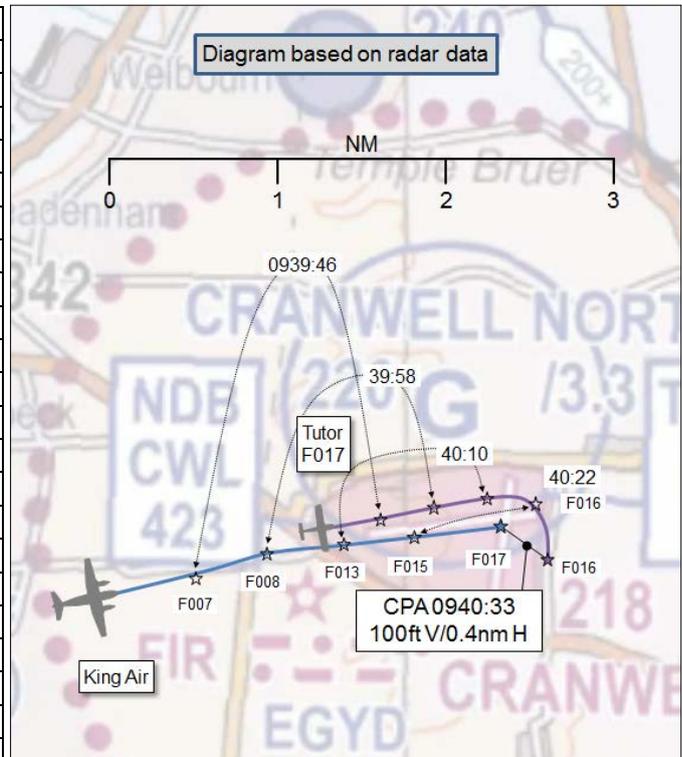


AIRPROX REPORT No 2017074

Date: 02 May 2017 Time: 0941Z Position: 5302N 00028W Location: RAF Cranwell (elev 218ft)

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	King Air	Tutor
Operator	HQ Air (Trg)	HQ Air (Trg)
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Traffic	Aerodrome
Provider	Cranwell	Cranwell
Altitude/FL	FL017	FL016
Transponder	A, C, S	A, C, S
Reported		
Colours	NK	White
Lighting	NK	NK
Conditions	VMC	VMC
Visibility	10km	NK
Altitude/FL	1500ft	1500ft
Altimeter	QFE (1013hPa)	NK
Heading	084°	NK
Speed	160kt	80kt
ACAS/TAS	TCAS II	TAS
Alert	RA	Unknown
Separation		
Reported	'200ft'	Not seen
Recorded	100ft V/0.4nm H	



THE KING AIR PILOT reports instructing a simulated asymmetric PAR with the student as PF, operating under an IF 'visor'. Throughout the initial phase of the approach, and whilst in receipt of a Traffic Service, ATC alerted him to a number of contacts. Coupled with a large number of TCAS contacts displayed on the HSI (set to 10 mile scale), he assessed the local airspace as particularly busy. During the downwind leg, he read back the clearance as 'PAR runway 08, DH of 580 feet to overshoot for SID 2'. He was cleared the requested SID 2 and told to contact Departures upon completing the low approach. He was handed to Cranwell Talkdown and conducted an uneventful simulated asymmetric PAR to the pre-briefed DH. At no point did he recall being advised of any traffic that may have affected the low-approach and overshoot. Commencing the simulated asymmetric overshoot, he soon became aware of a TCAS contact ahead by about 5 miles. Concentrating on the students simulated asymmetric overshoot, changing to the Departures frequency and trying to visually acquire the TCAS contact, he did not recall the exact height of the TCAS contact as it was coincidentally overlaid on an HSI range ring but believed it to have been 7-800ft above. He immediately told the student to reduce the rate of climb and to start to regain symmetrical flight. On handing over to the Departures frequency, he does not recall being informed of the traffic ahead; this may have been because he was concentrating on trying to visually acquire the other aircraft in a dynamic situation. Selecting the HSI scale to 5 miles to get greater situational awareness, he became aware that the aircraft ahead was now within 2 miles. As a result, he told the student to significantly reduce the rate of climb. The instructor was still not visual with the other aircraft and, with SCT/BKN cloud at 2500ft, could see only white sky. In prompt succession, TCAS issued a TA followed by him visually acquiring the other aircraft that was now rapidly blooming in the windscreen. He assessed the aircraft to have been less than 0.2 miles away and slightly above, passing through the 12 o'clock on what he perceived as a southerly vector. He took control and conducted an evasive manoeuvre to the left to prevent what in his opinion was a significant closing vector. Simultaneously, TCAS issued an RA 'Climb'. He remained visual with what he had identified as a Tutor whilst continuing a left, upward vector to de-conflict. He alerted ATC of the RA and asked them to log the time as he felt the

