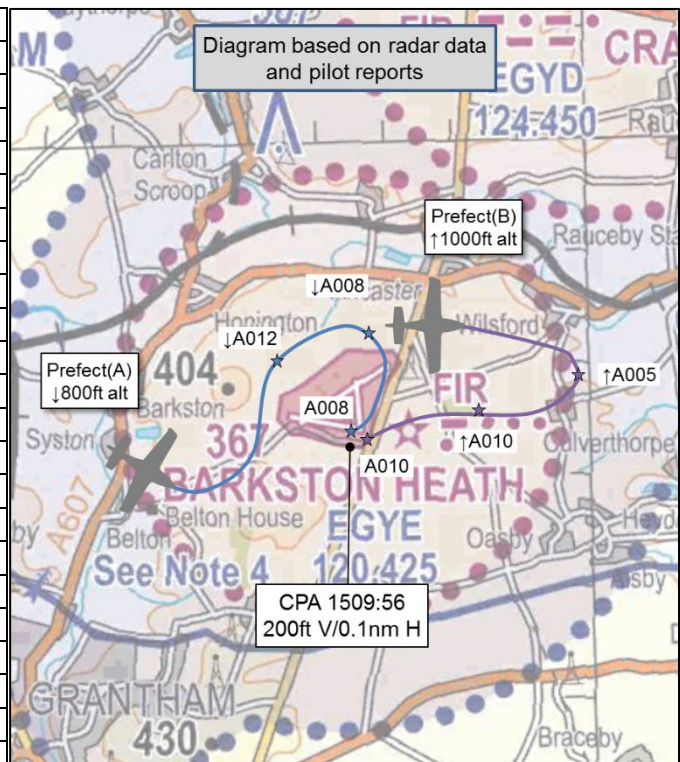


AIRPROX REPORT No 2018186

Date: 27 Jun 2018 Time: 1510Z Position: 5257N 00033W Location: Barkston Heath

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Prefect(A)	Prefect(B)
Operator	HQ Air (Trg)	HQ Air (Trg)
Airspace	Barkston ATZ	Barkston ATZ
Class	G	G
Rules	VFR	VFR
Service	ACS	ACS
Provider	Barkston	Barkston
Altitude/FL		
Transponder	A, C, S	A, C, S
Reported		
Colours	White, Blue	White
Lighting	NK	NK
Conditions	VMC	VMC
Visibility	10km	NK
Altitude/FL	800ft	1000ft
Altimeter	QFE	QFE
Heading	240°	240°
Speed	110kt	120kt
ACAS/TAS	TAS	TAS
Alert	TA	TA
Separation		
Reported	200ft V/200m H	200ft V/200ft H
Recorded	200ft V/0.1nm H	



THE PREFECT(A) PILOT reports that having completed a solo-student general handling sortie, he set up for an overhead join to Barkston Heath, RW06RH at 2000ft. Another solo student was in the circuit conducting a PFL, and another aircraft (with an instructor and student) was also conducting circuits. He called ‘High Key, touch and go’ and was visual with both aircraft in the circuit. Immediately afterwards he heard the instructor call ‘extending upwind’, shortly followed by what he believed was ‘climbing for a PFL’. In fact, a playback of the cockpit voice recorder shows that the instructor called ‘extending upwind for PFL traffic’, which ATC asked him to say again and he repeated the message. However, at the time he assessed that this aircraft was no longer a conflict to joining the circuit because it would remain well clear if climbing for a PFL. He then heard the instructor call ‘Fan stop, extending upwind’. At the same time, the PFL-aircraft called ‘low key’ and, as his aircraft crossed the RW06 threshold onto the deadside, he called ‘deadside descending’ and began a descending turn to the right in order to cross the 24 threshold at 1000ft and rejoin the live side. He had now lost visual contact with the instructor aircraft, but had contact with the PFL aircraft. At this point his focus was on the PFL aircraft and ensuring that he didn’t foul its flight path upon climbing away from his touch and go. As he was approaching the RW24 threshold he was banked over to the right and heard an aircraft call joining downwind. He assumed this must be a separate aircraft joining from outside the circuit and hence joining in an extended downwind position, i.e. 2-3nm. Again, having now heard the cockpit voice recorder, this was the instructor aircraft, but the student was now conducting the RT. Until this point he had not been listening to the callsigns, but hearing and recognising the voices of the three pilots, all of whom he knew and recognised, this led him to believe that the joining downwind aircraft was a third aircraft because he was expecting to hear the instructor’s voice for that aircraft rather than the student. As he was crossing the RW24 threshold, still in the turn, he received a TAS traffic alert, which he acknowledged. He thought this was for the PFL aircraft, however on re-checking TAS it showed an aircraft at the same height approaching from the 10 o’clock. He was not visual with this aircraft (it would have been below the engine cowling) and so he tightened his turn, inadvertently descending 200ft as he did so. He rolled out onto the downwind leg, checked over the wing and saw the other aircraft in his

