.

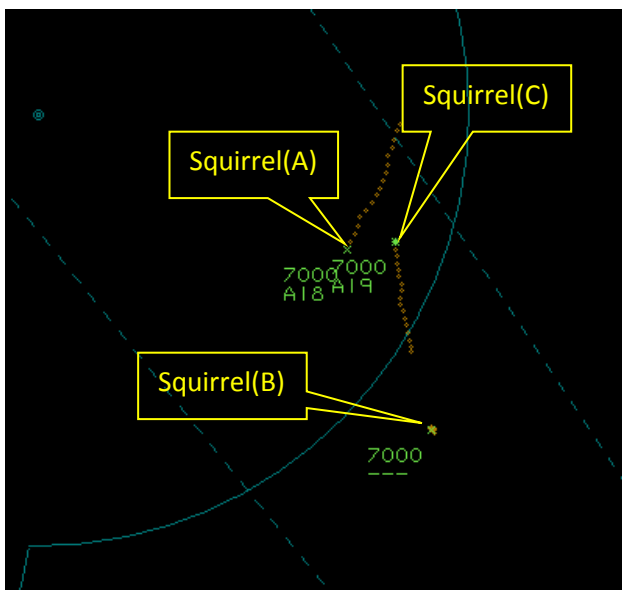


Figure 1: Geometry at 22:05:11

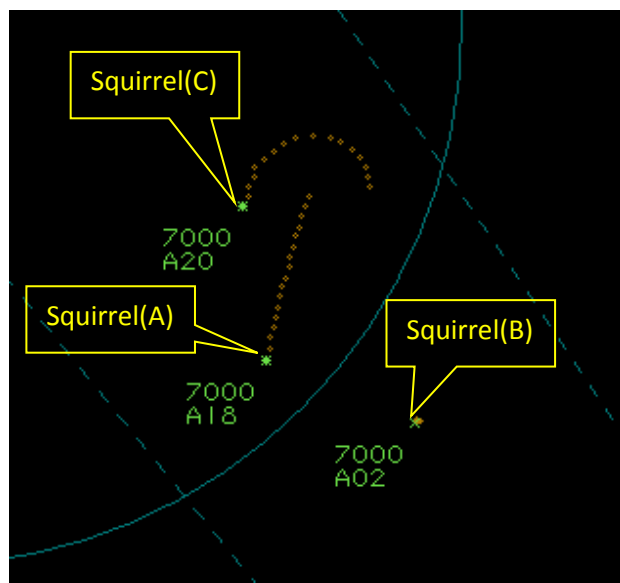


Figure 2: Geometry at 22:06:16

Figure 3 shows Squirrel(A) turning north on the deadside at Chetwynd, Squirrel(C) is flying through the Chetwynd overhead on the deadside and Squirrel(B) appears to still be in the hover or on the ground at Chetwynd.

Figure 4 shows Squirrel(A) just starting to turn crosswind at Chetwynd, Squirrel(C) has turned at Chetwynd heading north east, and Squirrel(B) has taken off and is climbing into the Chetwynd circuit.