confliction was an Airprox. On reflection, the instructor believed he could have levelled off much sooner to potentially prevent the conflict. Equally, subconsciously, he was probably expecting a TCAS alert if there was impending danger; however TCAS is significantly inhibited below 1000ft. It is however his belief that the conflict occurred due to a lack of visual acuity of the white Tutor aircraft against a white background, having been vectored on an instrument approach to a position where he had little room for manoeuvre in a highly dynamic situation.

He assessed the risk of collision as 'High'.

THE TUTOR PILOT reports that he had been made aware that analysis of ATC trace data following the submission of a DASOR had determined that an aircraft under his control was involved in an Airprox with a King Air in the circuit at RAF Cranwell on 2 May 17. Neither he nor the student had any recollection of the event having neither seen the King Air nor been made aware of the event over the R/T or during his visit to the ATC Tower immediately afterwards to supervise the student solo.

THE DEPARTURES/ZONE CONTROLLER reports operating with a medium, occasionally high workload. The King Air had been pre-noted to him by the Cranwell Approach controller, departing SID2 after their instrument approach. When the King Air pilot called him it was apparent that there was traffic in their 12 o'clock at a range of about 2nm, similar heading, indicating the same height (017 on Mode C) and wearing a visual circuit squawk. The controller identified the King Air, applied a Traffic Service and called the traffic. After a brief pause, the King Air pilot replied that he was responding to a TCAS RA. Shortly after, the King Air pilot reported the incident as an Airprox.

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

THE TOWER CONTROLLER reported that they had been controlling the Tutor in the visual circuit for about 30 minutes. At the point of the incident, she believed she had followed standard procedures of broadcasting the radar traffic type, range and intentions, with additional information that it was simulated asymmetric. In addition, she had provided extra situational awareness to the Tutor and let the pilots know that the radar traffic, a King Air, was going to be number one. She felt that had it been an ordinary radar approach or one of many, she would probably have broken off the radar traffic but allocated the priority on the basis that:

- a) The radar traffic had priority over visual circuit traffic, iaw runway occupancy and priority rules.
- b) The radar traffic was making only one radar approach at the start of its sortie, therefore it made sense to permit a full approach over circuit traffic.
- c) The radar traffic was a simulated emergency (simulated asymmetric) therefore had yet more priority.
- d) A clearance or a break-off had to be initiated at 3nm. No 'continue' was available for simulated asymmetric King Airs at RAFC Cranwell.
- e) The King Air call sign suggested that the squadron commander was on board and she felt it necessary to allow some priority unless that would have compromised safety.

The Tutor pilot elected to go-around early for the King Air radar traffic. Initially he called 'going around circuit height' but quickly corrected this to 'glide height'. The controller issued radar clearance to the Talkdown controller when the King Air was at 3nm, iaw standard procedures; '[King Air C/S], cleared low approach, one going around circuit height' with a quick correction, relayed immediately, of 'going around glide height'. At this point the controller was not concerned that anything was untoward, with only one in the circuit and correct visual circuit Traffic Information being relayed to the Talkdown controller and thus to the King Air pilot. The controller did not witness the Airprox because the aircraft would have been overhead the Tower and thus not visible. She first became aware there had been an Airprox after she was told the King Air pilot had over-torqued the engines and the Supervisor later advised her that the King Air pilot had called an Airprox on the Departures frequency. The controller noted that the circuit information provided to radar was accurate and more than adequate, and that the Tutor pilot was aware of the King Air presence and intentions, so would have avoided the King Air if it had drifted on to the dead side or become a factor as the Tutor flew around the circuit. She also noted that, due to the weather and colour of the Tutor, it was more difficult than normal to see them

that day and recalled asking some of the Tower personnel to help her visually acquire a Tutor in the visual circuit earlier that day.

