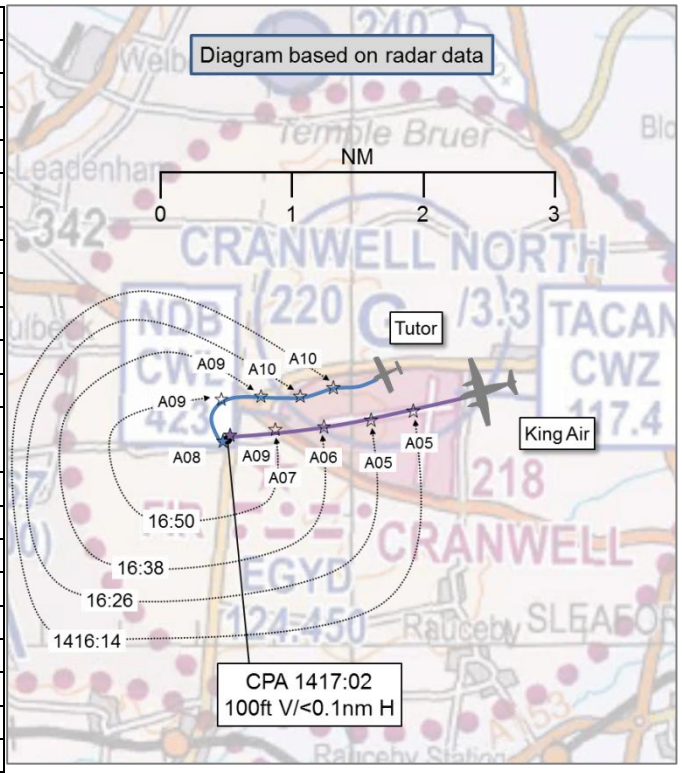
AIRPROX REPORT No 2015107

Date: 9 Jul 2015 Time: 1417Z Position: 5311N 00031W Location: Cranwell visual circuit.

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Tutor	King Air
Operator	HQ Air (Trg)	HQ Air (Trg)
Airspace	Cranwell ATZ	Cranwell ATZ
Class	G	G
Rules	VFR	IFR
Service	Aerodrome	Traffic
Provider	Cranwell Tower	Cranwell DEPS
Altitude/FL	800ft	900ft
Transponder	A, C, S	A, C, S
Reported		
Colours	White	White/blue
Lighting	HISLs, nav, landing	HISLs, nav
Conditions	VMC	VMC
Visibility	30km	10km
Altitude/FL	800ft	NK
Altimeter	QFE (1015hPa)	QFE (NK hPa)
Heading	360°	255°
Speed	80kt	130kt
ACAS/TAS	TAS	TCAS II
Alert	None[1]	TA
Separation		
Reported	0ft V/50m H	300ft V/500m H
Recorded	100ft V/<0.1nm H	



THE TUTOR PILOT reports recovering to Cranwell after a solo GH sortie for a join through initials to RW26. At the initial point,[2] he made a radio call and was made aware of a King Air on an instrument approach, which he soon saw, in his 7 o'clock. It was apparent at this stage that the circuit ahead was very busy. At 100kts and 800ft, he carried on towards the airfield, on the deadside, constantly looking for the King Air, which was now out of his field of view. His view of the runway was obstructed due to being in the right-hand seat and it being a left-hand circuit, so he often dipped the wing to watch for any aircraft on or around the runway. As he approached the turning point to the downwind leg he extended slightly upwind as he carried out an in-depth look to ensure he was safe to turn and that the King Air was no longer in the area. No traffic was spotted so he commenced the crosswind turn. As he was halfway through the left turn, perpendicular to the runway, he saw the King Air departing in his direction. It seemed like the King Air pilot raised his nose and turned right as he lowered his nose to avoid. Nothing was said on the tower frequency by the King Air pilot so, slightly confused, he regained height and heading and positioned for the downwind leg ready to land. The Tutor pilot noted that, had neither pilot taken avoiding action, the chance of collision was significant. He also stated that he was told by ATC to go around at circuit height, so he turned back onto the deadside, above the RW26 threshold. At this stage he was feeling quite shaken by the events so, to ensure he was safe, this time he requested clearance to turn onto the downwind leg, which was given by ATC. He was then told to go around at circuit height again during the downwind leg, which he did. Noticing he was now close to minimum fuel required on the ground, he requested an early turn to the downwind leg, which was approved. During the turn he noticed a Tutor approaching the low key position on a PFL, and ATC then asked if he was visual with the aircraft out of high key. He had previously been unaware of this aircraft. Knowing the PFL aircraft had priority, and seeing the aircraft