8 o'clock high, approximately 200ft above and separated by 200m. He was not sure whether they were visual with him, so he called 'Downwind to land' to alert them of his presence.

He assessed the risk of collision as 'Medium'.

THE PREFECT(B) PILOT reports that he was undertaking a final circuit consolidation sortie with a student, which was due to lead into a 30min solo circuit consolidation sortie. During the sortie, various circuit types were flown because he had not flown with this student before and he needed to be satisfied that the student was fit to fly solo. Towards the end of 30min airborne, a solo student declared High Key to land. To facilitate this approach he elected to extend upwind for an EFATO practise, called 'extending upwind for the PFL aircraft', instructed the student to climb ahead, and then instigated an EFATO calling 'C/S Fanstop, extending upwind'. The student then made a correct approach to a survivable field and, on instructing him to go around, the instructor called 'C/S climbing away, re-joining downwind'. This was acknowledged by ATC and he scanned for the PFL solo-student that he had heard going around while conducting the EFATO. He noticed there was TAS contact above his height and apparently deadside, but at that moment there was a distraction in the cockpit because, despite applying full power and selecting flap to take-off, the warning 'check gear, check gear' continued to sound thus using up any spare capacity as he diagnosed whether there was a problem. He heard the former PFL student call 'climbing for glide' and attributed that to the TAS contact. Throughout he was aware that there was a further solo student calling 'deadside descending' coincident with their EFATO, so by now his mental model was that as he was approaching the downwind position the solo student who had been deadside would now be late downwind and possibly approaching final. He requested that his student fly a flapless approach and instructed him to call 'downwind, flapless touch and go'. At that point he received a TAS alert '0 -2 and solid yellow circle'. The TAS was set to expanded-3nm and so he was able to assert with some measure of confidence that this alert referred to an aircraft off to the right and slightly behind. He eased the control column slightly left before fully taking control and diverging positively from a Prefect that he was now visual with in what would normally be recognised as an echelon-right formation waiting position. He then told ATC that he was going wide downwind to initial to re-join the circuit due to adjacent circuit traffic. The rest of the sortie was uneventful. On reflection he saw that it was his responsibility as an instructor to ensure that he had acquired all of the circuit traffic whether joining or already in the circuit, and he thought that reporting the event would allow lessons to be widely disseminated.

He assessed the risk of collision as 'High'.

THE BARKSTON ADC reports that at the time of the incident there were 3 aircraft in the circuit and one on the runway for departure. The solo student that had joined through the overhead called deadside descending and was given Traffic Information on circuit traffic. A second Prefect on an instructional sortie had just completed a fanstop and called rejoining downwind for a flapless circuit. He was also given Traffic Information, including the one deadside descending. His next call was wide-downwind, flapless, with another aircraft in close proximity; he was told it was a solo student and he elected to go to initials for a re-join. On listening back to the RT recordings, there had been a number of dual transmissions which may have contributed to a loss of situational awareness for all involved.

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

THE BARKSTON SUPERVISOR reports that it appeared that despite being given Traffic Information on each other, the pilots contrived to be very close to each other in the visual circuit. Dual transmissions are a known problem, particularly in the training environment where, he opined, student pilots can occasionally be so concerned with their own flight that they operate without regard to others in the circuit. These overlapping transmissions can, and do, cause both pilots and controllers to miss pertinent position calls and Traffic Information, but they shouldn't detract from good look-out. It seems that in this case good look-out by the instructor avoided some unpleasant consequences.

Factual Background

The weather at Cranwell was recorded as follows:

METAR EGYD 271450Z 08010KT CAVOK 22/09 Q1027 BLU=

Analysis and Investigation

CAA ATSI

ATSI had access to reports from the pilots of both Prefects and the Barkston Heath Aerodrome Controller. The area radar and Barkston Heath R/T recordings for the period were also reviewed. There was a timing difference of approximately 2 mins between the area radar timing source and the Barkston Heath timing source. The Screenshots and timings in the report have been taken from the area radar replay.