THE CRANWELL SUPERVISOR reports that he was in the Approach Control Room (ACR) at the time of the Airprox. The Unit's workload was 'gusting high' with the Departures controller working up to five aircraft and the Radar Approach controller working several aircraft and directing to both Barkston Heath and Cranwell simultaneously. The Supervisor had been required to pull a controller from a break as a second Talkdown to ease the burden on the Radar Controller. The Departures Controller notified the Supervisor of the Airprox at the same time as the warning light in front of the Supervisor indicated the visual circuit was now full. He had time to note the position of the King Air and a circuit squawk in his 1 o'clock but did not notice the height readouts of either. After letting the Radar Controller know he could keep both Talkdown controllers in position, he immediately proceeded to the Visual Control Room to assist the Tower Controller and manage the King Air recovery to ensure he was given priority to land. The Tower controller was not aware of the Airprox until he informed her, when traffic levels allowed (the visual circuit becoming full immediately after the incident). The Supervisor agreed that, with the exception of point e), she had made all the correct decisions and necessary broadcasts to inform both pilots of the other aircraft.

Factual Background

The weather at Cranwell was recorded as follows:

METAR EGYD 020950Z 35009KT 9999 BKN025 13/07 Q1021 BLU NOSIG=

An extract from the RAF Cranwell Flying Order Book¹ was provided, as follows:

'VFR/IFR Integration. The aerodrome controller is to make a broadcast to circuit traffic warning of IFR traffic at 7nm and 3nm. Each call will include the air system type and the intentions of traffic making an IFR approach. When the visual circuit is open, the IFR Missed Approach Procedure is not available; air system captains may fly the profile under VFR but remain responsible for safely executing their go around, integrating themselves with visual circuit traffic.'

Analysis and Investigation

Military ATM

An Airprox occurred on 2 May 17 at approximately 0940hrs UTC, in the vicinity of RAFC Cranwell, between a King Air and a Tutor. The King Air pilot was receiving a Traffic Service from Cranwell Departures and the Tutor pilot was receiving an Aerodrome Service from Cranwell Tower.

Portions of the tape transcripts between the Cranwell Tower controller, Talkdown controller and the Tutor are reproduced below:

From	To	Speech Transcription	Time	Remarks
Tower Broadcast	All	King Air, seven miles, low approach depart, simulated asymmetric	09:37:22	
Tutor	Tower	[Tutor C/S] downwind glide, touch and go	09:37:34	
Tower	Tutor	[Tutor C/S] roger wind three four zero, nine knots, King Air radar traffic is at six miles	09:37:41	
Other ac	Tower	[Other ac C/S] Stud 5	09:38:33	
Tower	Other ac	[Other ac C/S]	09:38:34	
Tower	Tutor	[Tutor C/S] just to advise you the priority radar traffic is at three and a half miles, will be number one to you	09:38:40	
Tutor	Tower	[Tutor C/S] going around at circuit height	09:38:43	

¹ Version 7.2, Order B207.

From	To	Speech Transcription	Time	Remarks
Tower	Tutor	[Tutor C/S]	09:38:44	
Tutor	Tower	At glide circuit height [Tutor C/S]	09:38:53	
Talkdown	Tower	Three miles [King Air C/S] low approach	09:38:53	Radar clearance
Tower	Talkdown	[King Air C/S] cleared low approach, one in going around circuit height	09:38:58	Radar clearance
Talkdown	Tower	[King Air C/S] cleared low approach, one in going around circuit height, acknowledge	09:38:59	Radar clearance
Tower	Talkdown	Apologies going around glide height	09:39:01	Radar clearance
Talkdown	Tower	Glide height, two and a half miles	09:39:03	Radar clearance
Tower Broadcast	All	King Air two and a half miles low approach	09:39:05	

Portions of the tape transcripts between the Cranwell Talkdown controller and the King Air are reproduced below:

From	To	Speech Transcription	Time	Remarks
Talkdown	King Air	[King Air C/S] cleared low approach, one in going around circuit height, acknowledge	09:39:01	
King Air	Talkdown	Cleared low approach go around [King Air C/S]	09:39:01	
Talkdown	King Air	Glide height two and a half miles	09:39:03	

Portions of the tape transcripts between the Cranwell Departures controller and the King Air are reproduced below:

From	To	Speech Transcription	Time	Remarks
King Air	Deps	Cranwell Departures [King Air C/S] SID 2 passing 1200ft	09:40:14	
Deps	King Air	Cranwell [King Air C/S] Cranwell Departures identified depart SID 2 Traffic Service, traffic twelve o'clock one mile similar heading, believed to be in the circuit at the same height	09:40:26	
King Air	Deps	Yeh, [King Air C/S], er just had a TCAS R A in the climb, visual with the traffic at this time	09:40:32	
Deps	King Air	[King Air C/S] roger	09:40:39	
King Air	Deps	Yeh, [King Air C/S] that's going to be an Airprox	09:40:42	

Figures 1 - 6 show the positions of the King Air and Tutor at relevant times in the lead up to and during the Airprox. The screen shots are taken from a replay using the Claxby radar, which is not used by Cranwell ATC, therefore are not necessarily representative of the picture available to either controller.

At 09:37:22 (Figure 1), the Cranwell Tower controller broadcast to all aircraft on frequency that the King Air was at 7nm, to low approach and depart, simulated asymmetric.

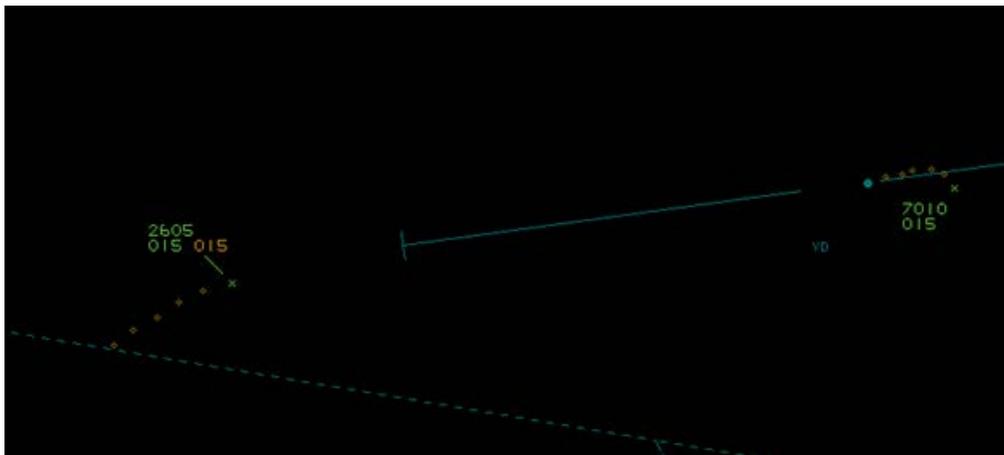


Figure 1: Geometry at 09:37:22 (King Air 2605; Tutor 7010)

At 09:37:41 (Figure 2), the Cranwell Tower controller informed the Tutor pilot, who had reported downwind for glide circuit touch and go, that there was King Air radar traffic at 6nm.

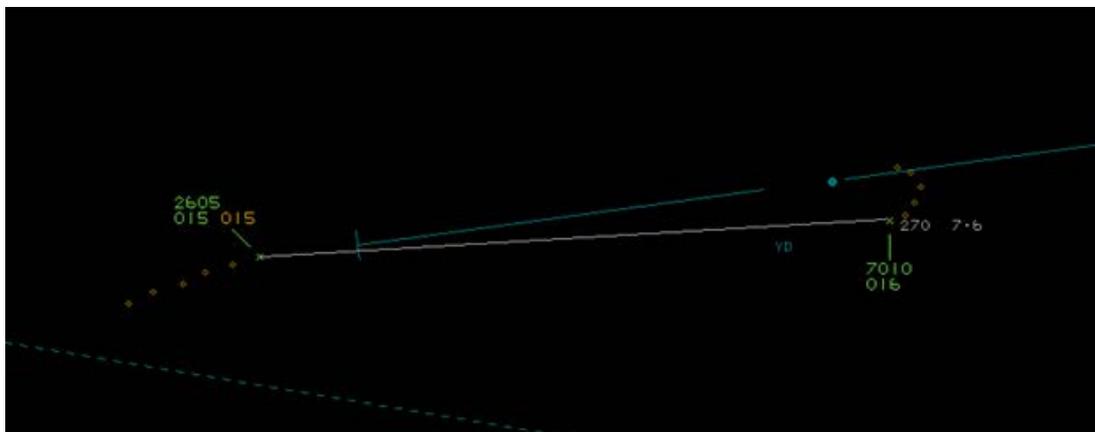


Figure 2: Geometry at 09:37:41 (King Air 2605; Tutor 7010)

At 09:38:40 (Figure 3), the Cranwell Tower controller advised the Tutor that the priority radar traffic was at 3nm and would be number one. The Talkdown controller then came through on the radar clearance line to seek a clearance for the King Air to low approach. The Cranwell Tower controller gave clearance for the King Air to low approach, with information that there was one going around circuit height, quickly corrected to glide height. The clearance was being relayed to the King Air by the Talkdown controller.