[1] The TAS was selected off in the circuit, in accordance with SOP.
[2] Initial point is a military term that describes a point 2nm on the approach to the runway, offset to the deadside, through which military aircraft route during visual recoveries.

start a turn to the left, he applied full power and extended to initial. After his radio call, and en-route to initial, he was made aware of a King Air on an instrument approach around the area of the initial point, which he never managed to see. After this, he completed a normal and uneventful circuit to land. The pilot noted that he was well over the authorised sortie time and had just enough fuel to make the landing minima. He felt that the visual circuit was overly busy with Tutors, King Airs and a Tucano all performing different types of circuit, as well as with busy mixed instrument pattern traffic often passing through the visual circuit.

He assessed the risk of collision as 'Medium'.

THE KING AIR PILOT reports conducting an Instrument Rating Test, with the handling pilot 'under the hood' and the aircraft captain as the non-handling safety pilot. He had been cleared for a low overshoot on RW26 following an asymmetric approach on the Talkdown frequency. ATC passed the circuit traffic, and advised that there was one Tutor deadside with others in the circuit. On starting the asymmetric go-around, at 250ft, the aircraft captain was looking out for the Tutor on the deadside and switched to Departure frequency. The Tutor was seen late as it turned at 800ft just past the upwind end of the runway and into the climb-out path of the King Air. The aircraft captain took control and manoeuvred to avoid the Tutor.

He assessed the risk of collision as 'Low'.

THE TOWER CONTROLLER reports he was screening another controller in the position during a busy session with multiple visual circuit and radar traffic. The Tutor pilot requested to join the visual circuit from the southeast, was given the correct instructions and told about radar traffic (the King Air) and how many aircraft were in the circuit. The Tutor pilot appeared to cross the nose of the radar traffic King Air whilst positioning for initial, with about half a mile between them at around the same height. Once the Tutor pilot called initial, the air picture was given, including the radar traffic, and also the surface wind, which is standard practice. As the King Air had conducted its touch and go and departed upwind, the trainee noticed the Tutor pilot crossing in front of it; this looked very close as the screen controller looked towards the Air Traffic Monitor. The screen controller had not been looking in the same direction as the trainee because other aircraft in the circuit required attention. The Tutor pilot was subsequently sent around, the screen controller believed twice more, for further radar traffic. An Airprox was not declared on frequency.

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

THE SUPERVISOR reports he was positioned in the VCR as the incident unfolded. He was first aware of the Tutor in question when it joined the circuit from the southeast, cutting across the nose of the King Air on radar to route through initial. As it flew through deadside he could see the Tutor rocking its wings and assumed it was trying to get visual with the King Air (which was now commencing its overshoot) and was presumably trying to decide whether it would have the separation to then cut across in front of the King Air. When the Tutor eventually turned crosswind, the Supervisor commented to the ADC that it would be close with the King Air climbing out. He did not ask the ADC controller to pass Traffic Information to the Tutor as he did not think the Tutor would turn crosswind without being visual with the King Air. Unfortunately there was no way of passing the proximity of the Tutor traffic to the King Air pilot quickly because he would have been changing between the Talkdown frequency and the Departures frequency.