At 1506:40 (Figure 1), Prefect(A) pilot requested an overhead join for RW06RH and was cleared to join overhead. The controller advised that there was one aircraft joining for a PFL and one aircraft in the visual circuit. The pilot acknowledged the joining instructions and said that they were aware of the traffic.

At 1507:50 (Figure 2), Prefect(B) pilot called extending upwind for PFL traffic and then 'fanstop extending upwind', this was acknowledged by the controller.

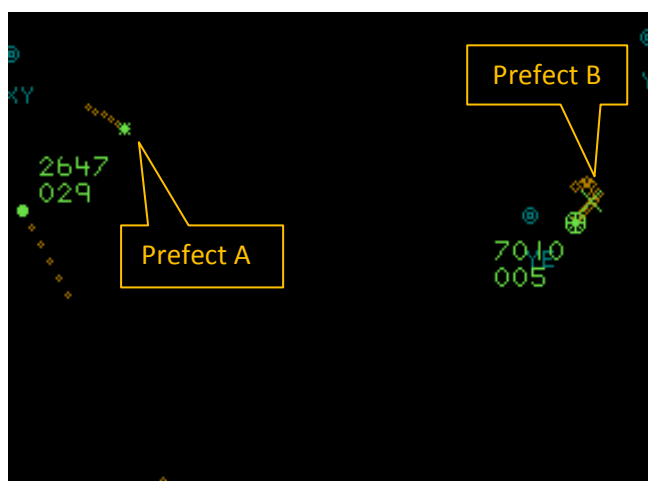


Figure 1 - 1506:40

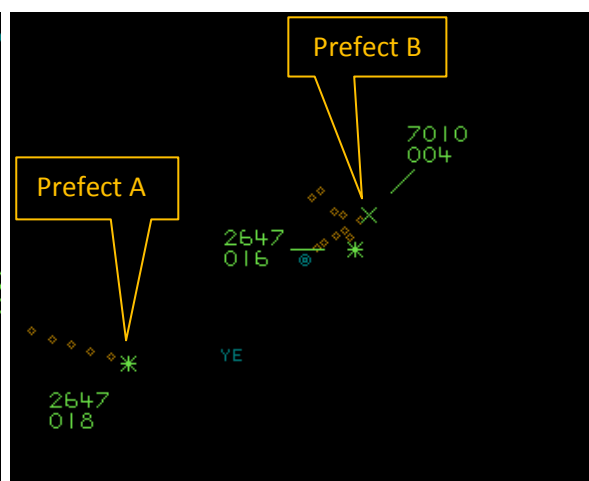


Figure 2 - 1507:50

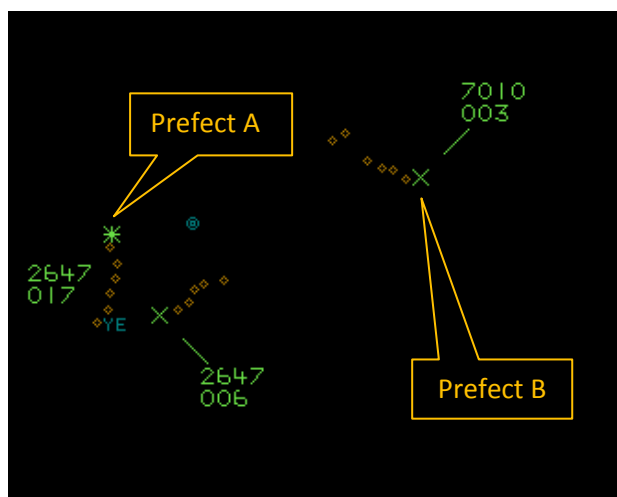


Figure 3 - 1508:34

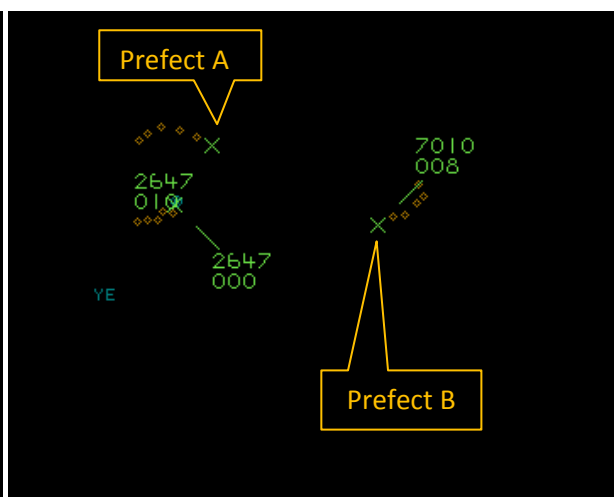


Figure 4 - 1509:19

At 1508:12, the pilot of the PFL aircraft called low key for a touch and go. This was not acknowledged by the controller.

At 1508:34 (Figure 3), Prefect(A) pilot called deadside descending and was advised by the controller that there was one aircraft on final and one crosswind. There was then an unreadable dual-aircraft transmission and the controller advised “two at once” and instructed the PFL aircraft to check gear, followed by clearing them for a touch-and-go. The controller then issued a line-up (and wait) clearance to a departing aircraft.

Prefect(B) pilot called joining downwind flapless at 1509:19 (Figure 4), and was advised by the controller that there was one on a touch and go, one on departure and one deadside. The pilot acknowledged this.