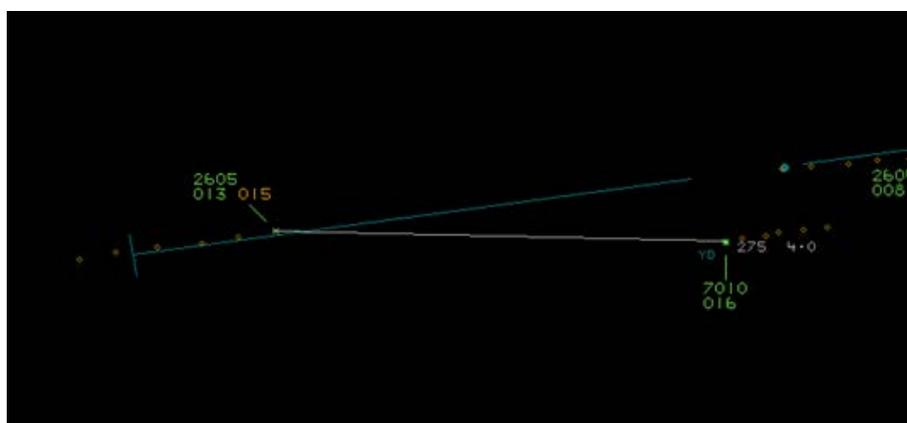


Figure 3: Geometry at 09:38:40 (King Air 2605; Tutor 7010)

At 09:39:05 (Figure 4), the Cranwell Tower controller broadcast to all aircraft on frequency that the King Air was at a range of 2.5nm to low approach.

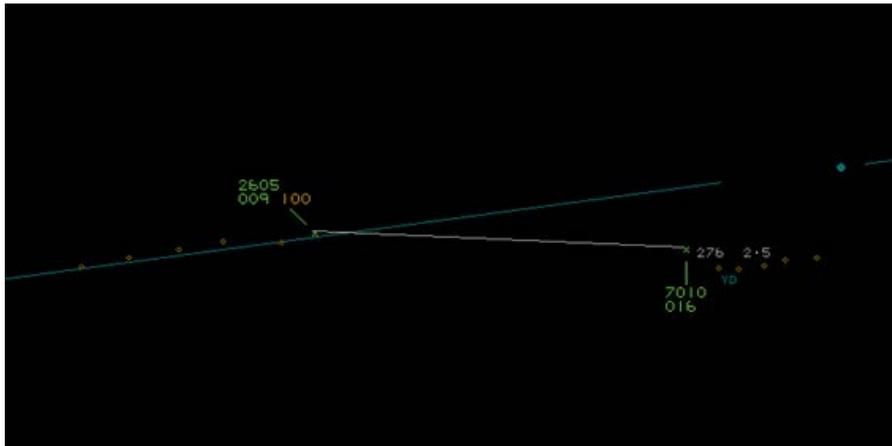


Figure 4: Geometry at 09:39:05 (King Air 2605; Tutor 7010)

At 09:39:32, the King Air pilot informed the Talkdown controller that he was going around, and then changed to Cranwell Departures. At 09:40:26 (Figure 5), the Cranwell Departures controller identified the departing King Air, agreed a Traffic Service and passed Traffic Information on traffic 12 o'clock, 1nm, similar heading, believed to be in the circuit at the same height. The King Air pilot responded that he was visual with the traffic and had just had a TCAS RA.



Figure 5: Geometry at 09:40:26 (King Air 2605; Tutor 7010)

At 09:40:33 (Figure 6), the King Air and Tutor passed at a CPA of 0.4nm and similar height.



Figure 6: Geometry at 09:40:33 (King Air 2605; Tutor 7010)

The Cranwell Tower elected to prioritise the King Air radar traffic based on the priorities in the Flying Order Book, the fact that the aircraft was conducting only one approach and that the single approach was simulated asymmetric. Therefore the pilot had to receive a clearance at 3nm or be broken off (they can be given a continue approach in other non-asymmetric circumstances). The

Tower controller carried out the required broadcasts in order to inform all visual circuit traffic of the presence and progress of the radar traffic and gave the Tutor pilot specific information that the King Air was being given priority.