Factual Background

The weather at Cranwell was recorded as follows:

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METAR EGYD 091350Z 30005KT CAVOK 19/06 Q1022 BLU NOSIG
METAR EGYD 091450Z 27008KT CAVOK 20/05 Q1022 BLU NOSIG
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Analysis and Investigation

Military ATM

The incident occurred between a Tutor and a King Air in the RAF Cranwell visual circuit at 1417 on 09 Jul 15. The Tutor pilot was under an Aerodrome Service with the Cranwell Aerodrome Controller and the King Air pilot was under a Traffic Service with Cranwell Talkdown. The incident was captured by the Radar Analysis Cell, based upon the London QNH 1023 hPa.

At 1413:50 (Figure 1), the Tutor pilot was given join instructions, "{Tutor c/s} *Cranwell Tower join information code Juliet correct, circuit clear with 2 Tutors joining, one via overhead, one via High Key*."

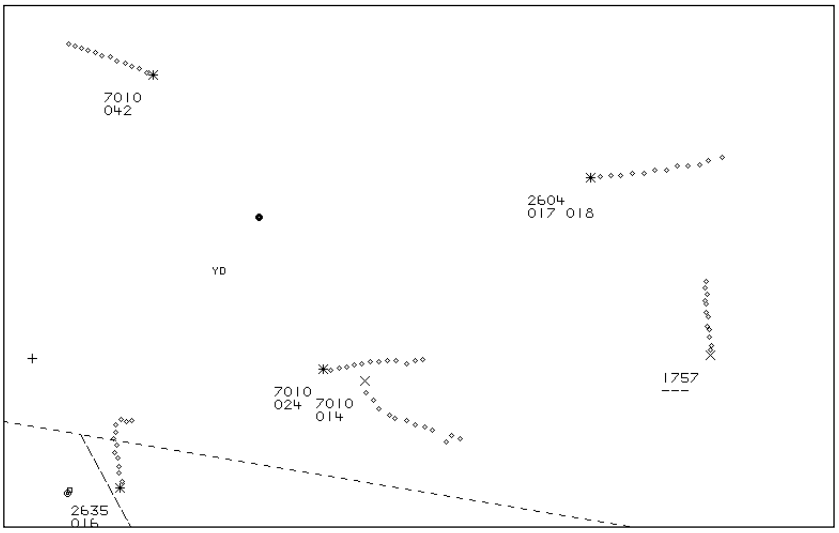

Figure 1: Join instructions at 1413:50 (King Air 2604; Tutor 7010, Mode C 014)

At 1414:14, the Aerodrome Controller transmitted, "*All stations, radar traffic 4 miles, low approach for further*." At 1414:19, the Tutor pilot called Initials and at 1414:24, the controller transmitted to all stations, "*radar traffic 3.5 miles.*"

At 1414:30, the Tutor pilot reported visual with the radar traffic (the King Air). At 1414:50 (Figure 2), the King Air pilot was cleared to low approach with 3 in the visual circuit and this was broadcast to all in the circuit.