At 1509:30, the departure aircraft was cleared for take-off. A further dual-transmission was received but was unreadable.

At 1509:45 (Figure 5), Prefect(A) pilot called downwind to land and the PFL-aircraft called flapless low-level. Both transmissions were acknowledged by the controller.

At 1510:00 (Figure 6), Prefect(B) pilot called downwind flapless for a touch-and-go and advised the controller that they were extending for the traffic ahead of them. The controller replied, “copied, the other one is a solo” and the pilot responded roger “we will go out to initials and re-join”. The controller acknowledged this and said thank you.

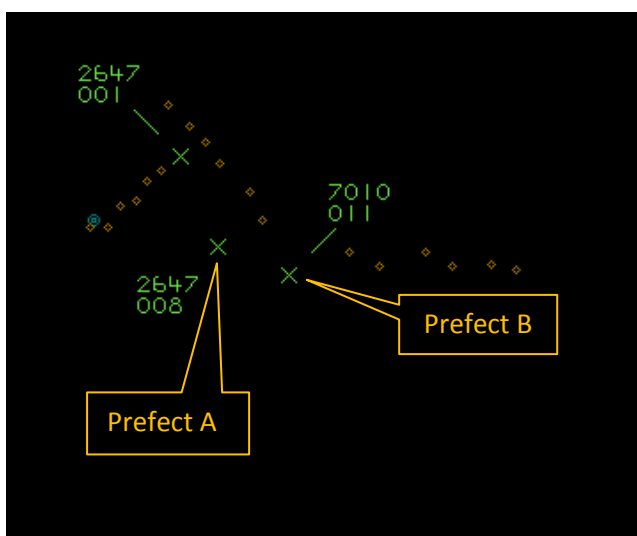


Figure 5 – 1509:45

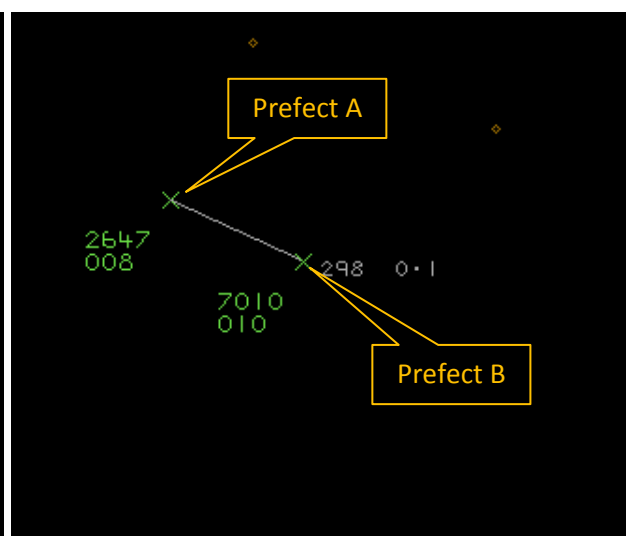


Figure 6 – 1510:00

The controller passed timely, accurate and relevant Traffic Information to all aircraft in the circuit and made every attempt to establish the source of any unreadable transmissions. When Prefect(B) advised the controller that they were extending for the aircraft ahead of them (Prefect(A)) the controller could have reasonably expected that the pilot had the aircraft in sight and would take action to ensure that they did not come into proximity with it. Therefore, the controller effectively discharged their responsibilities as the Aerodrome Controller.