The Tutor pilot initially stated that he was going around at circuit height (800ft QFE), then updated to state that he was going around at glide height (1500ft QFE). The updated information coincided with the Talkdown controller coming through on the radar clearance line to request the King Air's clearance, which may be why the Tower controller initially passed the circuit state as 'one going around circuit height' before correcting it. There was no expectation nor requirement for the Tutor pilot to report visual with the King Air when going around.

The Cranwell Talkdown controller relayed the circuit state, as passed by the Tower controller, to the King Air in the same transmission as the clearance to low approach. The initial information was that the Tutor was going around circuit height, which was incorrect. When this was subsequently corrected by the Tower Controller to state that the Tutor was going around at glide height (1500ft QFE), the information passed by Talkdown to the King Air did not explicitly say that the aircraft going around was at glide height. The King Air pilot did not read back the clearances correctly, however the Talkdown controller did not challenge the ambiguous read backs. Both of these examples may have contributed to the King Air pilot's lack of Situational Awareness concerning the height of the Tutor.

The Cranwell Departures controller identified the King Air climbing out on a SID and correctly passed Traffic Information at the earliest opportunity, although after the Airprox had occurred.

UKAB Secretariat

The King Air and Tutor pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard². 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 operation³.

TCAS system functionality is subject to a number of alert inhibits when in proximity to the ground⁴. These include the following when the aircraft is climbing: TA voice messages inhibited below 600ft agl; all RAs inhibited below 1100ft agl (TCAS switches to TA only mode); 'DESCEND' RA inhibited below 1200ft agl; 'INCREASE DESCENT' RA inhibited below 1650ft agl.

Comments

HQ Air Command

This Airprox led to a thorough safety investigation by the unit concerned, which identified 18 causal factors and made 9 recommendations. It is noteworthy that the pilots and controllers involved all acted in accordance with their rules and procedures, yet the Airprox still occurred. Consequently, further procedures to ensure separation of mixed IFR/VFR traffic are being considered, including the use of time slot allocations and/or increased use of satellite airfields for circuit work.

What is particularly striking in this incident is the fact that the Tutor crew had no recollection of there being a potential confliction and, when they turned across the path of the King Air, they did so with the SA that their flight path was clear. Additionally, the King Air crew's mental picture of the position (height) of the Tutor was potentially incorrect as the corrected information from ATC ('glide height') was passed at a moment when the crew would not have been listening for it and were also extremely busy as they approached their go-around.

² SERA.3205 Proximity.

³ SERA.3225 Operation on and in the Vicinity of an Aerodrome.

⁴ Eurocontrol ACAS Guide dated 26 May 2016, RA Inhibition page 57.

The King Air crew clearly had the higher SA regarding the traffic confliction; there is no mention as to whether or not the TAS on the Tutor indicated the presence of the King Air but the TCAS on the King Air indicated the proximity of the Tutor. However, there is a potential to become over-reliant on technology and, by their own admission, the crew of the King Air perhaps felt that had there been a pressing need to take avoiding action then the TCAS would issue an RA (which it ultimately did).

This incident is another example of the complicated nature of mixing visual circuit traffic and simulated instrument traffic in the same environment. The controllers did their best to pass appropriate information at appropriate times to the crews of the two aircraft, but it was ultimately the pilots' responsibility to avoid each other. The reasons that the two aircraft came into proximity are many, but the biggest lesson to take away from this incident is one of constant vigilance. If any one of the available barriers to MAC in the visual environment (lookout, electronic conspicuity, Traffic Information from ATC) fails – such as being unable to see what you know to be there – then the safest course of action is to fly the aircraft away from the last known position of the potential conflict.