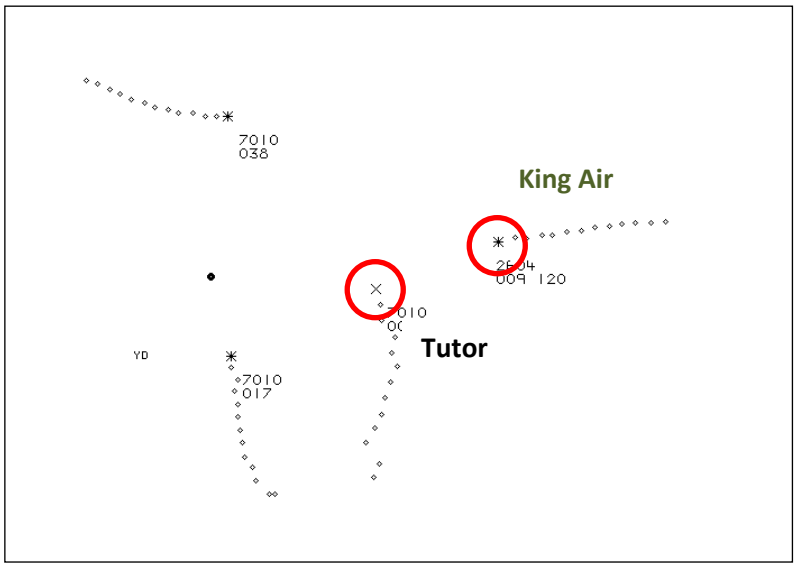

Figure 2: King Air cleared to low approach at 1414:50 (Airprox Tutor Mode C 008)

At 1416:04 (Figure 3), the King Air was on finals indicating 002 on Mode C and the Tutor was established deadside showing 007 on Mode C.

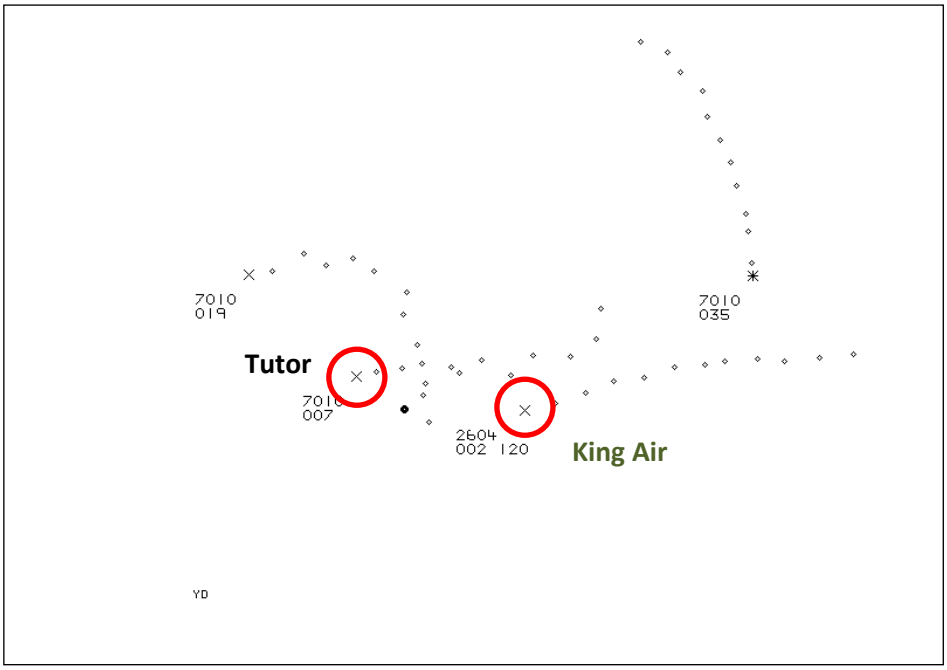

Figure 3: King Air on finals and Tutor deadside at 1416:04

At 1416:55 (Figure 4), the Tutor can be viewed turning crosswind as the King Air is climbing out.