UKAB Secretariat

The Prefect(A) and Prefect(B) pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a danger of collision¹. An aircraft operated

¹ MAA RA 2307 – Rules of the Air, paragraphs 1 and 2, Avoidance of Collisions.

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

An OSI was carried out by 3FTS and made 5 recommendations (Figure 7), all of which have been adopted.

No.	Summary	Status
2018/6669/R1	Safe Circuits Publicity Campaign	adopted
2018/6669/R2	SEFATO and Re-Join Procedures	adopted
2018/6669/R3	Alignment of Cranwell and Barkston FOBs	adopted
2018/6669/R4	Provision of ATM monitor in Barkston Tower	adopted
2018/6669/R5	TAS Procedures	adopted

Figure 7 OSI recommendations.

Comments

HQ Air Command

This incident led to an in-depth local investigation and a number of recommendations have been made to minimise the likelihood of recurrence.

The barriers to MAC that were available in this encounter were an Air Traffic Service, electronic conspicuity and lookout. In the circumstances where this incident took place – the visual circuit – the controller provides Traffic Information which is largely based on SA developed through what the controller can see out of the window and what the controller is being told by the pilots. This SA therefore relies on accurate information being passed to the controller from the pilots with respect to positioning. Although the controller passed timely and relevant information to the traffic in the circuit, this was not fully assimilated by all the pilots. Furthermore, TAS settings for Prefect operations are not standard, so interpretation of TAS information may be hindered by the pilot's selection – this is being addressed by a recommendation from the investigation.

In the visual circuit, lookout is usually influenced by a pilot's SA and he/she will look for traffic in the areas he/she believes it to be. A combination of assumption, double-transmission and misinterpretation led to the development of a flawed mental model on the part of both the pilots so neither was expecting to see another aircraft on the downwind leg. Additionally, there was no standard procedure for re-joining the circuit at this airfield after a simulated EFATO so when the pilot of Prefect (B) re-joined on the downwind leg it came into proximity with an aircraft that was in the 'conventional' circuit pattern.

² MAA RA 2307 – Rules of the Air, paragraph 15, Flight in the Vicinity of an Aerodrome.

Many lessons have been identified through the investigation of this Airprox and there will be changes to procedures and alignment of orders that should help to reduce the likelihood of another incident of this nature. However, it should be noted that the visual circuit is a visual environment and that an assumption that another aircraft is 'no factor' is wholly reliant on accurate SA unless it can be seen; if the SA is inaccurate then there is always the chance that you may be closer than anticipated to another aircraft. With a busy circuit, it may be more prudent to exit to a known reporting point (such as initials) and build accurate SA before re-joining – after the Airprox had occurred this is exactly what the pilot of Prefect(B) did.

Summary

An Airprox was reported when two Prefects flew into proximity in the Barkston Heath visual circuit at 1510hrs on Wednesday 27th June 2018. Both pilots were operating under VFR in VMC and receiving an ACS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board first looked at the actions of Prefect(A) pilot. As a presumably low-hours solo-student, they could understand how he might have become confused about the positioning of other aircraft in the busy circuit. Noting that he had sensibly joined via the overhead, members commented that the opportunity had existed to remain in the overhead in order to assimilate the position of all of the traffic in the circuit; pilots should not be afraid to ask ATC for position reports if they are at all uncertain. That being said, his report indicated that he had thought that he knew what each aircraft was doing, and that this incident highlighted how seeming trivial misinterpretations of radio calls could lead to flawed situational awareness with serious consequences. In this respect, the incident was a lesson in listening out for callsigns rather than voices, an easy mistake to make in a training environment where the voices were all colleagues. Notwithstanding, members agreed that he had positioned appropriately for his overhead join and, having no way of knowing where the EFATO-aircraft (Prefect(B)) was rejoining from, could plausibly assume that it would join at the start of the downwind leg rather than mid-way from beyond the ATZ boundary. As such, being already established downwind, he could reasonably expect the Prefect(B) pilot to integrate with him as he rejoined. Fortunately, Prefect(A) pilot's TAS alerted him to the presence of the other aircraft, and, although he initially thought this was for a different aircraft joining the circuit, his subsequent unintended descent as he looked for the other aircraft had likely done much to improve the separation between the 2 aircraft.