Summary

An Airprox was reported when a King Air and a Tutor flew into proximity at 0941 on Tuesday 2nd May 2017. Both pilots were operating under VFR in VMC, the King Air pilot in receipt of a Traffic Service from Cranwell Departures and the Tutor pilot in receipt of an Aerodrome Service from Cranwell 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 King Air Instructor's actions. He had been faced with a highly dynamic situation in which he perceived there was a risk of collision with the traffic indicated on TCAS. His workload during the overshoot was undoubtedly high as he monitored the student after instructing him to regain symmetric flight and reduce the rate of climb (in order to generate vertical separation); attempted to manipulate and interpret the TCAS display (to provide much needed SA); and tried to gain visual contact with the conflicting traffic. In the event, his late sighting of the conflicting Tutor resulted in avoiding action of sufficient severity that both engines suffered an over-torque. Some members wondered whether the King Air instructor could have switched to the Tower frequency autonomously once he had assimilated there was conflicting traffic in the visual circuit, thereby affording a direct line of communication to improve SA; however, it was recognised that this action lay outside trained behaviour and that the King Air instructor was operating under a high workload. Other members thought that, knowing there was an aircraft ahead, the instructor might have been better placed by taking control himself at the go-around point, thereby simply flying the aircraft without the need to monitor and pass instructions to the student.

A military aircrew member emphasised that both pilots were clear as to the relative priorities of the 2 aircraft, and members agreed that it was self-evident that the Tutor pilot had not intended to turn towards the overshooting King Air and create a potentially unsafe situation. However, they noted that the Tutor pilot was aware that the King Air was conducting a missed approach procedure, and would therefore be climbing and accelerating on a track following the runway centreline. Although the Cranwell Flying Order Book (FOB) specified that the King Air pilot was 'responsible for safely executing their go around, integrating themselves with visual circuit traffic', members questioned how IFR traffic conducting a missed approach, even if reverting to VFR, would be expected to effectively integrate with circuit traffic given the nature of the missed approach. On executing the missed approach there was no opportunity to sequence with visual circuit traffic other than to turn away from the visual circuit or deconflict in the vertical, both of which meant abandoning the missed approach

profile. Moreover, to expect pilots to assimilate, at the point of commencing the missed approach, the intentions and positions of all the visual circuit traffic seemed ill-advised to the Board. For example, in this case the FOB entry seemed to require the King Air captain to understand what was happening in the visual circuit, assess his options for integrating whilst attempting to obtain visual contact with the Tutor indicating on his TCAS display, and simultaneously monitor the student pilot who was conducting a safety critical go-around and reversion from asymmetric to symmetric flight (whilst also following the captain's instruction to reduce the rate of climb). Although the FOB stated that it was for the King Air pilot to integrate, members felt that the overriding requirement to avoid collision dictated that it was for the Tutor pilot, with his understanding of the King Air's flight path, to establish positively the position of the King Air before turning from the deadside to downwind. The Board considered that although the Tutor pilot had some information regarding the King Air's position, and had turned with the intention of remaining predictable in order to assist the King Air pilot, he did not positively establish the location of the King Air before turning, and that this was contributory to the Airprox.

The Board then discussed overall events concerning this Airprox and noted that there had been a number of previous military Airprox involving VFR traffic in the visual circuit coming into conflict with 'instrument traffic' conducting missed approaches. A previous UKAB recommendation⁵ had resulted in a detailed review of airfield ATC provision at military airfields with the result that the current arrangement was deemed appropriate given operational needs. Notwithstanding, civilian ATC members again noted that such a conflict would probably not have occurred under a civilian Aerodrome Control Service because the Tutor pilot would have been instructed to remain clear of the overshooting King Air, and would certainly not have been permitted to cross the approach/departure lane until the King Air was clear. If military ATC provision was to remain as is, some members wondered whether more robust procedures were required when mixed VFR and IFR traffic was present. In this respect, it was noted that the go-around from the visual circuit required the Tutor to cross the centre-line twice, once at the point of go-around to position on the deadside, and once to return to the visual circuit from the deadside. This introduced 2 potential conflict points with radar traffic on the centre-line, and one member wondered whether, given the lack of positive control in the military visual circuit, it might be better to stay marginally on the live side when going around in the circuit rather than crossing to the deadside and back.