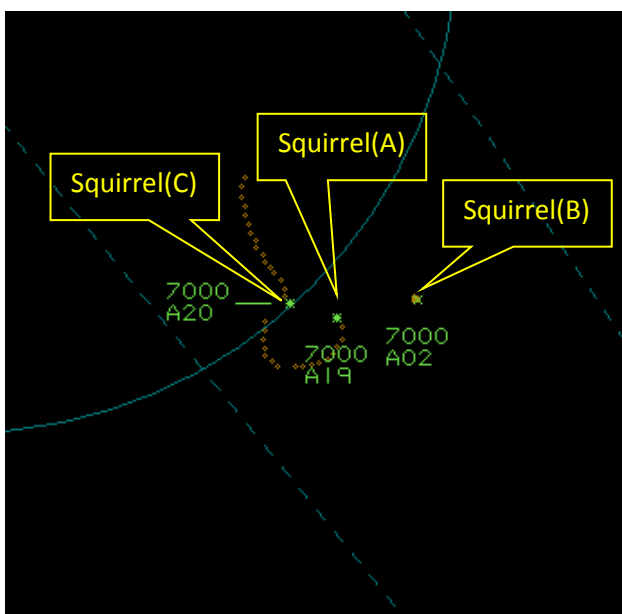


Figure 3: Geometry at 22:07:52

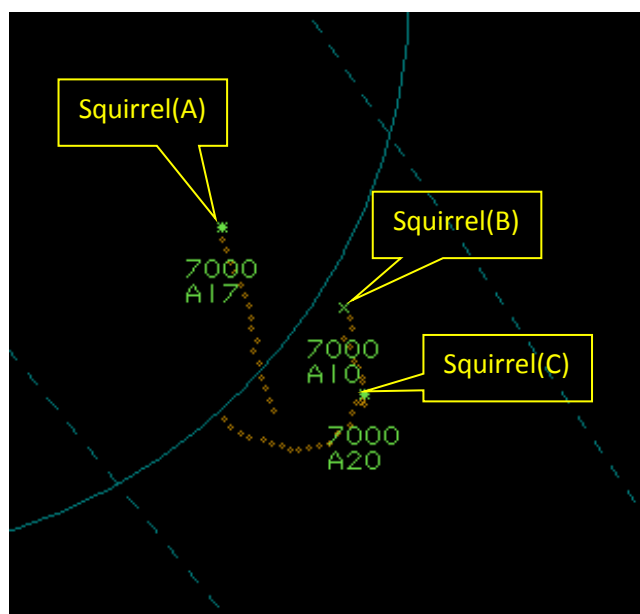


Figure 4: Geometry at 22:08:59

Analysis and Investigation

Military ATM

At 22:09:07 (Figure 5), Squirrel(A) was commencing a right-hand crosswind turn to join the circuit direction. The pilot reported that, when passing heading 110 degrees, he became visual with the lights of Squirrel(B), slightly below and in the 2 o'clock position, which prompted him to take an immediate left turn to avoid.

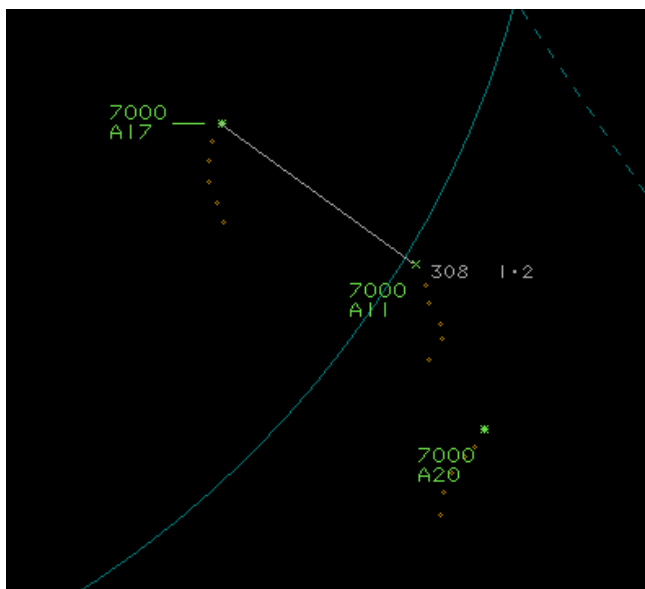


Figure 5: Geometry at 22:09:07

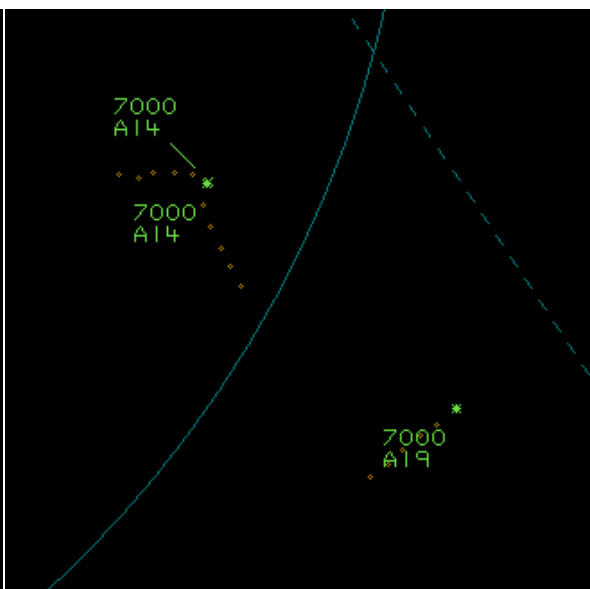


Figure 6: Geometry at 22:09:39

At 22:09:39 (Figure 6), the two Squirrels were at their closest proximity.