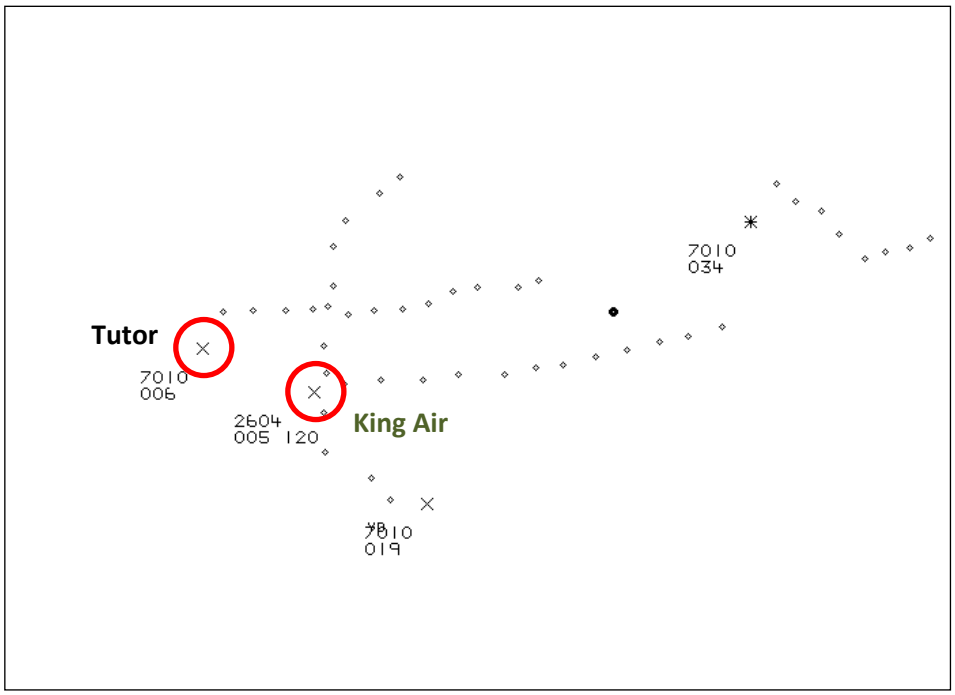

Figure 4: Tutor turning crosswind at 1416:55

At 1417:03 (Figure 5), the aircraft are shown at CPA with 0.1nm lateral and 100ft vertical separation.