Turning to Prefect(B) pilot, the Board recognised that he was trying to help ease the congestion in the circuit by carrying an EFATO and thus allowing the PFL aircraft to get his approach in. Noting the HQ Air comments about re-joining the circuit after an EFATO, military members agreed that he may have been better placed by going out to initials to re-join. However, GA members countered that, in civil circuits, it was quite normal for aircraft to rejoin downwind after an EFATO practise. That being said, in mitigation they noted that controllers in civil circuits provided a far more active control service than do military controllers, and a civil controller would have allocated a specific No1 and No2 priority which the two pilots would have been expected to comply with. The Board often saw differences between the ATC visual circuit procedures for military and civil airfields, and were heartened to hear that a new procedure detailing how to rejoin after an EFATO had been put in place at Barkston, in line with those at Cranwell, which they hoped would prevent a reoccurrence.

Ultimately, although he thought he had full situational awareness regarding the circuit traffic, Prefect(B) pilot's mental model was incorrect in that he had thought that the overhead join was further downwind than it was in reality. Furthermore, having made a decision to rejoin downwind, he was then distracted by an in-cockpit alarm which, by his own admission, caused him to focus within the cockpit rather than look out. In the end, it was his TAS that had alerted him to the presence of the other aircraft. In this

respect, the Board noted that there seemed to be no standard procedures for operating the TAS in the Prefect, both pilots had them on different settings, and the Board was informed by a military member that this issue was being addressed through new procedures being written.

Finally, the Board looked at the actions of the controller. The frequency was extremely busy and there had been a number of dual transmissions which made matters worse. Some members wondered whether the controller should have provided more accurate information on the overhead join to Prefect(B) pilot. However, controlling members noted that it was virtually impossible to see an overhead joiner from the tower because they are generally obscured by the roof and, in this case, there was no ATM and so the controller would be relying upon RT calls for situational awareness.

In determining the cause of the Airprox, the Board noted that this incident represented one where all the parties involved thought that they had full situational awareness, when in fact none of them did due to dual-transmissions or misinterpreted calls. Ultimately, the Board agreed that it was for Prefect(B) pilot to integrate with Prefect(A) as he rejoined the visual circuit from his EFATO; he had not done so due to flawed situational awareness and sub-optimal lookout caused by distractions in the cockpit. Contributory to this was that neither pilot had assimilated the radio calls of the other. The Board then debated the risk. Some members argued that providence had played a major part in the Airprox given that neither pilot saw the other until CPA; risk Category A. Whilst others agreed that there had been a degree of serendipity in their separation (and in particular the fortunate inadvertent descent by Prefect(A) pilot), the actual achieved separation of 200ft vertical and 0.1nm horizontal meant that separation had not been reduced to the bare minimum. After further debate and a vote, the latter view prevailed and the risk was categorised as Category B; safety had been much reduced below the norm.

The Board commented that the OSI had been thorough and had made a number of recommendations. Accordingly, although ordinarily they would have made recommendations with regard to the discrepancies in circuit procedures at Cranwell and Barkston Heath and TAS procedures for the Prefect, because this had already been covered by OSI recommendations there was little point in repeating them.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Prefect(B) pilot did not integrate with Prefect(A).

Contributory Factors: Neither pilot assimilated the radio calls of the other.

Degree of Risk: B.

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 and Action were assessed as **partially effective** because although the controller was aware of the Prefects in the circuit, they didn't detect the unfolding confliction.

Flight Crew:

Regulations, Processes, Procedures, Instructions and Compliance were assessed as **partially effective** because there was no formal post-EFATO procedure for re-joining the Barkston circuit.

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

Situational Awareness and Action were assessed as **partially effective** because dual and misinterpreted transmissions meant that both pilots had only a generic mental model about the position of the other.

Warning System Operation and Compliance were assessed as **partially effective** because although both TAS gave alerts, the Prefect(B) pilot was distracted by the ‘check gear’ warning and attributed the warning to a different aircraft.

See and Avoid were assessed as **partially effective** because neither pilot saw the other aircraft until in close proximity, although once seen the Prefect(B) pilot was able to take some avoiding action.