At 22:10:07 (Figure 7), the pilot of Squirrel(B) reported that he was at 500ft AGL having executed a prompt descent to avoid collision. The pilot of Squirrel(A) responded that the conflict had been with his aircraft.

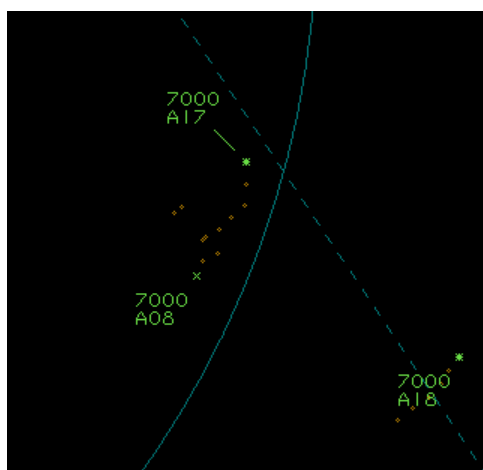


Figure 7: Geometry at 22:10:07

The Chetwynd Radio frequency is monitored by a Shawbury ATC controller operating from Tern Hill, where they are also in the role of Tern Hill ADC. There are 2 controllers rostered for Tern Hill ADC/Chetwynd Radio, although one of them will routinely control both positions whilst the other is on a break. During busy periods, the frequencies can be separated, and both controllers then control one position each. The controller has an Air Traffic Monitor (a slave radar feed from Shawbury Tower), which can be used for Situational Awareness. This is supplemented by a

pinboard, used as an aide-memoire subject to aircrew accurately updating their position information. Chetwynd RLG is not visible from Tern Hill tower, and air systems on final, in a low hover or on the ground are not displayed on the ATM due to terrain. There is no requirement for the Chetwynd Radio controller to identify aircraft or monitor the ATM when providing the Basic Service listening watch. The primary method of controlling Chetwynd Radio is by the use of the pinboard.

At the time of the Airprox, the Shawbury Tower controller was monitoring Stud 4, the frequency being used by aircraft operating at Chetwynd RLG, but no incident was reported on frequency and there was no reason for the controller to believe that operations were not proceeding as normal.

UKAB Secretariat

The Squirrel(A) and Squirrel(B) pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard¹. 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 operation².

Occurrence Investigation

As Squirrel(B) departed and climbed from the 'T', he observed Squirrel(A) in a position ahead and to the west, and he continued his climb in preparation for a RH circuit. Meanwhile, Squirrel(C) was approximately east of Squirrel(A) and flying on a north easterly heading as part of his Navex. Confident with his student's visual acquisition of Squirrel(B), the Captain of Squirrel(A) initiated a turn onto east and also gained visual contact on the same aircraft, which was in fact Squirrel(C). Based upon the estimated distant position of Squirrel(C), a subsequent transmission from Squirrel(B) stating that he would be turning downwind to reposition for the cross-headlights caused Squirrel(A) to believe that it was safe to intercept the downwind leg of the circuit by maintaining his easterly heading.

While tracking east, the crew of Squirrel(A) received three separate TAS alerts in rapid succession, which were cancelled immediately on the assumption that they were triggered by the aircraft visually acquired to their east. At the same time, Squirrel(B) received a single TAS alert, which was cancelled in accordance with SOP's and with Squirrel(A) in sight. As Squirrel(A) continued on a collision course, Squirrel(B) took evasive action by completing a hard descending turn to the east. On the basis of TAS data, it is estimated that the aircraft flew within 100ft of a collision.