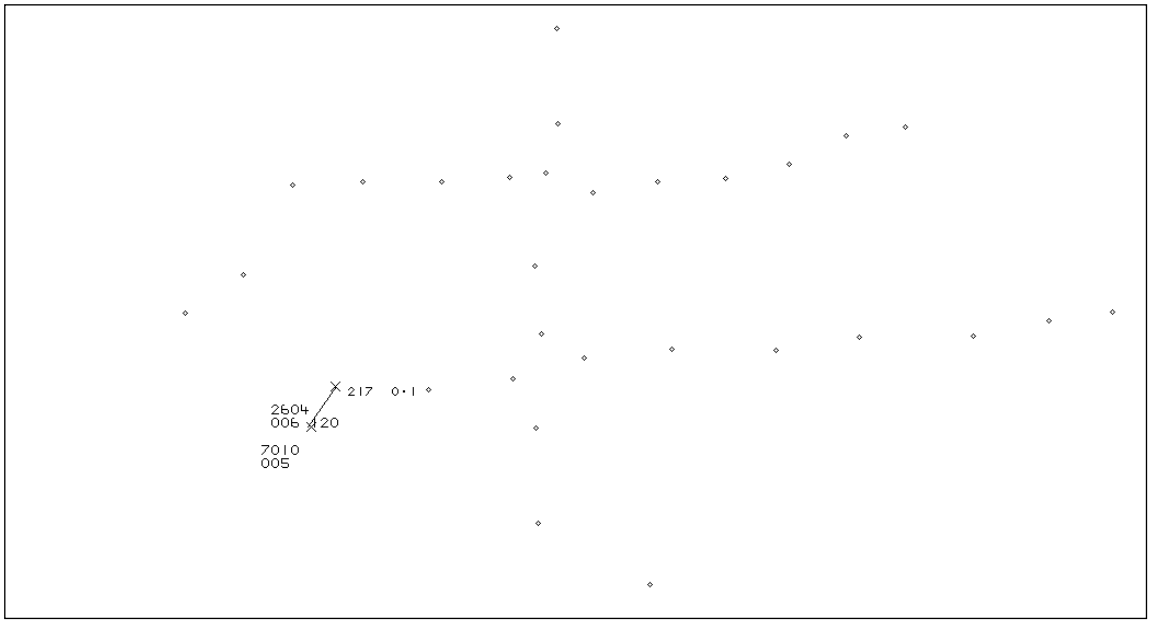

Figure 5: CPA at 1417:03

The Aerodrome Controller passed the circuit state to the Tutor pilot upon join (circuit clear with 2 Tutors joining for overhead and High Key) and the liaison broadcasts were made to inform of the King Air at 4 miles finals, cleared for a low approach for further radar approaches. The Supervisor was aware that the Tutor pilot was dipping his wing to get visual with the King Air, but the absence of any request for Traffic Information and the crosswind turn had indicated that the Tutor pilot was visual. The circuit had become busy with multiple types of recovery, leading to a high task difficulty for the trainee Aerodrome Controller. The ATC Supervisor had noticed the Tutor pilot looking for the King Air but in a busy circuit, apart from mandated Traffic Information, it may be impractical for ATC to pass constant traffic updates; the crews can ask for specific updates at any time. Solo student sorties are annotated by callsign and should receive the appropriate attention from ATC.

A Duty Pilot was positioned in the Visual Control Room, responsible for the overall supervision of student flights. The Tutor pilot struggled to become visual with the King Air, partly due to the obscuration factors of being in the right-hand seat in a left-hand circuit. The King Air was on a low approach for further radar circuits which meant that the pilot did not switch to the Tower frequency; clearance to use the runway was relayed to the Talkdown Controller. As the King Air was not seen or heard, the Tutor pilot may have assumed that it had accelerated away. The circuit was a complex one, requiring a lot of a student pilot in terms of sequencing and separating against mixed types conducting different types of approaches and patterns. The solo students normally used Barkston Heath as a dedicated airfield; however, the student Tutor pilots were temporarily mixed with the main Cranwell circuit for periods in July 2015.

The normal barriers to an Airprox in the visual circuit would be lookout and ATC-derived circuit Traffic Information. TAS was turned off in the visual circuit, as per local SOP. General information on the three other aircraft entering the circuit was passed, although the other aircraft were joining from different positions: radar, high key and the overhead. An inexperienced pilot was responsible for visually acquiring the King Air prior to turning crosswind. A busy and complex circuit would have increased the workload for all involved and the stressors mentioned on the Tutor pilot, help provide context for the decision to turn crosswind.

UKAB Secretariat

The Tutor and King Air pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard[3]. 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[4]. Although the King Air TCAS was selected on, its altitude was such that TCAS RA alerts would have been inhibited.

Comments

HQ Air Command

This incident took place in a complex circuit and was exacerbated by the Tutor Pilot's limited experience. Once informed of the traffic at 4nm, the Tutor Pilot made unsuccessful attempts to visually re-acquire the King Air by dipping his wing; a request for a position update from the Tower controller may have been appropriate. Additionally, an opportunity may have existed for both the Duty Pilot and the Tower controller to proactively assist the solo student by prompting an early turn onto the downwind leg to avoid the potential for confliction This event also highlights the issue of integrating traffic conducting a IFR procedure in a VFR environment versus traffic in the visual circuit. Thankfully, both the safety pilot in the King Air and the Tutor Pilot became visual, albeit at a late stage, and both pilots made adjustments to their flight path to ensure separation at the CPA.

At the time of this incident, the RAF Safety Centre were conducting a study into Airprox in the Aerodrome environment which concluded that passage of information when joining, mixed speed traffic and integrating radar traffic into the visual circuit were all areas for further analysis. Cranwell are also using this incident as an example of when the Duty Pilot needs to be pro-active.

Occurrence Investigation

This is an honest report from a junior aviator that highlights a number of useful points. The Sqn concerned had only recently relocated to Cranwell from Barkston Heath where they were used to operating in a single type environment. The traffic loading in the circuit at the time of this incident, although at the top end of the expected spectrum, was not over planning assumptions or operating limitations. We have a type specific Duty Pilot in the VCR at all times during Tutor solo student flying and that individual is charged (specifically) with the overall supervision and integration of circuit activity. All sqns will be tasked to use this incident as an example of when the DP needs to be pro-active.