The Board then considered ATC's actions and agreed that events had been routine until the Tutor pilot declared he would be at glide circuit height (1500ft) at almost the same time that the King Air had reached the missed approach point. In the subsequent near simultaneous radio calls on their respective frequencies, the information on the Tutor's height reached the King Air pilot in a non-standard format and was not assimilated, which members agreed had not helped the King Air pilot's SA. Although the King Air pilot was required to integrate with the visual circuit, both pilots shared an equal responsibility to avoid collision and the Board agreed that this could most effectively be accomplished by the traffic in the visual circuit. To this end, members agreed that the Airprox had been caused because the Tutor pilot had turned from the deadside towards downwind without sufficient SA on the King Air's position, and into conflict with it. Members noted that the King Air pilot's assessment of separation at CPA had been substantially less than derived from the radar picture, but they noted also that at low altitudes there is an associated large degree of radar jitter. Some members felt that the recorded separation was such that it could be considered that effective and timely avoiding action had been taken, especially since there was a recorded separation of 0.6nm between the 2 aircraft as the Tutor crossed the King Air's track (see Figure 5) with a subsequent CPA of 0.4nm. However, after considerable debate, the Board agreed that the combined circumstances of the reported separation distance, the King Air pilot's late sighting and the Tutor pilot's non-sighting amounted to a situation where safety had been much reduced below the norm.

Finally, members were heartened to note that the RAF Cranwell Flying Order Book VFR/IFR Integration requirements had subsequently been amended to remove the requirement for the 'instrument traffic' to integrate and for prime responsibility for collision avoidance to be vested on the circuit traffic when instrument traffic was within 3nm:

⁵ Airprox 2014121 – 'The MAA review the provision of Aerodrome Control Service at military airfields'.

‘VFR/IFR Integration. The aerodrome controller is to make a broadcast to circuit traffic warning of IFR traffic at 7nm and 3nm. Each call will include the air system type and the intentions of traffic making an IFR approach. When the visual circuit is open, the IFR Missed Approach Procedure is not available; air system captains may fly the profile visually. Circuit traffic has prime responsibility for collision avoidance once instrument traffic is within 3nm. When the visual circuit is declared closed on ATIS, then the Missed Approach Procedure may be executed under IFR.’

PART C: ASSESSMENT OF CAUSE, RISK AND SAFETY BARRIERS

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

Contributory Factor: The Tutor pilot did not positively establish the location of the King Air before turning.

Degree of Risk: B.

Safety Barrier Assessment⁶

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

ANSP:

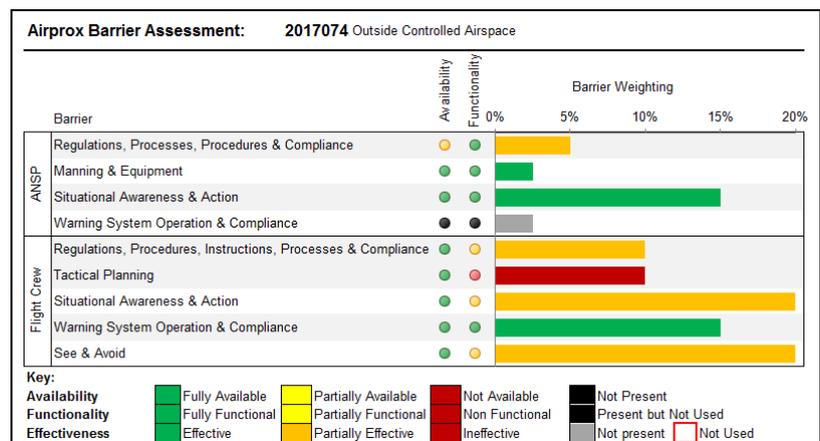
Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because under military regulations, ATC do not pass directive instructions to pilots in the visual circuit. Also, the Cranwell FOB placed the onus on the pilot of the aircraft conducting the missed approach to integrate with the visual circuit traffic, which was considered counter-intuitive.

Flight Crew:

Regulations, Processes, Procedures, Compliance and Instructions were assessed as **partially effective** because the Tutor pilot turned from the deadside to downwind without positively determining the position of the King Air.

Tactical Planning was assessed as **ineffective** because the King Air instructor’s plan to avoid the traffic displayed on TCAS did not prevent the conflict, and the Tutor pilot did not formulate an effective plan to avoid the King Air that was going around from the radar approach behind him.

Situational Awareness and Action were assessed as **partially effective** because although the King Air instructor was aware of the traffic ahead and told the PF to reduce the rate of climb, this did not prevent the aircraft flying into conflict. For his part, the Tutor pilot had awareness that the King Air was going around from the radar pattern, but he did not assimilate that this meant that there was a likely confliction as he crossed to the live side.



See and Avoid were assessed as **partially effective** because the King Air instructor did not see the Tutor until at a late stage, and the Tutor pilot did not recall seeing the King Air in proximity.

⁶ The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).