Comments

HQ Air Command

The open reporting culture of the aircrew, reinforced by the subsequent investigation, reveals that this incident took place because of inadequate SA. Operating at night time without the aid of night vision devices can be a challenging environment for aircrew of all experience levels. During his first sortie away from the main operating base at night time, the student pilot of Squirrel(A) misidentified the departing aircraft as the conflicting aircraft. He didn't realise that the aircraft he was visual with wasn't the one he was talking with. The pilots of Squirrel(B) were visual with Squirrel(A) and had devised a circuit deconfliction plan with Squirrel(A) on the radio. However owing to Squirrel(A) basing their judgment on an incorrect mental model, the two aircraft lost safe separation.

As a barrier to prevent loss of safe separation, the rules for operating at Chetwynd were clearly defined and understood by the aircrew; however, the departing crew's use of the phrase

¹ SERA.3205 Proximity.

² SERA.3225 Operation on and in the Vicinity of an Aerodrome.

'complete at Chetwynd' before repositioning into the overhead prior to commencing the navigation route contributed to the incorrect mental model of the pilot of Squirrel(A). Several recommendations have been raised to minimise the likelihood of recurrence.

Summary

An Airprox was reported when two Squirrels flew into proximity at 2215 on Wednesday 5th July 2017 whilst conducting night circuits at Chetwynd. Both pilots were operating under VFR in VMC, both pilots in receipt of a Basic Service from Shawbury.

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, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board were first briefed on Squirrel night training operations by the RAF helicopter pilot member. He began by commenting that the Squirrel navigation route which Squirrel(C) had been following was designed to start overhead Chetwynd, and that it had been recognised that this had inherent potential for aircraft to be misidentified with aircraft in the Chetwynd visual circuit. He went on to comment that the route had now been changed to avoid this recurring. Turning to the circuit training itself, he informed the Board that the task in hand was the students' first night flight at a site away from their main base. As a result, students were under a high workload as they endeavoured to operate in this new environment, and the instructors were also required to maintain a higher level of oversight than normal, thus also causing them higher workload, particularly during the joining procedure. With both pilots in Squirrel(A) working hard, and thinking that Squirrel(C) had already departed the location, it was therefore easy to misidentify Squirrel(C) as Squirrel(B). Contributory to this misconception as to Squirrel(C)'s position was Squirrel(C) pilot saying he was 'complete', which was misinterpreted as his sortie being complete (and therefore returning to base) rather than he was 'complete in the Chetwynd circuit and would be commencing his navigation exercise' which would involve flying through the Chetwynd overhead again.

The Board then looked at the actions of the Squirrel pilots. The Squirrel(A) pilot had flown from the north to the deadside area of the visual circuit at Chetwynd after the pilot of Squirrel(C) informed him that he was 'complete'. At this point, Squirrel(B) was in the hover/on the ground at Chetwynd. Squirrel(C) initially left the Chetwynd visual circuit to the northwest before following Squirrel(A) back to Chetwynd to start his navigation exercise. Squirrel(A) pilot entered the deadside and turned left to establish along runway heading. This turn took him blind to Squirrel(C) who he thought had departed already. As he turned, Squirrel(A) pilot saw Squirrel(B) on the ground and agreed to deconflict by turning downwind behind. Squirrel(A) pilot then lost sight of Squirrel(B) as he continued his deadside left turn onto runway heading blind to Squirrel(B) (during which time Squirrel(B) got airborne). When the pilot of Squirrel(A) was ready to start his right-turn crosswind, he asked his student (who was positioned on the right-hand side of the aircraft), if he was visual with Squirrel(B). Squirrel(A)'s student pilot saw Squirrel(C) (which had now routed through the overhead), mistook it for Squirrel(B), said he was visual with Squirrel(B), and so the pilot of Squirrel(A) turned crosswind. Meanwhile, the actual Squirrel(B) was climbing away from the night-T unsighted by Squirrel(A)'s pilots until they came into conflict. Although recognising that it was easy to be wise in hindsight, some members wondered whether the Squirrel(A) instructor should have been more cautious of his student's sighting given that he was likely making his judgement as an inexperienced pilot in a very unfamiliar environment. However, others commented that both Squirrel(A) pilots were under the impression that only they and Squirrel(B) were in the circuit, and so Squirrel(A) instructor had no reason to doubt the student's sighting was Squirrel(B). In this respect, the Squirrel(A) pilot's TAS warnings might have cued him to the fact that Squirrel(C) remained near the overhead, and members wondered whether Squirrel(A) pilot had become inured to the TAS audio alerts, simply cancelling them as a nuisance as he 'pattered' the joining procedure to his student. Finally, some members commented on the geometry of Squirrel(A) pilot's overhead join, and opined that, as for normal overhead joins, it would have been better if Squirrel(A) pilot had actually flown through the overhead above circuit