Summary

An Airprox was reported when a Tutor and a King Air flew into proximity at 1417 on Thursday 9th July 2015. Both pilots were operating in VMC, the Tutor pilot, under VFR, in receipt of an Aerodrome Control Service from Cranwell Tower and the King Air pilot, under IFR, in receipt of a Traffic Service from Cranwell Departures.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from the pilots of both aircraft, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Board members first discussed the overall sequence of events. The Tutor pilot had recovered to Cranwell from the southeast and, although he had not been given specific Traffic Information on the

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

King Air, an all-stations broadcast was made 24sec after his clearance to join had been issued, "…*radar traffic 4 miles, low approach for further*". A further all-stations broadcast was made 5sec later, "…*radar traffic 3.5 miles*". The Tutor pilot reported he was visual with the King Air 10sec later, at 1440:30, when he was 2nm east-southeast of Cranwell, heading north with the King Air in his right 1.30 at 2nm and at about 3.5nm on the RW26 extended centreline. The Tutor pilot crossed the RW26 centreline 1nm ahead of and co-altitude with the King Air (descending on the glideslope) and turned left for initials. Having then lost visual with the King Air, it was clear to the Board that the Tutor pilot became uncertain as to its position and his repeated lowering of the left wing was an attempt to regain visual contact. He stated he had carried out an 'in-depth look' at the end of the downwind leg and, having not seen the King Air, turned left to crosswind and into proximity with the King Air.

Members noted the ATC Supervisor's comments that he could see the incident unfolding as the Tutor pilot turned crosswind, and they wondered whether the Air Traffic team, including the Duty Pilot, could have helped more by providing more information, or even directing the obviously struggling student Tutor pilot as to when to turn. Members agreed that this would have been appropriate, but also noted that it was for the Tutor pilot to state his predicament if he was unsure; otherwise, ATC would be left in a permanent state of trying to second-guess pilots' intentions in the circuit and when to intervene. That being said, they also noted that this was an inexperienced student pilot who may have been reticent to communicate his dilemma. It was in this respect that they thought that the Duty Pilot had a key role to play in thinking ahead for the student, and they wholeheartedly agreed with the Occurrence Investigation's comments regarding the need for Duty Pilots to be pro-active. The military pilot member confirmed that the RAF had recently undertaken a thorough review of visual circuit activities, one of the results of which, was that the Duty Pilot role had been clarified and emphasised.

Ultimately, the Board agreed that, notwithstanding his inexperience, it was for the student Tutor pilot to either request Traffic Information on the King Air before he turned or simply extend upwind if he was in doubt, informing ATC of his intentions. Notwithstanding, although members agreed that this would have resolved the situation, they emphasised that a student pilot would likely be more prone to stress factors, in this case that he had exceeded the authorised sortie duration and that he was approaching his minimum landing fuel, which in turn could reduce capacity and the ability to maintain an appropriate level of situational awareness. Mention was also made of the common theme of IFR radar traffic integration into and through the visual circuit; members agreed this was also a factor but that it was also well understood and that current procedures, taken in their entirety, provided effective mitigation against conflict. Finally, members noted that the Tutor pilot had had his TAS turned off, and that this might have been a useful tool in aiding his situational awareness. It was also pointed out that the Tutor pilots were at a very early stage of their flying training and that the addition of TAS information to their situational awareness may be more demanding than was realistically possible.

The Board considered the likely cause and, after further discussion, agreed that although more help would have been appropriate, it was that the student Tutor pilot had turned into conflict with the King Air. The collision risk was assessed by the pilots as 'Medium' and 'Low', Board members considered, however, that the separation at CPA was such that safety margins had been much reduced below normal, and that both pilots had had to take late avoiding action.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The student Tutor pilot turned into conflict with the King Air.

Degree of Risk: B.