height and then turned right-hand deadside in accordance with the circuit direction rather than conducting a left 180° turn in the opposite direction to the circuit pattern. By routing through the overhead and turning right, he would have been able to maintain visual contact with Squirrel(B), who was already established in the circuit.

For his part, members noted that Squirrel(B) pilot was visual with Squirrel(A) quite early on but continued his climb presumably comfortable in the knowledge that Squirrel(A) pilot had agreed to avoid him and turn behind. In a seeming case of both confirmation bias and likely visual illusion, although Squirrel(A) was probably already converging on him, it was not until a late stage that Squirrel(B) pilot assimilated that Squirrel(A)'s lights were not continuing on runway heading but were in fact turning across his nose. By that time both aircraft were very close together, with Squirrel (A)'s lights blooming rapidly enough to break the perception that they were on parallel tracks.

The Board then looked at the cause and risk of the Airprox. They agreed that, fundamentally, it was for Squirrel(A) pilot to integrate with Squirrel(B) who was already established in the circuit. Although the misidentification of Squirrel(B) was contributory, members agreed that the fact of the matter was that Squirrel(A) pilot had not achieved integration, and so the cause was determined to be that the Squirrel(A) pilot had flown into conflict with Squirrel(B). Turning to the risk, members noted that although the pilot of Squirrel(B) was visual with Squirrel(A), he had continued on track believing that Squirrel(A) pilot would avoid him. It was not until the last moment that both aircraft's pilots had recognised the conflict, by which time they had become close enough for Squirrel(B) pilot to discern the colour and detail of the Squirrel(A) cockpit area. Accordingly, although both pilots had carried out avoiding action manoeuvres, the Board determined that aircraft proximity had been such that a serious risk of collision had existed that had only been avoided by the slimmest of margins. Therefore, the degree of risk was assessed as Category A.

The Board were heartened to hear that the use of the Chetwynd overhead for navigation exercises had been changed as a result of this Airprox, and that a higher level of supervisory management was now in place to ensure flights were deconflicted from each other. Although not germane to the incident, members were also pleased to hear that a greater level of advice had also been introduced regarding the cancelling of TAS warnings.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Squirrel(A) pilot flew into conflict with Squirrel(B)

Contributory Factor(s): The Squirrel(A) pilot misidentified Squirrel(C) as Squirrel(B).

Degree of Risk: A.

Safety Barrier Assessment³

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

ANSP

Situational Awareness & Action was assessed as **ineffective** because Air Traffic Control were only able to maintain generic awareness of numbers of aircraft operating at Chetwynd through pilot reports rather than participate proactively in their integration.

Flight Crew

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

Regulations, Processes, Instructions and Compliance was assessed as **partially effective** because local instructions allowed the Squirrel(A) pilot to cancel his TAS warnings on numerous occasions.

Tactical Planning was assessed as **partially effective** because the Squirrel pilots did not successfully execute their deconfliction plan.

Situational Awareness & Action was assessed as **partially effective** because the Squirrel(A) crew misidentified Squirrel(C) as Squirrel(B), which resulted in flawed and inaccurate SA; and, although Squirrel(B) pilot was aware of Squirrel(A), he did not act until the last moment because he thought Squirrel(A) pilot was going to avoid him.

Warning System Operation and Compliance was assessed as **ineffective** because the Squirrel(A) pilot routinely cancelled TAS indications which may have provided SA on Squirrel(C) three times.

See and Avoid was assessed as **partially effective** because although Squirrel(B) pilot saw Squirrel(A) at an early stage, he did not act to avoid Squirrel(A) until the last moment because he thought that Squirrel(A) pilot was going to avoid him.

